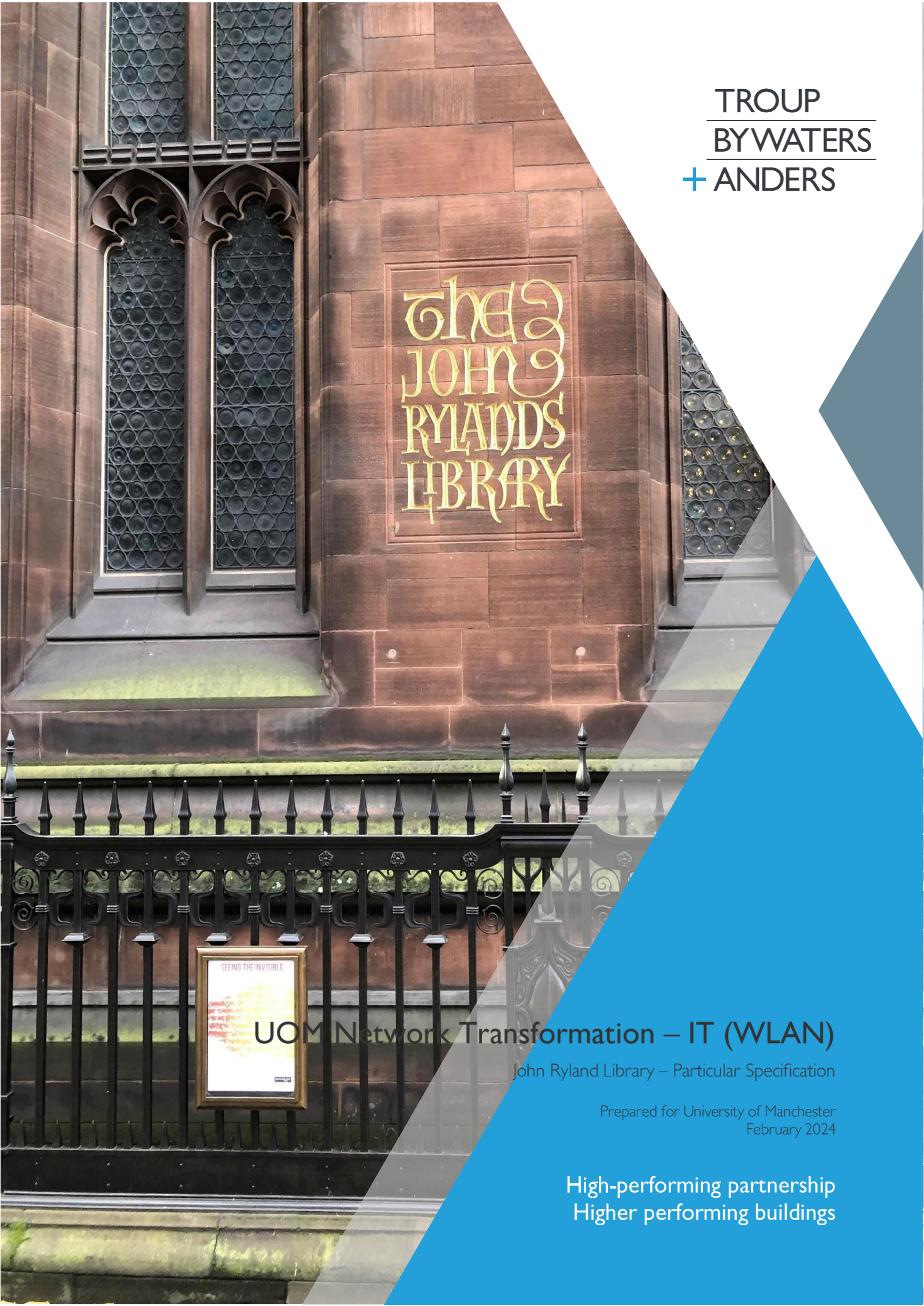




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UOM Network Transformation – IT (WLAN)

John Ryland Library – Particular Specification

Prepared for University of Manchester
February 2024

High-performing partnership
Higher performing buildings

PROJECT

UoM Network Transformation

PROJECT NO

EA0029

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John Rylands Library Particular Specification

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I.0 Project Overview

I.1 Project description

The aim of the project is to upgrade the existing Wireless Access Points within the John Rylands Library building by the installation of new WIFI Access Points units (AP), modification/relocation of the existing AP's. Refreshment of the existing equipment in the same location has already been undertaken in most buildings.

ROC Technologies have carried out a survey of the building and have identified the particular works to be carried out within the building. Their report is located within the Appendices of this document.

The following summarises the works that are to be carried out by the Building Services Contractor (henceforth referred to as the "Contractor").

- + Carry out the AP works as defined within the ROC Technologies Report.
- + Carry out the IT/Data cabling in accordance with EPM PM19 – January 2023.
- + Prepare all necessary RAMS which shall be approved prior to starting any work in a building.
- + Carry out the installation of the AP units and containment as discussed and agreed with the Conversation Architect, refer to attached TB+A Design Note dated 5th March 2024.
- + Prepare construction issue working drawings detailing all agreed works.
- + Ensure all necessary permits to work, isolation for fire alarms, emergency lighting and electrical works are logged with the UoM engineers as soon as possible to ensure all necessary isolations can be carried out in good time to meet the program.
- + Install new cable containment to the relocated and new data outlet points. Containment to be sympathetic with the surroundings and to match existing containment where every possible, as detailed within the attached PEL proposals document.
- + Install new structured cabling to all NEW data outlets. (2No points per AP)
- + Carry out labelling and ensure all AP units are correctly labelled to UoM Standards.
- + Carry out labelling and ensure all structured cabling and outlets for the AP's are labelled to UoM Standards.
- + Install new twin data outlets to a location close to the proposed AP unit location, care is to be taken to ensure that the containment is installed in a sympathetic manor so as not to cause any damage to the existing features of the building and in agreement with the Conservation Architect.
- + Where AP units are to be installed on false ceilings the twin data outlet shall be installed on the underside of the false ceiling adjacent to the AP units.
- + Install all free issue AP units and fixing brackets to complete an operational system.
- + Where AP Units are installed on mineral fibre ceiling tiles the Contractor is to provide a wooden pattress plate on the back of the tile to support the AP Unit. The pattress plate to be the same size as the tile supporting the AP Unit.
- + Where AP units are installed on to top of Cupboards the Conservation Architect's preference is to place the AP Units on top of the cupboard. Contractor to install a wooden frame to support the AP Unit from falling off the top of the cupboard.
- + Install new Cat 5e (UTP) patch leads between both new/existing data outlets and the AP units.
- + Where a single data outlet is provided for an AP Unit, a single new Cat 5e patch lead shall be provided to connect to the new AP Unit.
- + Where twin data outlets are provided for an AP Unit, 2 No new Cat 5e patch leads shall be provided to connect to the new AP Unit.
- + Terminate each new data cable into existing patch panels into existing data rooms.

- + Install new patch panel cords at the cabinet these are to be 1000mm in length and Cat 6A (STP) for Cat 6A installations. All new patch panel cords at the cabinet are to be 0.25m in length and Cat 5e (UTP) for Cat5e installations.
- + Where single existing/new data cables are installed for the AP units, a single patch lead to suit the existing cable installation shall be provided at the data rack.
- + Where new twin data cables are installed for the AP units, a single patch lead to suit the existing cable installation shall be provided for the two cable connections at the data rack.
- + Carry out all necessary builders' work.
- + Replace any ceiling tiles where the AP units are removed and the tile has been cut to allow the cabling to connect to the AP unit, cannot quantify, type of tile number etc (repair blank plate)
- + Installation of fire stopping to any services holes where the cabling is being installed.
- + Where AP units are moved off walls the Contractor shall make good the walls and locally redecorate the repaired area.
- + Repair of the fire stopping damaged when installing cables through fire stopped holes.
- + Liaise with all client and stakeholder parties regarding the scheme.
- + Complete testing, commissioning, and validation of the services, including Cat 5e and Cat 6a cabling.
- + Complete operating & maintenance documentation.
- + Complete record drawings for all services.
- + Carry out all works in compliance with university procedures.

