4106: University of Manchester

Main Quadrangle Masonry and Associated Fabric Repairs: Phase 3

DESIGN AND ACCESS STATEMENT

September 2011

PLANNING AND BUILDING CONTROL
03 OCT 2011



LLOYD EVANS PRICHARD

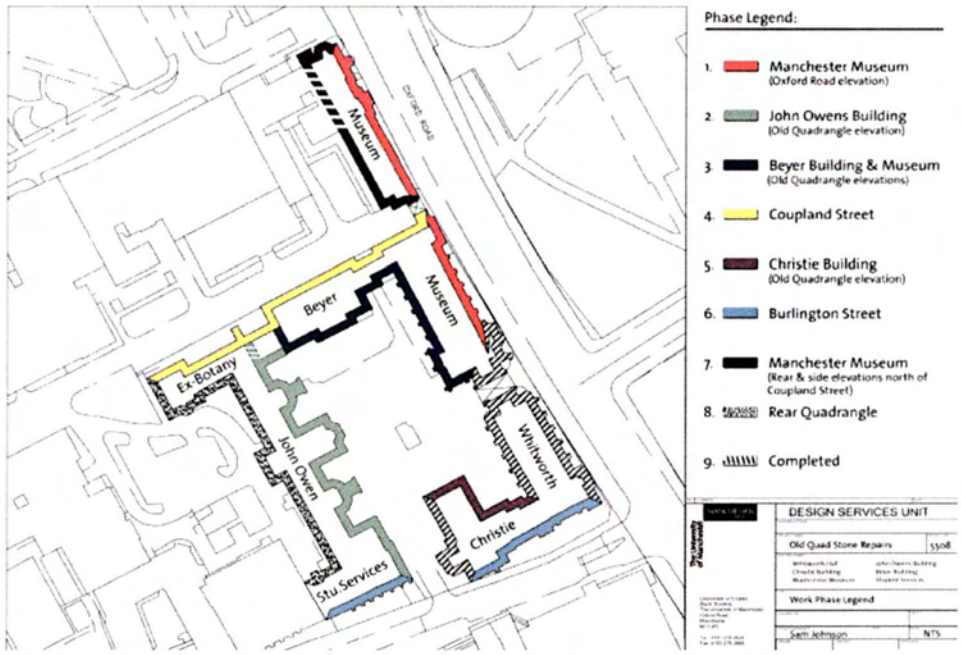
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Design and Access Statement

Introduction

As part of the ongoing maintenance of the University's assets the need for repair and maintenance of the deteriorating external fabric of the original University buildings was identified. Prior to Lloyd Evans Prichard's appointment a piecemeal approach had been undertaken to these works, which commenced with the fabric repairs undertaken to part of Christie Building under the direction of the University's own in house Estates team.

The brief for phased fabric repair projects to the building elevations facing into the main University quadrangle and fronting Oxford Road and Burlington Street was established at a meeting held on 14th December 2010. The extent of work was later expanded to incorporate the rear facades of the John Owens and Museum buildings, together with those facing the south side of Coupland Street. The overall programme saw construction works phased on an elevation by elevation basis, beginning with Burlington Street in September 2011, and working towards the anticipated overall completion of all phases in July 2015.



Site Plan indicating the anticipated phasing of the works.

Lloyd Evans Prichard were appointed to undertake the Contract Administrator's role for the second phase of works to the Oxford Road frontage of Whitworth Hall and currently on-going works to the Queen's Arch and Tower, the content of which had previously been established by the University team. For the remaining phases still to be commenced LEP would provide architectural services in addition administering the building contract. Surveys of the building fabric were undertaken to determine the overall scope of works required to all elevations, which in turn informed a Stage C report, prioritised the areas to be included in the initial phasing, and enabled estimates of the likely total costs to be prepared.