I.2 Programme

Refer to main contract preliminaries.

I.3 Health, Safety and Asbestos Information

Please refer to the documentation contained within the Preconstruction Information.

2.0 Project Management Requirements

2.1 Client Rules and Procedures

The University are employing a Main Contractor to act as the Project's Principal Contractor, to ensure that University and Health & Safety procedure are fully understood and adhered to.

The Sub-Contractor should refer to the University Standards and Procedures and comply with them at all times in executing the works unless otherwise agreed in writing.

2.2 Planning & Managing the Construction Works

At least one week prior to construction commencement, the Principal Contractor shall submit to the client team a project-specific Construction Phase Plan which shall details the method statement and risk assessment for the complete works. Issues specific to this project that should be addressed, include (but not be limited to);

- + Managing and issuing all necessary RAMS, and isolation permits in good time to meet the program for the works.
- + Reviewing the Asbestos Register and ensuring that the areas of work have been suitably cleared of all asbestos prior to starting in a building.
- + Managing access to the working areas.
- + Managing access into security-controlled buildings.
- + Maintaining the fire escape routes from the work areas to the site building boundary.
- + Access and materials movement to each work area through the occupied building.
- + Access into solid ceilings to allow the installation of new services.
- + Cordoning off the areas of work within each working area.
- + Electrical isolations for the existing power circuits where necessary.
- + Isolation of AV/Data services to allow the new equipment to be connected to the existing racks.
- + Moving access equipment to enable access to the false ceilings.
- + Access into some false ceiling especially above solid ceilings via access panels or deep ceilings (greater than 800mm) will require suitable access equipment/towers to reach items in the deep voids above the false ceiling. Working off the top of steps shall not be allowed.

The Principal Contractor's Construction Phase Plan will be reviewed by the Principal Designer and Client Representative.

Work must not commence on site until the client is satisfied that the arrangements for managing the construction phase, and proposed welfare facilities, are suitable. The client will achieve this by issuing the Construction Phase Plan Review letter which will confirm there are no objections to the project starting on site.

The Principal Contractor shall update this plan/RAMS at relevant intervals to suit all any changes, identified risks, circumstances of significance.

A kick-off / prestart meeting is to be arranged to review all issues identified and the planned Construction Phase. The Client will monitor the Principal Contractor's performance by a Clerk of Works, Consultant inspections, site safety audit, progress reports and progress meetings. The Principal Contractor will cooperate with all ongoing periodic review of safety performance and progress reporting to the Client at twice-weekly intervals.

The Principal Contractor is to arrange a site induction for all project team members, (client team, operative, site management team, end-users affected by the works

The Principal Contractor is to consider refresher inductions as the project progresses and access and emergency arrangements adapt to the ongoing working methods.

2.3 Communication and Liaison

The Principal Contractor shall direct all project communication through the University's Project Manager. Throughout the project the Principal Contractor, General Building Works Contractor, Principal Designer and Project Manager shall meet to review the technical/construction works and Health & Safety procedures.

3.0 Executing the Works

Refer also to the main contract preliminaries and University Standards.

Building Services Survey

The Contractor shall carry out a site visit of the project to satisfy himself of the extent of the works.

The Contractor shall carry out a survey to identify all areas outside the contract areas within which it shall be necessary to traverse or work in order to undertake isolations, delivery of equipment and materials, new works, diversions and/or recommissioning as necessary to complete the works.

For all existing services, affected by the works, including systems being modified or adapted, the Contractor shall carry out testing to verify and certify the integrity, duties, and conformity of these system prior to the procurement of any equipment.

During the survey the Contractor shall confirm points of isolation and services needing to be maintained in operation.

Works within an occupied building.

The Contractor shall carry out the works in accordance with all University and statutory obligations and shall be deemed to satisfy all other safe working practices in order to complete the works in a safe manner. Ensure compliance with requirements, encompassing specific risk assessment and Construction Design and Management Regulations for specific demolition and temporary supports / associated works.

Carry out the installation works in staff/student/public areas in a sequenced manner, to minimise disruption, with the area of works cordoned off to maintain access and service throughout.

Minimise noise, dust and other air borne contaminates by an appropriate method during the course of the works, particularly those within occupied areas / outside the contracted works.

Take adequate precautions to protect site operatives and the general public from health hazards associated with dangerous fumes and dust arising during the course of the Works; allow for all necessary equipment and consumables to have all precautions in place.

The Contractor shall include for regular review of the site, adjoining areas and vehicular access routes and clear these from any arising from the works, which have been deposited. Leave areas clean and tidy at all times during the course of the works.

Clear away all waste/rubbish and dispose from site, please note all buildings will be fully occupied and in operation at all times, no rubbish shall be left in escape corridors or where the rubbish will cause issues for persons moving around the building. Leave the site and any working / access areas clean and tidy on completion and all remaining engineering services in a fully operational and controllable condition.

Illuminate and protect any site hazards as necessary. Include for all necessary equipment for working in confined spaces / voids located throughout the site internally and externally.

4.0 Builderswork

General Requirements

The contractor shall include in his costs for carrying out all builders work necessary to execute and complete the works, including all making good. Allow for all making good and decoration identified, and all works necessary to enable the construction and completion of the specified works.

Allow for providing builders work details in descriptive and drawn format, of all builders' work associated with services installation; issue these details to the client and his representatives for review and written acceptance prior to construction. All BWIC shall only be carried out with specific prior approval from the client team. Agree the method of executing all builders work prior to construction.

All works impacting on or interfacing with the existing building fabric, structure, beams/columns, fittings etc shall be detailed by the contractor for agreement with the client team and engineer in a timely manner prior to construction.

Allow for providing builders work information indicating size and setting out of all proposed penetrations, incoming services requirements, chases, pattress requirements and supports. Provide plant and services weights as required.

All permits shall be submitted and provided, prior to any hot works being undertaken.

System Descriptions

The Contractor will supply, carry out, install and make-good the complete works to enable and serve all specified work within the tender documents and including (but not limited to):

- + All builderswork associated with the new containment routed through the building.
- + Forming and making good penetrations through walls and partitions to suit the new cable services.
- + All builderswork associated with the fitting of new and relocated data outlets.
- + All builderswork associated with the fitting of new and relocated access-points.
- + Making good of wall penetrations after the removal of the existing services being stripped out.
- + Provision of new fire stopping to new penetrations
- + Making good of existing fire stopping where new services pass through.

The contractor shall employ a fire stopping specialist, to the agreement of the University fire team, carry out and certify the fire stopping associated with the Works, within the building.

5.0 Working in a Listed Building

Over the entire estate there are a number of Listed buildings which will require specific attention to the existing structure and fixtures within the buildings, John Ryland Library is one of those buildings and the Contractor must abide with the details below.

5.1 Builderswork

All builders work shall be reviewed and agreed with the Conservation Architect prior to any works being carried out. No holes or drilling shall be started unless agreed. The Contractor shall review any builders work requirements with the Conservation Architect and the Project Manager in advance of the works starting or if any unforeseen issues arise whilst carrying out the works.

All fixing methods will need to be agreed on a building-by-building basis as some buildings may well have specific fixing requirements which will need to be adopted.