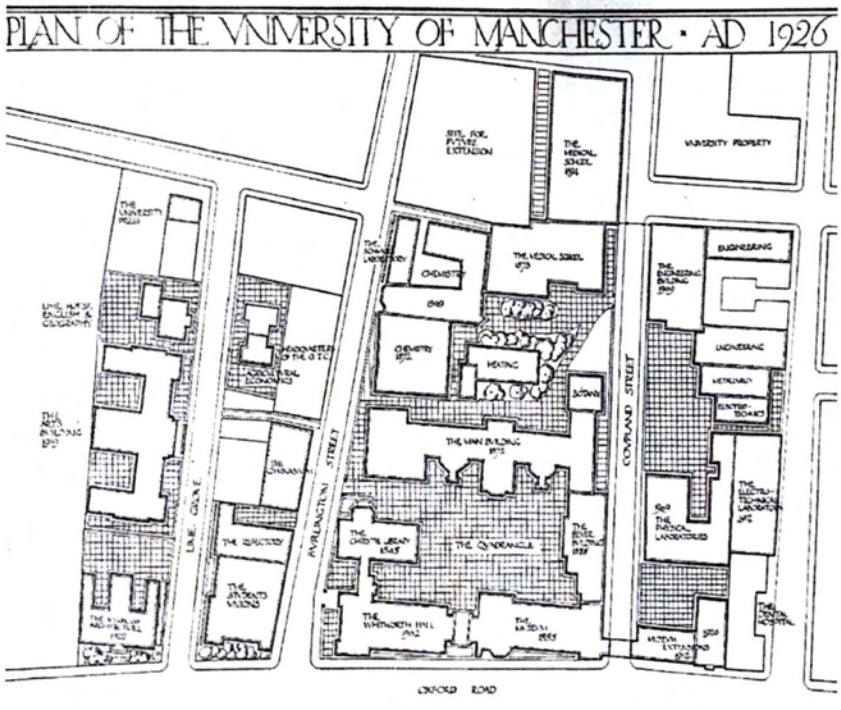
The works to which this application relates are the third phase of the overall programme of fabric repairs, including the Burlington Street facades of Whitworth Hall, the Christie Building, and John Owens, together with the northern section of John Owens facing into the quadrangle. In addition the remaining sections of the quadrangle elevations of John Owens have been included as part of this submission. The works include the following:

- Repairs to the external masonry.
- Repointing where considered necessary.
- Remedial works / renewal of rainwater goods.
- Localised renewal of roof coverings and rationalisation of rainwater disposal.
- The repair or replacement of windows, incorporating thermal upgrades where appropriate.
- Thermal upgrades to roofs where appropriate.

The Location and Early Morphology of the Site

The buildings which form the historic core of the former 'Victoria University of Manchester' are located approximately 1.25 miles south east of Manchester city centre in the suburb of Chorlton-on-Medlock, and front the west side of Oxford Road (B5117).

Now almost exclusively given over to educational establishments, the first University buildings were constructed in a residential area comprising a mixture of terraced housing, largely set back from the road, and larger detached dwellings with front and back gardens. In the mid nineteenth century Coupland Street stopped short of Oxford Road and ended in a partly developed square. By 1893, when the original Owens College, Beyer Laboratory and Museum buildings had started to determine the form the main University quadrangle takes today, Coupland Street had been extended up to Oxford Road, and both had been fitted with tram lines. Any previously vacant plots to the east of Oxford Road had, by this time, been swallowed up by terraced housing.



Site Plan indicating the anticipated phasing of the works.

By 1922 the quadrangle had been completed by the construction of the Whitworth Hall and Christie Library, the Museum had extended to the north of Coupland street, linked to the original buildings by a bridge, and the Dental Hospital had been built on the corner of Oxford Road and what is now Bridgeford Street. The Museum was further extended in 1927, replacing the last terraced house on the block to abut the Dental Hospital, which, with the exception of the recent Museum entrance building, brings the whole ensemble to its current recognisable form.

Today Oxford Road is one of the principal arteries into Manchester city centre form the south, and as a result the location has excellent public transport links to the city centre to the north, and Rusholme, Fallowfield, Withington and Didsbury to the south. It is not surprising that these former suburbs and 'villages', now engulfed by the expansion of the city, are a popular location for the students whose academic lives are concentrated around the site.

The Site

The site forms the core of The University of Manchester buildings which are centred on Oxford Road, and fill a larger area roughly bounded by Booth Street East / Booth Street West to the north, Upper Brook Street to the east, Grafton Street / Dilworth Street to the south and Higher Cambridge Street / Lloyd Street North to the west. Once mixed residential, this not insignificant area comprising some 48 Hectares is now almost exclusively given over to the academic institutions which form part of the University.

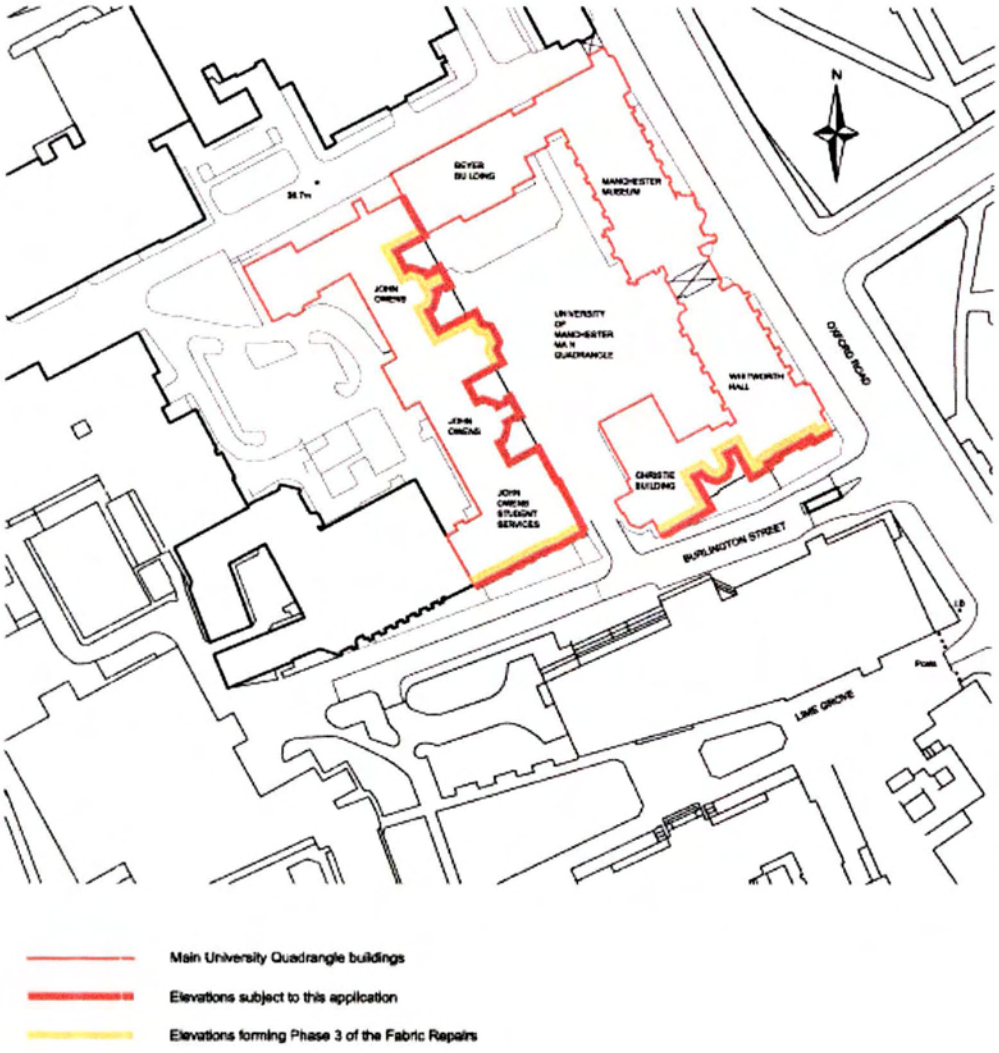


John Owens centre gable.

The buildings which are the subject of the proposed phased fabric repair works are located to the west side of Oxford Road, to which they have a 175m long frontage extending from Whitworth Hall northwards to the Museum café, pierced only by the Queens Arch leading through to the main quadrangle and the Museum arch spanning Coupland Street. The rear Museum buildings are included as far as the new entrance, from where the boundary of the phased works can be traced around the north elevations of the Museum, Beyer John Owens and Botany facing Coupland Street, before returning around the western (rear) facade of John Owens to Burlington Street, the elevations of John Owens, the Christie Building and Whitworth Hall facing which define the southern extent of the proposed works.

Not all the facades within the above notional boundaries are included as part of this submission. The extent of the fabric to which this application relates is the south facing gables of Whitworth Hall and the Christie Building, including the low level link building between, the Burlington Street elevation of John Owens, and the north elevation of John Owens facing into the main University Quadrangle.

Topographically the main quadrangle is ostensibly flat, at a level equating to Oxford Road. Burlington Street to the south falls gently westward away from Oxford Road, whilst Coupland Street rises eastward towards the main road, most notably in front of the new Museum entrance. This enabled John Owens, the first building to grace the front quadrangle, to appear almost domestic in scale when viewed from the quadrangle, the semi-basement lower ground floor appearing as a full storey on the more imposing west side.



Site Plan indicating the areas covered by the Application and extent of the Phase 3 Works.

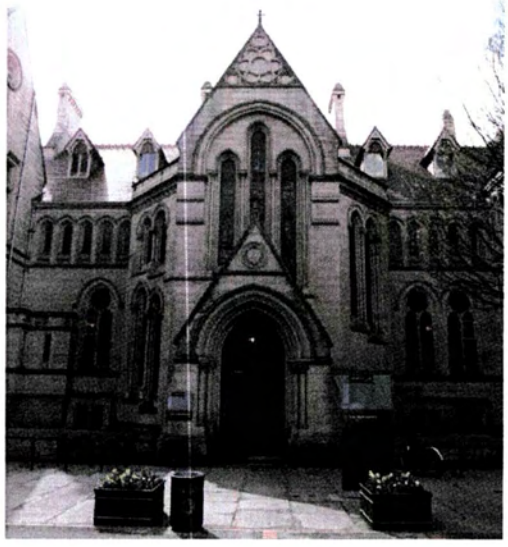
Given the extent of development on a tight urban site largely enclosed by thoroughfares the landscaping is inevitably hard, softened only by pockets of green towards the east end of Burlington Street, and the scattered mature trees and greenery towards the northern end of the quadrangle.

The surrounding area is characterised by similarly dense development to the north, west and south, constructed in a variety of architectural styles betraying the preference of the times in which they were built. The University has developed organically over more than a century, and this is reflected in the variety of both style and scale demonstrated in its architecture. Buildings to the east of Oxford Road generally appear relatively newer, and their siting less constricted by the tight urban grain seen further west. Consequently the area has a more open feel than that in the vicinity of the quadrangle, with significantly more open space and greenery between the component structures.