5.2 Fixed equipment

It may be a requirement for some of the existing fixtures, skirting boards or shelving to be removed to allow the installation of the cabling. Where this is to be carried out the Contractor shall employ a Specialist Carpenter to carry out the removal and replacement as the equipment, skirting boards or shelving will have to carefully stripped out, stored, and reinstalled in exactly the same way they were removed. All equipment, skirting or shelving will have to be reused. Replacement sections will not be allowed to be installed.

In some of these buildings the cabling will be installed within the existing floor trenches within the wooden floor. These shall be carefully removed and will need to be replaced exactly in the way they are removed. The Contractor shall take particular care when lifting the covers so as not to damage the lids or the floor around the lids. All floors must be level after the lids are replaced once the installation works are complete. No Trip hazards shall be left after the works have been carried out.

5.3 Unforeseen Incidences

Should an issue arise from an unforeseen issue, the Contractor shall immediately inform the Project Manager, Engineer, and the Conservation Architect, to agree the best way forward with the installation. All issues not identified on the drawings and previously agreed with the Conservation Architect must be agreed with all parties prior to completing the works. If works are completed without agreement by all parties the Contractor shall at his own cost strip out the works and re-install the in the agreed manor and make good all damage caused by the incorrect installation method.

5.4 Agreement with the Conversation Architect

The Contractor shall discuss and agree the final installation methods with the Conversation Architect to ensure that the AP units are installed in a manner that is both suitable for each area and to cause the least disruption and damage to the building finishes and listed features. For initial details refer to PEL document and the TB+A Design Note included in the rear of this document.

6.0 Structured Cabling Systems

6.1 Performance Objectives

The Contractor shall provide a complete works as summarised in section 1.1 of this specification.

6.2 Design Parameters

Carry out the complete works to meet the requirements of

- + Building Regulations
- + Relevant British and European Standards
- + Electrical Installation Wiring Regulations BS 7671:2008+A3:2015

All University Standards and procedures – can be viewed at this link

<https://www.estates.manchester.ac.uk/media/services/estatesandfacilities/policiesandprocedures/>

The Contractor shall take particular note of

- + EPM HS12 - Permit to Work and Controlled Access Procedure rev I
- + EPM HS14 - Construction (Design and Management) Regulations 2007 Procedures.
- + EPM HS14a - Construction (D&M) Regs 2007 Appendices to Procedures.
- + EPM HS14b - H&S & O&M File Handover Procedure
- + EPM HS14c - HS File Sign Off
- + EPM HS16 - Electrical Shutdown Procedure.
- + EPM HS25 - Asbestos Management Plan.
- + EPM HS30 - Fire Safety Signs Provision and Installation.
- + EPM HS37 - Fire Alarm Management Policy.
- + EPM PM8 - Standard Electrical Specification.
- + EPM PM19 - Structured Cabling Specification January 2023.

6.3 System Description

Access point locations and associated data services

Provide the complete installation to the Access Points as identified on the drawings including new and relocated positions.

Termination of Cables in Comms Rooms

All data cables to new and relocated APs are to emanate from the existing comms rooms as identified on the drawings.

The University's IT services will identify the exact cabinet and position that new cables are to terminate.

The Contractor will terminate all cables in line with the University standards. Each NEW AP requires 2 No. data connections to provide resilience, each connected to a separate patch panel, from mimicked ports then patched to the switch.

Where existing AP units are to be "refreshed" and currently only have a single data cable connected this cable shall be retained and reused. No new cabling shall be installed unless the existing cable fails performance test. If a failed cable requires replacement the contractor shall install 2 No data cables to this AP unit.

The University's IT Services will confirm if the Contractor is to provide new patch panels to the cabinets or reuse existing available ports. Current philosophy is that patch panels will have spare capacity and the Contractor shall provide a price to provide & install a single 24-way patch panel to existing racks.

The Contractor is to allow for all cable lengths within the Comms Rooms to enable the data cables to be terminated into any cabinet.

6.4 General Requirements

The University of Manchester Specification document EMP PM19 January 2023 shall be utilised for the structured cabling, Wireless access point cabling and equipment to be provided & all new containment shall be installed to EMP PM8 for this refurbishment project.

The Main Contractor shall employ an Electrical Contractor to install all the containment works to Manchester Specification document EMP PM8. The Electrical Contractor shall employ a "University Approved" specialist structural cabling installer (refer to EPM 19 for details) to install the IT/Data network strictly in accordance with the requirements of the University of Manchester Specification document EMP PM19 January 2023. Any differences between the drawings, specification, and the UoM Document EMP PM19/PM8 shall be brought to the attention of the Engineer for clarification.

The Contractor shall ensure that there is no loss of IT/Data/Telephone services whilst the works are carried out. The Contractor shall agree with the University of Manchester IT/Data/Telephone Engineers the appropriate time to carry out the incorporation of the new patch panel connections to existing racks.

Data and Communications Cabling and equipment shall be supplied, installed, and commissioned by the Specialists detailed within the University of Manchester Specification document EMP PM19 January 2023. The specialist Cabling Contractor shall be employed by the Electrical Contractor. The approved specialist installers are:

1. INS Sudlows Ltd
2. TIS
3. CNS
4. Network Installation Solutions Ltd
5. NG Bailey IT Services

For all Contacts and contact details, refer to University of Manchester Specification document EMP PM19 January 2023.

All final locations of outlets and equipment racks to be agreed by the Contractor with The University of Manchester IT and Telephone departments. All positions and heights to be agreed prior to starting any works.

The Contractor shall include for the testing of all of the data outlets to verify that existing cable is still suitable for reuse and shall provide a full set of test documentation for handing over to the University IT department.

The Contractor shall inspect the design drawings and the Roc technologies report for the building to fully ascertain the extent of the works to be carried out.

As it has not been possible to fully identify the location of all of the AP unit cable numbers and the comms room where they are connected to, the Contractor shall carry out a test of each of the AP unit cabling to fully identify where the cables have been routed to and from. The final routing/location of the data cabling shall advise the University of Manchester IT Support Engineer and the Engineer with the routing, location and rack connection numbers for the existing units. Where existing data outlets and/or cables are to be reused, the Contractor shall verify the actual lengths of the cabling to ascertain if it is possible to utilise a longer patch lead than the standard lead. The use of patch leads up to 5m long leads shall be agreed with the Engineer and the IT Support Engineer.

From these tests the final location for any new cabling will be finalised and agreed with the UoM IT Support Engineer. No works can be carried out until the cables have been fully identified and labelled at both ends.

Where an AP Unit is to be decommissioned, the existing AP Unit shall be unplugged from the data outlet and removed off the ceiling or wall. The Contractor shall strip out the redundant data cable completely from the existing containment all the way back to the Comms room.

Where an AP unit is stripped out the Contractor shall include for replacing the ceiling tiles where they have been cut to allow the patch leads to pass through the ceiling tile.

If it is not possible to completely strip out the cabling due to the building construction, then the Contractor shall strip out the cabling from each end. Where the cabling cannot be stripped out the cable shall be cut, and the cable labelled as a redundant cable.

Where an existing data cable is to be decommissioned, AP unit cable may require to be reused for a new AP unit being installed within the same area. In this instance the existing cables shall be stripped back to the new AP unit location and re-terminated into a new data outlet and correctly labelled with the cable number.

For all NEW AP units, the Contractor shall ensure that each unit is provided with two data cables to each AP unit. Where currently a single data cable has been installed to an existing AP unit being relocated, the Contractor shall just move the single data point. A second data point in this instance is not required.

Where an existing AP unit is to be refreshed, the Contractor shall verify the location of the data outlet/outlets for the particular AP unit and shall verify the cable number. The Contractor shall strip out the existing AP unit and interconnecting patch leads and install the new unit together with new patch leads.