Historical and Architectural Significance of the Buildings

The Victoria University of Manchester had its origin in Owens College, an institution set up by the trustees of John Owens, a Manchester merchant who bequeathed a substantial sum to found a college in which education could be provided 'in such branches of learning and science as are usually taught in the English Universities'.

The college opened in 1851, initially operating out of a house in Quay Street, which, following a decade of brisk development in the 1860s, soon became unfit for purpose. An appeal was launched raising £100,000 towards a new site and buildings, and Alfred Waterhouse was appointed as the architect for the new Owens College building in 1869, the year he commenced work on Manchester Town Hall.



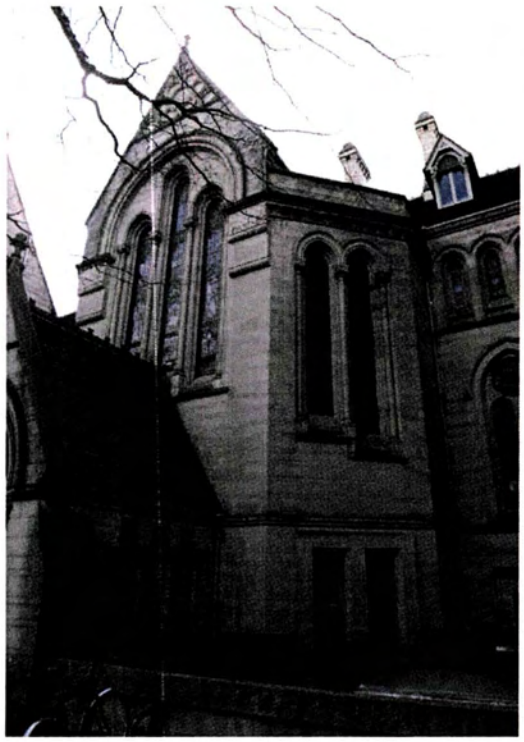
John Owens: Southern Quad entrance.

The design of the resultant heritage asset is in Waterhouse's characteristic free Gothic style, in which elements of Gothic architecture are used to meet the practical requirements of the brief whilst achieving a balanced and picturesque composition. When viewed from the quadrangle the accommodation comprises two principal floors with an attic storey and semi-basement and appears domestic in scale compared with the other, later, heritage assets which complete the ensemble. By way of contrast the natural fall in the land westward from Oxford Road allows the basement to appear as a full storey at the rear, and this together with the continuous run of linked dormer structures at roof level gives the west façade an altogether more imposing feel.

The elevations are faced in sandstone, noted in contemporary accounts to be from the Minera quarry in North Wales, which, in common with the later buildings, is laid in alternate thin and thick banded coursing. The steeply pitched roofs are clad in red clay tiles with decorative fish scale bands and red clay capped ornamental ridges. The upper floors are solid, constructed with the Dennett and Co. fireproof system of brick vaults on iron beams. Waterhouse's design also takes account of the need for good levels of natural light within the heritage asset, with a high percentage of the external wall area given over to windows. Those into teaching spaces generally took the form of large timber vertically sliding sashes, with leaded lights into corridors and stairwells. Consideration was also given to good ventilation provision, in particular to the lecture theatres, as evident from the vents and central fleche on the skyline of the building.



John Owens from the rear Quad.



The 2 No. staircase towers accessed from the Quadrangle porches are a prominent architectural feature of the façade and articulate the east elevation of the

Whilst irregular in shape the plan form of the heritage asset shows Waterhouse's clarity of organisation, which, despite much intervention since the building was opened, is still clearly evident today. A spine corridor connected larger teaching spaces in the north and south wings, with a central wing comprising common rooms and refectory at lower ground level, lecture theatre on the upper ground floor, and library at first floor level. Smaller rooms are located on the west side of the corridor facing the rear quad. As in many Waterhouse buildings the staircases, located on the side of the corridor facing the main quad, are a significant architectural feature, providing a formal entrance and a visual link between the principal floors.

The building has been extended and altered over the years to accommodate the changing needs of the University. The Botany laboratories were added to the north west corner circa 1910 to the design of Paul Waterhouse, Alfred's son. They are similar in elevational treatment and materials to the main building, (although the facing stone is from a different source), and incorporate a central staircase and lift.