The Contractor shall label the new AP unit with the AP reference number (Cable number) and shall ensure that the data outlets have been correctly labelled with rack and frame numbering system as detailed within the UoM EMP PM19 January 2023.

Where the AP unit is to be relocated (Moved), the Contractor shall strip out the existing AP unit and any patch leads currently installed into their respective data outlet. The existing data cables shall be re-routed to the new AP position. The redundant recessed outlet box below the ceiling or on the wall shall be provided with a blanking plate.

Where an AP Unit is to be refreshed or moved and the new point is within a 1000mm patch lead length of the existing data point, the existing data point shall be retained in its present location (subject to final cable tests).

The Contractor shall ensure that all existing cables that are pulled out of a recessed data outlet and back into the ceiling void are installed in a suitable containment system from the main data cable tray to the location of the relocated data outlet. The containment shall be supported independently of the ceiling construction and secured back to either the structure or to a series of suitable fixing brackets of other services to ensure that the containment is fully supported.

It may be possible to utilise existing single data outlets within the area around the new/moved AP Unit. In this instance the Contractor shall install a surface fixed PVC conduit which shall at all times be visible from the proposed data outlet to the new/moved AP Unit location and an extended patch lead installed within the conduit to connect the data outlet to the AP Unit. The design drawings shall identify the number, location and routing of these extended patch leads, from this the Contractor shall be able to ascertain an approximate length of the conduit and extended patch lead. As a general guide the extended patch leads shall be no longer than 5000mm and the length shall be kept as short as possible, the final length shall be determined by standard length patch leads and the overall length of the existing data cable not exceeding 95m. The Contractor shall verify the length of the existing data cable prior to installing the extended patch lead.

Care is to be taken when installing services within very deep ceiling voids. Where access is via the false ceiling and shall be carried out in a safe manner that will not endanger any persons installing the equipment or persons within the local areas. The Contractor MUST ensure that all methods of installation (RAMS) are fully detail with the correct use of access equipment to be able carry out the installation in a safe manner. All RAMS must be submitted and approved in good time and before the works are started within any building.

Where new structured cables are to be installed for new or existing data outlets, they shall be installed to match the existing cable types, i.e. if the existing cabling and equipment is cat 5e the new cables being installed shall be cat 5e. Mixing of cat 5 and cat 6 cabling is not acceptable to the University. The Contractor shall verify the exact cable type to be installed prior to starting work. Any deviations shall be reported to the Engineer and the UoM IT Support Engineer. The cable types are noted on the drawings.

All new cabling shall be installed where possible on the existing cable containment within the false ceiling voids & risers. The drawings detail where existing cable basket trays are and whether they have capacity. Should the cable containment be fully utilised the Contractor shall install a new basket tray to accommodate the new cabling. Contractor to refer to the design drawings for areas where new cable basket has been identified as requiring to be installed. If other areas are identified during the works which have not been highlighted on the drawings the Contractor shall advise the Engineer and the UoM IT Support Engineer of the requirement for the addition cable containment.

Access to some areas has not been possible and route of existing contained and cable types have been assumed on the basis of the serving areas. If these assumptions are different to the actual install area access and site works commence, a changeover will be provided and placed on the schedule of rates.

Where surface installations are required, these shall be carried out utilising either trunking or conduits to provide containment to the new data outlet locations.

The Contractor shall take particular care with the fixing of conduits and the AP units at all times. All fixings shall be kept to a minimum and any fixings shall be carried out in a manner that can be reversible where possible. The Contractor shall consider alternative methods for fixing conduits and equipment which shall be agreed with the Conservation Architect prior to the commencement of the installation works.

Where possible fixings should be located within the mortar of brick walls, i.e. between the bricks, damage to the bricks shall not be allowed unless agreed with the Conservation Architect.

Within the basement any new containment shall match the existing containment and shall be finished in the same material finish.

Where surface containment is installed below the false ceilings or surface fixed on the walls, the installation shall be in compliance with BS7671 521.10.202. Galvanised metal conduits and trunkings shall be installed as per UoM EPM PM8.

Where plastic trunkings/conduits are utilised, the conduits shall be installed by utilising either metal spacer bar saddles with a white powder coating or by the use of metal clips screwed to the wall or ceiling. Plastic trunking shall incorporate where possible internal metal clips secured to the structure.

Where metal clips are utilised, these shall be secured to the structure by the fixings recommended by the manufacturer of the clip system. Metal clips are manufactured Marshall Tufflex from their Firefly Fire Safety Clips range. This document their recommended fixing arrangements including concrete walls and plaster board fixings.

Metal conduit clips are manufactured by either Centaur Cable Management – 25mm steel conduit spacer bar saddle finished in white (Power Coated) or Edwardes – Deligo SB25W 25mm Spacer bar saddles white (Plastic Coated).

In some areas of the ceiling void where cables are to be installed from the cable basket to an AP location the cabling shall be installed in a conduit to within 500mm of the data outlets, the final 500mm of the cable length can be installed in a metal flexible conduit. At all times the conduit and flexible conduit shall be supported off the structure and shall comply with BS7671 521.10.202.

In some instances where new AP Units are to be installed in solid plaster board or acoustic ceilings where no access is available, the Contractor shall install a recessed plaster board back box into the false ceiling. This box will afford an access point to allow the Contractor to pass a draw wire through the ceiling to the nearest access point in the accessible ceiling.

The Contractor shall in this instance install metal PVC coated flexible conduit from the accessible section of the ceiling to the data outlet box. The flexible conduit shall be pulled tight and correctly terminated into the back of the back box and on the basket tray. Each flexible conduit to be coded and each connection to a metal back box and to each mesh trunking or cable/basket tray. Where existing access hatches are provided the flexible conduit shall be secured to the ceiling soffit using metal fixings.

The Contractor shall take particular care when removing ceiling tiles whilst working in the buildings. Extreme care shall be given to the metal pan ceiling tiles when removing from the ceiling and whilst working in the ceiling voids. Some of the metal tiles incorporate a built-in hinge section, which allows the tile to be retained in the ceiling. Some of these hinges have been cut off due to issues with removing the tiles, this causes issues with the ceiling tiles and tiles can be easily dislodged from the ceiling and fall. Extreme care should be taken to ensure that there is no danger to persons working in the building.

The metal tiles should be removed by the ceiling manufactures recommended removal tool. The Contractor shall ensure that all employees are provided with the correct removal tools for each type of tile within the building.

All new twin data outlet points for the new AP Units and where existing twin data outlets are being relocated, the data outlets shall be installed on the underside of the false ceiling located adjacent to the AP unit.

Where AP units are to be installed on a metal pan tile, the ceiling tile shall be cut to recess the data outlets into the tile. The metal tile will be stiffened with a suitable backing material which is sized to support the tile and the equipment being installed and to allow a recessed accessory box to be secured in the tile. Where the tile is to be stiffened the Contractor shall ensure that the tile fits into the ceiling correctly and will not fall out of the ceiling due to the weight of the equipment installed on the tile.

AP units shall where possible fixed back to the structure, all fixing methods shall be agreed with the Conservation Architects. Where the AP units are located above cupboards the Conservation Architect's preference is to sit the AP units

on top of the cupboard, no fixing to the cupboard shall be allowed, it may be necessary to lay a wooden mounting frame on top of the cupboard to install the AP Unit onto. This should also be agreed with the Conservation Architect.

Where the Contractor finds tiles have been cut or significantly damaged the tile will be replaced with a new tile to ensure that the tiles are correctly inserted in the ceiling grid. At no stage shall the Contractor refit damaged or tiles with structural elements of the tile cut off back into the ceiling and shall ensure that when the tiles when re-installed in the ceiling are as per the manufacturer's recommendations.