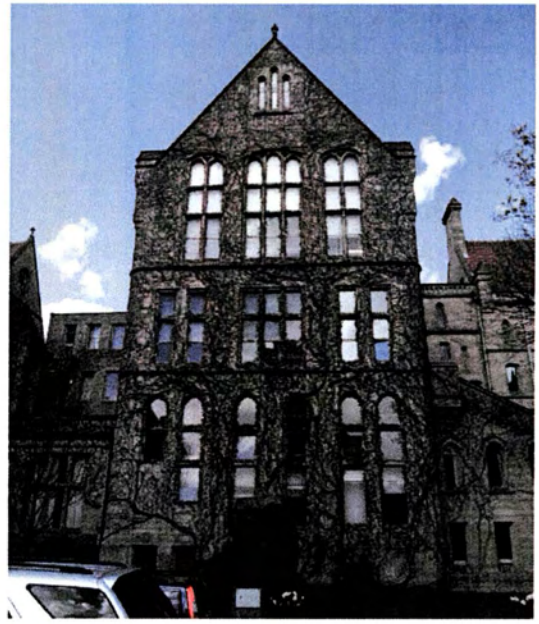
The principal alterations, however, have been to the interior of the asset, necessitated by a change in the building's primary function from teaching to housing the central administration of the University, including the President and Registrar's offices and the offices of the Finance Directorate. The most significant of these interventions has been the alterations to the arts and chemistry lecture theatres, where the tiered seating has been removed and floors levelled to provide office accommodation. In the case of the latter a further mezzanine floor was also inserted. The spine corridor was also extended at upper ground and first floor levels connecting the staircases through the former lecture theatre and library. There are numerous minor alterations where larger rooms have been sub-divided. A small lift was also added next to the south section of the spine corridor. This is not wheelchair accessible and is no longer in use. The basement lightwells facing the main quad have been roofed over to provide additional ancillary accommodation at lower ground floor level.

The new building was opened on the 7th March 1873 by the Duke of Devonshire, the then President of the College:

"As to the new buildings, of which the College takes possession this day, the Council are assured on every side of the success of the architect's endeavour to combine simple beauty of design and thorough adaptation to practical use. It will be recollected that the pile already called Owens College is only one side of a quadrangle, the principal buildings of which are to stand in front, with a more imposing façade along the Oxford Road. The present front is, however, in itself of notable grace and dignity."

As suggested in the President's speech the new building was conceived as the first part of a building programme intended to meet the demands of the college for yearly increasing accommodation, and to provide the scientific facilities demanded by the College's subscribers. Once again Alfred Waterhouse was consulted to prepare plans for the buildings which would complete the quadrangle.

The first of these, the Beyer Laboratory, was linked by a low level flat roofed structure to the west façade of John Owens northern gable. Completed in 1887 the Beyer Building forms the north side of the main quadrangle, and contained the Natural history laboratories, and lecture room and a portion of the Museum. The building was funded by public subscription and a donation from the Whitworth legatees, Robert Dukinfield Darbishire and Richard Copley Christie.



Beyer building: Quadrangle gable.

The building, along with the museum, was designed by Alfred Waterhouse at a cost of £75,000.



The public entrance to the Beyer building in the north east corner of the Quadrangle.

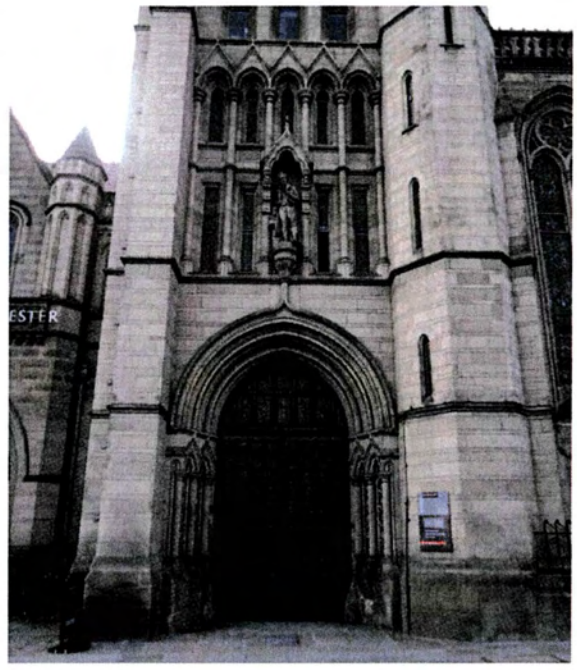
In contrast to the north wing of the original building which was set back from Coupland Street the new extension projected forward to the street line which it followed as far as the corner of Oxford Road. Combined with the Manchester Museum building, designed and constructed at the same time, the extension would have a more or less equal width throughout, ensuring a quadrangle space remained, albeit incomplete until the Christie Library and Whitworth Hall were constructed in 1898 and 1902 respectively.

The public entrance to the Beyer Laboratories, is in the north east corner of the College quadrangle, just north of the principal gable which dominates the north side of the courtyard. A grid of windows in this purely functional façade allows the maximum amount of light possible to enter the spaces inside, the only decorative element being the stone fleche located slightly north of the centre of the ridge line, and resembles more a graceful turret than an aid to the ventilation system serving the laboratories below.

When viewed from Coupland Street the architecture of the heritage asset is dominated by the oriels of the various professors' rooms, corbelled out one above the other, just east of the central gable. The varying types of fenestration give considerable diversity to the general aspect of the block. This part of the extension was designed to be used purely by collegians and professors, as opposed to the publicly accessibly Museum buildings facing onto Oxford Road.

The origins of the Museum lie in specimens belonging to the Manchester Natural History Society and the Manchester Geological Society, which were transferred to the College in 1872 on condition that the College house and maintain the collections, and give the public free access and lectures. For some years however the collections had to be stored in such a restrictive space that a large part of them was practically inaccessible. However, in 1888, the new buildings of the Museum, erected by public subscription and aided by a donation of £27,500 from the Whitworth legatees, were completed. The buildings were formally opened on June 8th 1888.

The principal feature of the Museum building is a lofty and imposing tower which finishes the extreme south end of the museum block on Oxford Road, and constituted the main entrance to the college.



The Oxford Road doors to the carriageway at the base of the Museum Tower.



The tower has a strict geometric relationship with the earlier historic assets, being set in line with the central gable of John Owens. A broad carriageway with a vaulted stone roof runs through its lower stages, which, prior to being enclosed, would have afforded pedestrians on Oxford Road full views of the clock nestled high in the gable apex across the quadrangle.

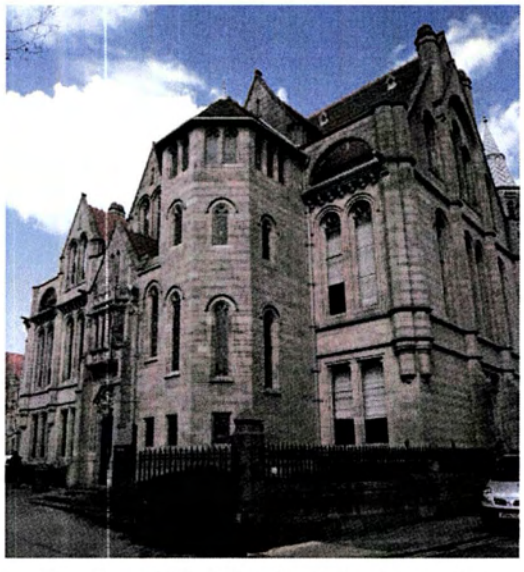
The Museum's Oxford Road frontage north of the Tower.

The tower rises to 44m high. It has corbelled angle buttresses, and is covered by a hipped saddle-back roof. The octagonal turrets, each with hipped coverings in harmony with the tower's roof, set on top of the buttresses are not of equal height; that which contains the staircase is much taller than the other. The upper part of the tower is arcaded on all sides, and all the stages of the structure facing Oxford Road are richly decorated in the same way. On the plan the tower gateway is deeply recessed, and has bold arched mouldings running down onto the gabled heads of the niches in the jambs, while the niches themselves are elaborately arcaded.

North of the Tower the building line becomes recessed, and the elevational appearance more firmly utilitarian, with no period character of any kind. The only relief to the regularity of the general fenestration comes with the high lancet windows of the grand staircase. It was clearly Waterhouse's aim to get every possible square inch of light through the Museum windows on the Oxford Street front. The monotony of the repeated tripartite window motif is softened by the arrangement of projecting buttresses with high, pyramidal terminations between the windows, which give strength to the building, and provide a ready means of carrying the extraction flues to the basement level. At the junction of Oxford Street and Coupland Street the building line comes forward to the line of the tower, and terminates in the form of a gable, flanked by octagonal turrets corbelled out from the level of the first floor. In its upper part the gable is arcaded and further enriched by the arms and crest of the College, carved in colossal size.



The twin gabled Council Chamber at the rear of the tower, note the arch through to the carriageway.



The Christie building from the Burlington Street quadrangle entrance.

The architectural details of the asset's quadrangle elevations follow those of the Oxford Road frontage, the uniformity of the window pattern broken only by the twin gables and traceried windows into the Council Chamber at the rear of the Tower.

The enclosure of the quadrangle was completed by the construction of The Christie Library and Whitworth Hall. As with the other heritage assets these buildings were designed by Alfred Waterhouse.

The Christie Building, the former college library, was given to the College by Richard Copley Christie, one of the Whitworth trustees. The bequest was made in 1895, and the work was completed in 1898.

It is situated to the east of the main college buildings, adjoining Burlington Street, and in close proximity to the Whitworth Hall, whose foundation stone was laid during the opening ceremony of the Library. The building is 30m long by 14m wide, measuring 14m to the top of the parapet and 22.25m to the ridge of the roof.

The exterior of the library is similar to the other buildings of the quadrangle, in a free non-historicist Gothic style. The library does, however, display a generally more relaxed style than the assets fronting Oxford Road, and its ornamentation is in larger details, such as the dormer windows connected by stone arches along the east and west facades. Unlike the earlier assets Derbyshire Darley Dale stone is used for the facings of the walls, although the same alternate coursing bands prevail throughout all the component buildings of the Quadrangle.