It will not be possible to quantify the number of replacement tiles required at tender stage, the Contractor shall include the cost for a couple of boxes of ceiling tiles within their costs to allow for replacements.

Where conduits are installed within the false ceiling, the conduits and flexible conduits shall be terminated into a purpose manufactured metal bracket (Marshall Tufflex refer to a Conduit feed plate within their cable basket range). This plate must be earthed to the cable tray to ensure the earth continuity of the conduits.

Where new basket cable trays are installed and these are not fully connected to the existing basket cable trays, the new cable tray shall be electrically bonded to the existing cable tray utilising the manufactures earth straps/connection modules.

All new cable trays shall be installed in accordance with the requirements of UoM EPM PM8, all cable trays shall be supported by the use of drop rods and channel. The cable trays shall be securely fixed back to the structure. Any deviation to this shall be agreed with the Engineer and the UoM IT Support Engineer.

Refer to Appendix No E for typical sketch details of installation methods for the cable containment systems.

6.5 Standard Equipment Details and ROC Key References

The ROC Technologies documentation has identified the location of the new, relocated, and refreshed AP unit locations for each floor of the building.

They have provided a naming convention for the AP's, these are as follows: -

New and Refreshed APs will be identified by the following naming convention.

FXX-T-M(A)

Where: -

F = Floor Number

XX = AP Number

T = AP Type

- H = AP-345
- L = AP-315
- B = AP-303

M = Mounting Type

- C = Ceiling
- W = Wall
- O = Oberon Bracket

(A) = Action

- R = Refresh
- M = Move
- N = New

Other AP Labels

(D) = Decommission AP location

(K) = Keep AP location and leave AP as installed.

Equipment supplied by Roc Technologies

The following equipment shall be issued free of charge to the Contractor who shall install, and place in operation.

The equipment is as follows: -

- + Wireless Access Point AP-345
- + Wireless Access Point AP-315
- + Wireless Access Point AP-303
- + Oberon wall bracket

For further information refer to the appendix within the ME Prelims where the technical specification is located.

6.6 Deviations to the Roc Technologies Report

Following our visual inspection of the building, a number of points have been identified as deviations to the details identified within the ROC Technologies report for specific AP Units.

The ROC Technologies AP unit referencing has been maintained (as described on their report) on our drawings, however, the drawings identify where new cabling and data outlets will be installed to "moved/relocated" AP Units and where existing data outlets and cabling shall be stripped back to be reused for new data outlets where cable lengths allow.

7.0 Building Particular Details

7.1 Performance Objectives

The Contractor shall supply, install, test, commission and validate the complete works including new containment and data cabling to serve new Wi-Fi Access point requirements.

7.2 Design Parameters

Carry out the complete works to meet the requirements of

- + Building Regulations
- + Relevant British and European Standards
- + Electrical Installation Wiring Regulations BS 7671:2008+A3:2015
- + University of Manchester Standards,
 - o Standard Electrical Specification - EPM PM8.
 - o Structured Cabling Specification - EPM PM19 January 2023.

7.3 Building Description

This building is a residential building.

It is located at: -

The University of Manchester
John Rylands Library
150 Deansgate
Manchester
M3 3EH

The Comms Room from which new Data cable emanate from is located - Refer to TB+A Drawings for details.

8.0 Commissioning & Handover

8.1 Handover

Prior to Practical Completion of the Works for the building the Principal Contractor must ensure that the following are complete

- + Contract works are complete (with the exception of minor snags or defects)
- + The instruction of the Employer's staff in the use and correct operation and maintenance of the installation has been completed.
- + All commissioning and testing are completed and accepted.
- + Complete demonstration of the contract works and the systems' operation.
- + Draft record documentation/test sheets and record drawings are issued for comments.
- + All Draft information required for the health & safety file is issued for comments.

8.2 Health & Safety File

The handover is required as detailed in

- + EPM HSI 4b – H&S & O&M File Handover Procedure – The Principal Contractor must fully comply with these requirements.
- + The project Preliminaries

The Principal Contractor shall provide a combined Operating & Maintenance Manual / Health & Safety File for presentation to the Client at Practical Completion.

Appendix A - Schedule of Design Drawings

EA0029-JRL-E-65-B2-001 – Basement B2 Wi-Fi System Enhancement

EA0029-JRL-E-65-B1-001 – Basement B1 Wi-Fi System Enhancement

EA0029-JRL-E-65-00-001 – Ground Floor Wi-Fi System Enhancement

EA0029-JRL-E-65-01-001 – First Floor Wi-Fi System Enhancement

EA0029-JRL-E-65-02-001 – Second Floor Wi-Fi System Enhancement

EA0029-JRL-E-65-03-001 – Third Floor Wi-Fi System Enhancement

EA0029-JRL-E-65-04-001 – Fourth Floor Wi-Fi System Enhancement

Appendix B – Record Drawings

At present there are no IT/Structured Cabling services record drawings available for this building. The Contractor shall take particular care when working in these rooms and shall check and verify all services connections prior to starting any works. The Contractor where necessary to carry out any surveys/tests necessary to identify the cable connections prior to disconnecting the cabling.

Appendix C – TB+A Design Note Tated 5th March 2024

Design Note

University of Manchester, John Rylands Library

Access Points

Job number:	MA	Number of Pages:	6
Prepared by	B Doran	Date:	05/03/24
Reviewed:		Revision	00

1.0 Summary

This Note aims to summarise the discussions regarding the setting out of WIFI access points and associated wiring. The following table confirms the dialogue to date in confirming the agreed strategy for the APs.

Table 1 - Summary of Queries and clarifications for WIFI Access Points in The John Ryland Library

Item No	AP No	Queries / Observations from Manchester City Council, Urban Design and Conservation Team (recd 8/2/24)	RECOM Response	Performance Electrical (PEL) Response	TB+A Notes
1.	[General]	<p><i>John Rylands is designated at Grade I, in the top 2.5% of listed buildings nationally, and designated due to its high historic, architectural, evidential, aesthetic, and communal values. The designated premises include the original 1890s building, the 1910s/20s extension, the c.1960 extension and the 2000s extension. Each element is characterised by excellence in craftsmanship and high aesthetic interest, with most features and elements throughout, whether historic or modern, designed with great attention to detail. The library is also one of the museum, library, and archive collections of national and international importance under the Designation Scheme for England.</i></p> <p><i>The building is located in Deansgate Conservation Area, a key contribution to its character and appearance and a key landmark in the local townscape. It is located in the immediate setting of a number of listed buildings, including the Grade I listed Masonic Temple and the Grade II listed Sawyers Public Arms.</i></p> <p><i>As the works are internal, the only asset affected by the proposed works would be the Grade I listed Library, with no impact on Deansgate Conservation Area or other listed buildings positioned in its setting.</i></p>			Noted
2.		<p><i>The application is for the installation of 41 new wireless access points at the John Ryland's Library and associated installations across the original portion and later additions to the GI listed asset.</i></p> <p><i>The principle of the coloured slip-on covers to the APs and the use of brown data cables is supported and noted as positive measures that would mitigate and reduce the adverse visual impact of the proposed new installations.</i></p> <p><i>Throughout the GI listed building, exposed conduits must be avoided and omitted where possible, otherwise minimised. This is on account of the exceptional significance of the asset under consideration, the guidance within section 16 of the NPPF and saved UDP policy 19.1.</i></p>			Noted

Item No	AP No	Queries / Observations from Manchester City Council, Urban Design and Conservation Team (recd 8/2/24)	RECOM Response	Performance Electrical (PEL) Response	TB+A Notes
3.		Where exposed conduits are required above the basement/cellars, these should match the attractive modern and customised containment across the Grade I listed building (see 'Existing Trunking', PEL report) rather than be in the form of the standard black painted steel conduits, as proposed.			Noted and agreed
4.		Alternatively, MICC conduits, used in the Grade I listed Town Hall due to their size/diameter and the high-quality finish befitting of its somewhat comparable intricately detailed and well-preserved stone interiors, could be supported, albeit customised containment to match existing would be preferred. Please amend / respond as required.	Works will be undertaken as item 3		It would be difficult to incorporate the MICC use into the Wi-Fi installation
5.		Further information on the proposed fixings (i.e. screw holes) required to the APs and conduits would be required. These should be reduced to the minimum required, with other reversible methods (i.e. Velcro APs) used where possible.	Any fixings would be into mortar joints rather than masonry APs would be sat on top of cupboards rather than fixed wherever possible Numbers of fixings would be minimised as much as possible.		Noted. We have concerns about the use of velcro which may not offer a permanent fixing and could therefore in turn give rise to uncontrolled remedial works -
6.	AP 1502 AP-1502-L-C(M)	Please confirm whether the proposed AP 1502 (PEL report) refers to AP - 1502-L-C(M) as per proposed floorplans.		Yes, this is -1502.	Clarification as PEL notes
7.	AP 0504 AP-0504-L-C(N)	Please confirm whether the proposed AP 0504 (PEL report) refers to AP - 0504-L-C(N) as per proposed floorplans and the annotated photograph included in the ROC report. Please note that the location in ROC report does not match that in the PEL report.		Yes, this is -0504. The AP is shown in the same area on both PEL and Roc reports just the mounting location has changed. The tray isn't suitable to mount the AP on so we suggest it should be fixed to the steel beam instead.	Clarification as PEL notes
8.	AP 305 AP 309-L-C(N)	Please confirm whether the proposed AP 305 (PEL report) refers to AP 309-L-C(N) as per proposed floorplans and the annotated photograph included in the ROC report.		Yes, this one should be 309. Apologies we had 2 No labelled as 305.	Clarification as PEL notes

Item No	AP No	Queries / Observations from Manchester City Council, Urban Design and Conservation Team (recd 8/2/24)	RECOM Response	Performance Electrical (PEL) Response	TB+A Notes
9.	APs - 1504 & - 1505	<i>Please relocate to existing tray/conduits and to a more discrete position. Please note – a number of currently back of house spaces in the basement/cellars will be opened to the public as a result of the New Chapter scheme.</i>	AP can be moved to existing tray/conduit		Noted
10.	AP-0504-L-C(N)	<i>Please note existing AP. Please confirm whether new is required in this location or whether existing is to be removed.</i>		A new AP is required in this location.	We trust this new AP is acceptable
11.	AP 004	<i>Please confirm whether the new exposed conduit is required. Not clear on annotated photographs whether this presents one or two options.</i>		New conduit is required if the AP is to be sited as per drawings and Roc report. We suggested an alternative location closer to the existing tray work which would negate the use of conduit.	We agree with the suggestion to move AP close to existing tray. ROC to confirm if AP can be moved any close to existing
12.	AP 005	<i>More information is required prior to approval – see reference to new riser TBC. Concerns regarding the quantum and prominence of exposed new conduit in this location.</i>			Concerns noted and suggest, this is reviewed on site with further investigation to be carried out when contractor is on site to gain approval prior to commencement of work to this AP
13.	AP 108	<i>Excessive new containment proposed. Further information required prior to approval – the PEL report reads that “riser position and AP position to be agreed”.</i>	This will be agreed between all parties on site	We were sent information from another project who are also installing new data points within this area. It was suggested we follow the route of their cabling. We didn't though receive confirmation of the exact route and riser position., I assume this is being done under a separate LBC application. Co-ordination between the two projects will be required.	To be agreed in coordination with other projects.
14.	AP 111	<i>Concerned about the prominence and the route of the proposed conduit. It is advised that APs are integrated into the new display cabinets. Please note that the PEL report notes that most display cases have existing data points, which can be utilised in order to avoid / minimise harm to the original fabric, appearance and appreciation of the GI listed building.</i>	AP to be moved closer to the existing sensor	We believe there is no other option to route cables to this location. Note, existing data points are not present in the display cabinets in this location.	Noted if prominence of cabling/conduit is unacceptable, alternative location will have to be sought
15.	AP 112	<i>Further information required prior to approval – the PEL report reads that “further investigation [is] needed to confirm spare ways and routes through display cases”. Exact location TBC.</i>		We think the best location for the AP would either within the base of the display case or on top, but we were unable to access the display case to confirm due to an exhibit being on display. This will require further investigation by others to confirm.	Requires further investigation on site. Will it be possible to agree exact details on site after project commences but prior to any work starting to this AP, allowing investigation.
		Item 15 and 45 – as per previous advice, exposed new black/galvanised containment in medium/highly significant spaces [most spaces other than basement/cellars] will not be acceptable. Please confirm the exact location of any new proposed new exposed containment through the Grade I listed building. Unless specifically approved, no exposed new conduits/cables should be installed anywhere across			

		the designated premises. Amend attached document as required.			
		AP 005 - not acceptable due to proposed exposed conduit. Remove and amend attached document as required.			
		AP 204 - not acceptable due to proposed exposed conduit. Remove and amend attached document as required.			
		AP 205 - not acceptable due to proposed exposed conduit and prominent location of AP. Amend attached document as required.			
		AP 206 and 207 – not acceptable due to proposed exposed conduit. Amend attached document as required.			
		AP 113 – new riser to match new elsewhere required. New black enamel conduit is not acceptable. Amend attached document as required.			
		AP 111 – not acceptable due to exposed conduit in highly significant space. Remove and amend attached as required. New data points and AP in his space need to be integrated into new display cabinets			
		AP 311 – retain in existing location. Amend attached document as required.			
		AP 303 – insufficient information as per attached and not acceptable based on the information submitted. New port to existing timber panelling and exposed conduits would not be acceptable in this location.			

		Delate item 8 (AP 407/8/9/10) and amend report as required.			
		AP 405 – Mount AP directly above switch at low level (Option B). Amend attached document as required.			

Item No	AP No	Queries / Observations from Manchester City Council, Urban Design and Conservation Team (recd 8/2/24)	RECOM Response	Performance Electrical (PEL) Response	TB+A Notes
16.	AP 113	<i>Further information required prior to approval – the PEL report reads that “location route and riser to be agreed”. Concerned about the proposed conduit route onto stonework. Position of AP(on top of porch and set behind ‘parapet’) is acceptable in principle.</i>		We show two options one each side of the porch with black conduit rising up, MCC to confirm preferred option. If black conduit is not acceptable then a new riser could be formed to match in with the existing building fabric, but this would need to be reviewed to confirm exact details.	We understand that the proposal as PEL report aims to follow existing service route. Cable route but that exact route would need to be explored further when on site to fully identify. If fixing of conduit onto stone is a concern, minimal fixings (at floor and top) can be agreed
17.	AP 204	<i>The proposed high-level position of the AP and exposed conduit cannot be supported in this location. Should an AP be required, the cabling should be routed behind the panelling and positioned discretely within the space (i.e. internal furniture shelf).</i>		Our report details that the cables are to be installed behind the wooden panelling.	Cabling to be routed behind panelling. If mounting of AP on wall above panelling is not acceptable, ROC to confirm if AP can be located within internal furniture shelf.
18.	AP 205	<i>Mount AP next to existing data point and omit proposed conduits. The proposed location would also require excessive damage to existing fabric of the Grade I listed building and thus cannot be supported.</i>	low level mount is allowed by exception		We understand that discussions on site agreed that the AP could remain within the alcove (to allow new cable installation to be discrete) but located at high level, where AP is less vulnerable
19.	APs 206 & 207	<i>Move APs next to existing data points and omit proposed conduits. –</i>	low level mount is allowed by exception		the university would prefer APS at high level where they are less vulnerable to damage,
20.	AP 208	<i>Please locate closer to existing equipment (to top corner).</i>	AP will be relocated close to the existing equipment		Noted
21.	AP 303	<i>Further information on the route and impact of the AP position required.</i>			It may be possible to route cabling behind panelling with AP mounting above bookshelf. Further investigation to be carried out when contractor is on site to gain approval prior to commencement of work to this AP.
22.	AP 305	<i>Please confirm whether the proposed cable/conduit will be routed behind / within existing cabinets/panelling. The location of the AP is supported.</i>		Yes, cable will be routed behind the existing panelling.	Noted and agreed
23.	AP 309	<i>further information required prior to approval – the PEL report reads that “exact route TBC”.</i>		The intention would be to follow the route of cable to an existing AP within the same area but we are unable to confirm the exact route at present.	Noted and we trust that when on site further investigation will clarify options and proposal can be agreed prior to installation going forward.
24.	AP 311	<i>Retain AP in existing position.</i>	can be accepted if there is no alternative		AP in requested location will offer better coverage. If cables can be drawn behind panelling will AP at H/ be acceptable.