The Christie building's dormers connected by stone arches.



The Oxford Road entrance to Whitworth Hall.

The Whitworth Hall, begun in 1898, was completed in 1902 by Paul Waterhouse, son of Alfred Waterhouse. Being the last boundary structure completing the college quadrangle this was a highly significant addition, helping to define the college not only spatially, but symbolically, by affording it a status symbol that would allow it to compete with other major educational institutions.

Built using funds of £50,000 from the bequest of Sir Joseph Whitworth the Whitworth Hall provided a much-needed ceremonial space, used for receptions, examinations, graduations and other such events, and in this way gave the college a stronger sense of identity. The opening ceremony was conducted on 12 March 1901, fifty years to the day since the opening of Owens College. A year after the hall was completed, the college was granted independent status as the Victoria University of Manchester.

Although the hall has changed little in appearance since its opening, some significant developments have taken place. The organ, gifted from Mrs. Rylands, was largely rebuilt in 1962, and the ornate chandeliers, whilst virtually identical to the originals, were rescued from the redundant Church of the Saviour in Bolton. They were fitted in the early 1970s to replace pendants fitted some 40 years earlier.

All the heritage assets are listed, their listing descriptions and references are detailed in the following section.

Listing Descriptions

The existing Buildings which are affected by the phase of works to which this application relates are Listed as follows:

A. SJ 8496 698-1/21/614 VICTORIA UNIVERSITY OF MANCHESTER
including Christie Library, Whitworth Hall: Grade II*

Formerly known as: Owens College, Oxford Street, Chorlton-on-Medlock.
University. All by Alfred Waterhouse; with Whitworth Hall added to south end of east range c.1895-1902 by Paul Waterhouse.

Sandstone Ashlar, red tiled roofs with fishscale bands. Large and irregular plan round a courtyard which is open at the south-west corner. Gothic style.

The WEST RANGE (Main Building), the first on the site, in domestic scale and style, of 2 storeys plus basements and attics, has a projected gabled wing in the centre flanked by large canted entrance bays which have gabled porches with moulded 2-centred doorways and large 2-centred arched windows of 3 stepped lancet lights rising into steep gables, and tall coupled arched windows in the flanks (some with stepped sills); the central wing has a canted 2-storey bay at the gable end with a niche at ground floor containing a carved shield, a large 5-light window at 1st floor and a tiled hipped roof, a clock face in the apex of the gable, side walls with gables, and a fleche on the roof. The outer wings differ in plan and elevation; all parts have various mullioned, arched and arcaded windows, and small gabled dormers and tall stone chimneys.

The EAST RANGE (the main façade to Oxford Street) is monumental in scale and style, asymmetrical, with a very large rectangular tower at the south end, a 2-storeyed entrance archway to the left of this and a tall 4-storey 7-bay range to the right. The entrance archway has a wide 2-centred moulded arch, and above this a stepped triple lancet in a gable flanked by pinnacles. The tower, with pilastered corners and an octagonal stair-turret at the north-east corner, has a very large 2-centred arched doorway with splayed reveal including foliated niches, 4 orders of moulding, and hoodmould with apex carried up to form a pedestal to a 1st floor niche with a statue; arcaded windows on 6 stages (successively 5, 5, 3, 3, 5 and 5 lights), all different and those at the top stage with a colonnaded screen; and a steep saddle-back roof with banded cladding of lead and tiles. In the angle with the main range to the right is a tall 2-bay canted staircase which has buttresses, tall 2-light windows with geometrical tracery, and an arcaded parapet. The main range itself, 4 storeys diminishing in height and 7 bays with buttresses square at ground floor and chamfered above, terminating in pinnacles, has arcaded windows filling each bay, those at ground floor segmental-headed with transoms and arched lights, those at 1st and 2nd floors with shafts and 3 square-headed lights and those at 3rd floor with 4 arched lights; and a corbel table and blind arcaded parapet to each bay.

WHITWORTH HALL (to the left of the entrance archway), of 2 unequal storeys and 8 bays plus a corner tower at the south end, has buttresses, coupled segmental-headed windows at ground floor, bands of blind arcading between floors, and tall 2-light transomed windows with cinquefoil lights at 1st floor; an elaborate 2-storey gabled porch to the 1st bay with pinnacles, blind-arcading in the gable and open arcading linking the gable to the pinnacles on either side, and a 2-centred doorway moulded in 3 orders; and a 3-stage corner tower with a tiered segmental oriel, corner pinnacles, octagonal belfry and short spire, all in elaborate Gothic style.