Item No	AP No	Queries / Observations from Manchester City Council, Urban Design and Conservation Team (recd 8/2/24)	RECOM Response	Performance Electrical (PEL) Response	TB+A Notes
25.	AP 405	<i>Exposed conduit cannot be supported in this location. Mount AP directly above switch at low level (Option B).</i>	low level mount is allowed by exception	This is fine but the AP will be at low level, would this need UoM to confirm.	UoM have confirmed acceptance of AP at low level.
26.	AP 406	<i>No information appears to be submitted in either PEL report or the ROC report. Please submit further information.</i>		Yes, corrected on the attached.	As PEL proposal.
27.	APs 407, 408, 409 and 410	<i>More information required – please note PEL report. Concealed conduits/cabling routed through/behind fixed furniture and located on top of the furniture (behind ‘parapet’) can be supported.</i>		The intention would be to route the cables concealed behind the wooden panelling and mounting the AP on top. If this can’t be achieved, then alternative option of routing cables behind the skirting boards and up through the bookcase offered.	Further review once contractors is on site to confirm if options 1 can be achieved.
28.	AP 411	<i>Not clear on what is proposed. Further information required. Exposed conduit cannot be supported in this location. Conduit/cabling to run through/behind fixed furniture. An AP located on top of the furniture (behind ‘parapet’) can be supported.</i>		Our proposal shows 2 options where cables could be potentially fished up behind the wooden panelling, but we are unable to confirm until the bookcase has been emptied	Further review once contractors is on site to confirm if proposal can be achieved. Approval to be prior to commencement of work to this AP.

Appendix D – PEL Rylands Library Document



Ryland's library

7 Nov 2023

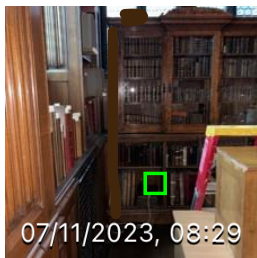
Identified 45 Issues

AP 405 4th floor

1

Mount AP directly above switch, as shown by the green square below.

Complete ☐



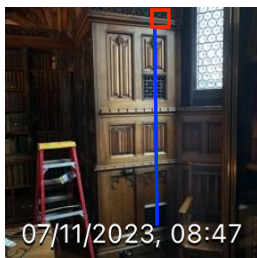
AP 408 4th floor

2

Spare cat 5 in back box not connected need to confirm cable is satisfactory or use existing and PC in this area connects to WiFi

Drill hole through top of bookcase behind cornice in line with vents fish cable down to data point mount AP on top

Complete ☐



AP 411 4th floor

3

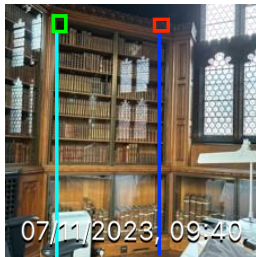
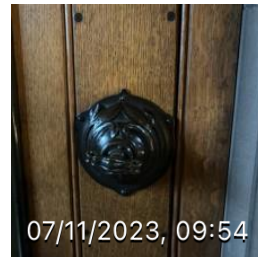
Re use existing data 01/12/3-4

Potentially fish/ conduit behind bookcase panelling removed by others

Alternatively specialist joiner to remove corner cornice to fish cables through up to AP point

Cables route from high level behind switch plate potential route

Complete ☐



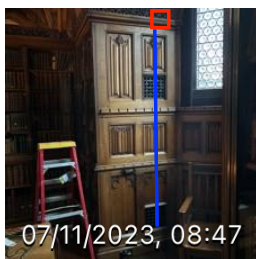
AP 410 4th floor

4

Spare cat 5 in back box not connected need to confirm cable is satisfactory or use existing and PC in this area connects to WiFi

Drill hole through top of bookcase behind cornice in line with vents fish cable down to data point mount AP on top

Complete ☐



AP 409 4th floor

5

Spare cat 5 in back box not connected need to confirm cable is satisfactory or use existing

Drill hole through top of bookcase behind cornice in line with vents fish cable down to data point mount AP on top

Complete D



AP 407 4th floor

6

Spare cat 5 in back box not connected need to confirm cable is satisfactory or use existing and PC in this area connects to WiFi

Drill hole through top of bookcase behind cornice in line with vents fish cable down to data point mount AP on top

Complete D



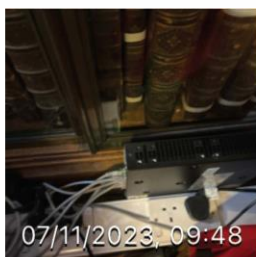
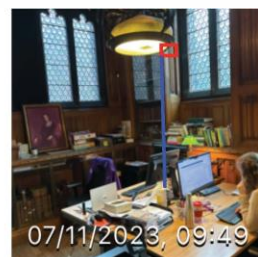
AP 406 4th floor

7

Black conduit through back of bookcase to switch

Switch has 1 spare port

Complete D



Item removed from report.

Complete ☐

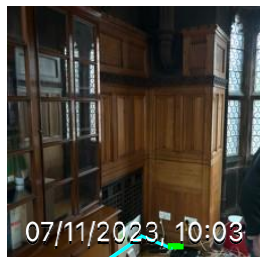
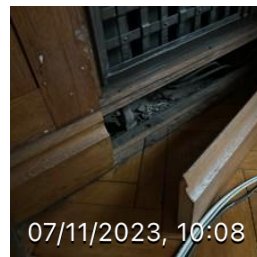
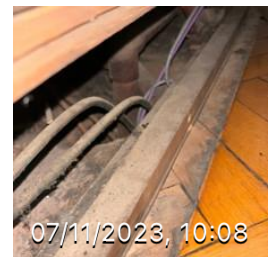
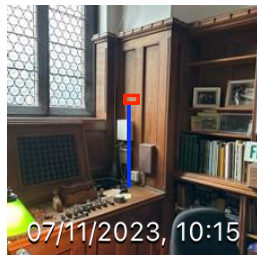
AP 305

9

Remove skirting board cut in new box and brush plate route cables behind skirting and cabinet new black conduit installed/clipped AP mounted in top of cabinet

Cabinet to be emptied and moved by others if needs be

Complete ☐



AP 302 3rd floor

10

Existing switch fish cables behind cladding above BT DP

Mount AP

Complete ☐

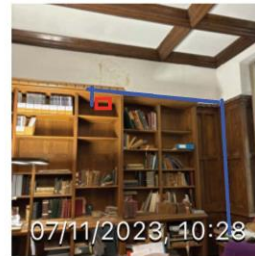
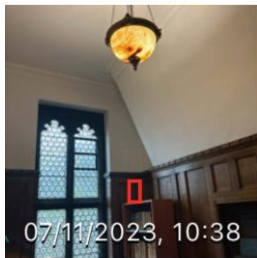
AP 304 3rd floor

11

Existing switch in room

Cut box and brush plate into skirting fish cables behind cladding route high level to above bookshelf

Complete **D**



AP 303 3rd floor

12

Existing data outlet to be utilized, AP to sit on shelf above data point.

No new containment required.

Complete **D**

AP 309

13

Cable to be routed behind panelling to AP exact route TBC

Follow route of existing AP

Complete **D**

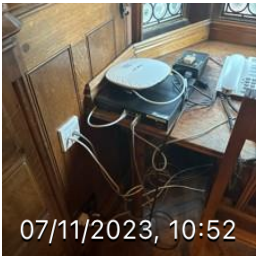


AP 311

14

AP to remain on the desk in its existing location.

Complete ☐



Item removed from the report

15

Complete ☐



AP 112

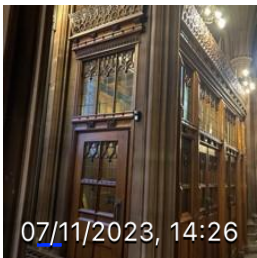
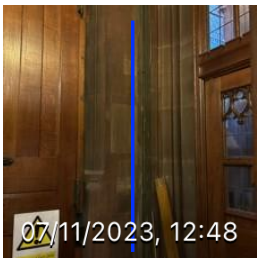
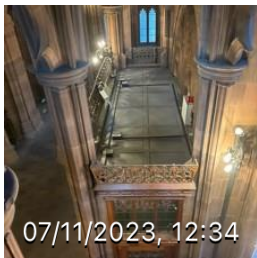
16

Cables route from basement most if not all display cases have data existing

Further investigation needed to confirm spare ways and routes through display cases

New cable trunking to match existing installed to allow cables to rise from the basement.
AP to be mounted on top of porch roof.

Complete ☐

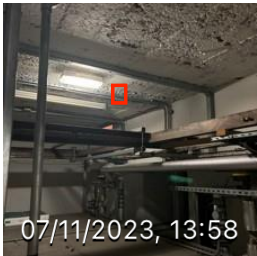


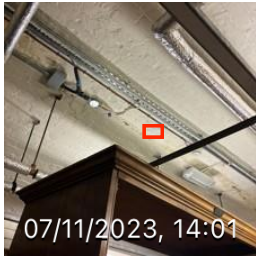
AP to be integrated into new display cabinets.

Complete ☐

Existing tray/unistrut mount AP next to it

Complete ☐



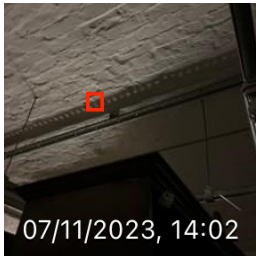


AP -1509

20

Use existing tray mount on ceiling

Complete ☐



AP -1507

21

Mount on ceiling use existing tray

Complete ☐

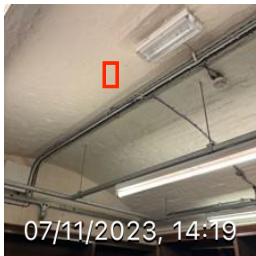


AP -1506

22

Use existing tray, mount on ceiling

Complete ☐



AP -1508

23

Existing tray, mount on ceiling

Complete ☐



AP -1505

24

AP to be mounted to the existing tray

Complete ☐



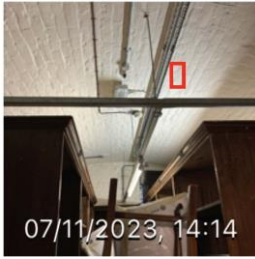
AP -1504

25

AP to be mounted to the existing tray

Complete ☐

26



AP-1503

Existing tray, mount on ceiling

Room to be cleared for access

Complete

D

AP-1502

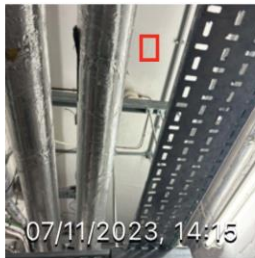
27

Existing tray, mount on ceiling AP

currently mounted above data cab

Complete

D



AP207

28

AP to be mounted at low level above existing data
outlet. No new containment required.

Complete

D



AP206

29



AP to be mounted at low level
above existing data outlet. No new
containment required.

Complete

D

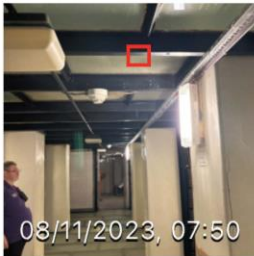
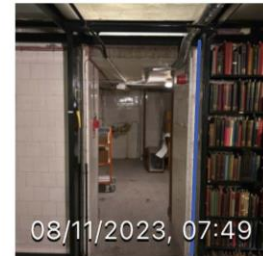
AP-0504

34

Existing tray has fire alarm on cat 5 is on the trays tray runs to riser

Drill metal work to mount AP bracket

Complete D

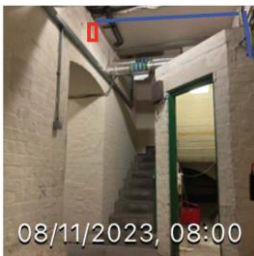
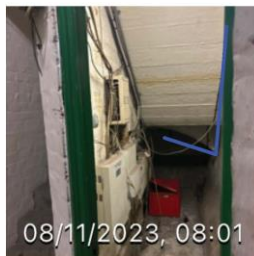


AP -0505

35

Cables come along tray into under stairs tray/conduit needed existing cables are just tied to each other drill through above door head to existing tray work to new AP position

Complete D



AP108

36

New riser to be created new data going in in future works email states share points!

Riser position and AP position to be agreed

Complete D



AP107

37

Omitted.

Complete **D**



AP106

38

Existing tray has pyro for EM lighting on

Complete **D**



AP105

39

Mount AP next to existing tray

Complete **D**



AP101

40

Unable to lift tiles due to potential asbestos survey being under taken soon

Route for AP will have to be confirmed when all is clear

Complete **D**

AP 004

41

Move AP closer to existing tray, tray has alarm and pyro on already

Tray runs to riser

Metal frame work to be drilled for bracket

Complete ☐

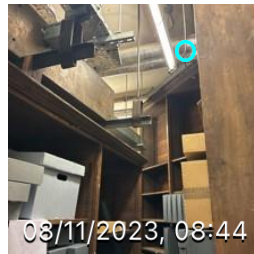


AP 005

42

AP to be moved to opposite side of room and mounted high level adjacent existing Containment.

Complete ☐



AP109

43

Removed from this report due to change of location.

Complete **D**

AP110

44

Omitted.

Complete **D**

Item removed from report.

45

Complete **D**

Appendix E – Tender Summary Analysis

Preliminaries etc – Dalton Ellis Hall		
Section		
A	Site investigations	£
B	Protection of existing finishes	£
C	Site set up	£
D	Access equipment	£
E	Decoration around local affected areas	£
F	Fire stopping	£
Other	(specify)	£
	(specify)	£
Sub-total		£

Electrical Services – Dalton Ellis Halls		
Section	Description	
	Preliminaries	£
	Cable Containment	£
	IT/Data cabling	£
	Installation of AP Units	£
	Testing & Commissioning	£
Other	(specify)	£
	(specify)	£
	Total	£