B SJ 8496 698-1/21/608 MANCHESTER MUSEUM
extensions Grade II

Extensions to the Manchester Museum. Designed 1911 and 1918 by Paul Waterhouse, and built 1911-1927. Paul Waterhouse died in 1924, and the contract was completed by his son, Michael. Sandstone ashlar, with roofs of lead and red tiles. Linear plan in 3 portions, the earliest to the left and latest to the right. Gothic Revival style. The earlier portion in Hotel de Ville style, 2 storeys and 5 bays, symmetrical, has buttresses, an embattled parapet to the 3 centre bays and slightly higher square parapets to the end bays penetrated by gablets, and a steeply-pitched lead-clad hipped roof wit ha fleche; large double-transomed 9-light windows at ground floor, large segmental-pointed 3-light windows at 1st floor with arched lights and 6-light perpendicular tracery, and gablets in the end bays containing multifoils. Attached to the left end is a 2-storey entrance archway and bridge over the entrance to Coupland Street. This has a large 2-centred arch and 3 3-light windows above, the centre under a gable, and incorporates a porter's lodge and curator's room. The central portion, 2 lower storeys and 3 bays, with gabled centre flanked by pilaster buttresses, has windows at ground floor like those to the left, and 3-light windows on 1st floor, all with cusped heads. The central window has perpendicular tracery rising into the gable. The right-hand portion is a cross wing with a facing gable. 4 storeys, and attic in one wide gabled bay, with octagonal tourelles at the corners finished with arcaded pinnacles flanking the gable. The lower half is a giant segmental-headed arch with a projecting gabled porch which has a 2-centred arched doorway moulded in 2 orders with shafts, and is otherwise filled by a 7-light window with 14-light perpendicular tracery; the upper half has mullioned 1, 3 and 2-light windows to the next 2 floors, a band of blind arcading between these, and an attic window with 2-centered arched centre and blind-arcaded surround. The rear of this range has mainly flat-headed windows in a grid pattern, and a central gable with a pointed arched traceried window, flanked by hipped dormers.

Proposed Works: Overview.

This, the third phase of works proposed to the heritage assets, will concentrate on the external fabric of the following buildings:

- Whitworth Hall: Burlington Street elevation and short western return.
- The low level link between Whitworth Hall and Christie.
- Christie: Burlington Street elevation and short eastern return.
- John Owens: Burlington Street and Quadrangle elevations.

Only the centre gable and facades to the north of the Quadrangle elevation of John Owens is included in the phase 3 works, but the complete east elevation forms part of this application, which concentrates on the following elements of the external fabric to all the above assets:

- Repairs to the external masonry, and localised cleaning.
- Repointing where considered necessary.
- Remedial works / renewal of rainwater goods.
- Localised renewal of roof coverings and rationalisation of rainwater disposal.
- The repair or replacement of windows, incorporating thermal upgrades where appropriate.
- Thermal upgrades to roofs where appropriate.

With the work content of the first 2 No. phases, the Oxford Road frontage of Whitworth Hall, Queens Arch, and the Museum tower, comprising essentially 'like for like' repairs, an application for Listed Building Consent was not considered necessary. Whilst the forthcoming third phase still fundamentally concentrates on repairs, the approach differs from the earlier schemes in the following areas, necessitating this submission:

- The drainage of the small areas of flat roof each side of the stairwells in John Owens is compromised by a poor discharge detail with no overflow, leading to surcharging of the outlet and saturation of the wall head masonry. This requires rationalising.
- The University's strategy and commitment to improving the thermal efficiency of its building stock has resulted in double / secondary glazing being proposed for the refurbishment of a number of the windows included in this phase, principally in Christie and John Owens.
- Similarly where it is possible to thermally upgrade the roofs without disturbing the external building fabric the opportunity will be taken, in this case to Christie.

The Heritage Assets and Climate Change:

The University's Carbon Management Plan has a requirement to reduce carbon emissions by 40% by 2020 as part of a Campus wide refurbishment programme of its building stock. In order to meet this target the thermal efficiency of the heritage assets will need to be improved as part of the phased fabric repairs to the assets around the Quadrangle and Museum.

In attempting to address this issue the University only have a limited number of options open to them to both improve thermal performance in order to meet the targets of the Carbon Management Plan and address the severe problems in heating the more traditional buildings where 40-50% of the wall area is glazing with high thermal loss and draughts. This situation results in a measure of discomfort to building occupiers which is totally unacceptable these days. As a result measures have been considered for applying to this phase of the works, and across the heritage assets making up the Quadrangle and Museum as a whole, on an elemental basis as follows:

- Walls: Consider adding insulation to the external walls of the assets.
- Roofs / ceilings: Consider adding insulation to the roof voids / sloping ceiling areas of the assets.
- Windows: Consider introducing double / secondary glazing as part of any works to restore or replace the windows.

With the exception of localised areas of the Museum, which fall outside the scope of this application, the walls throughout are stone faced on a brick background. A nominal cavity may exist between the two materials, but in construction terms all the walls should be regarded as solid. Restoration of defective areas of facing stone and renewal of defective and eroded pointing to mortar joints will improve thermal performance by reducing air leakage.

In looking at a strategy for improving the thermal efficiency of the walls of the buildings a number of factors need to be taken into consideration, including costs, the practicality of improving the thermal efficiency of the wall construction, and the high proportion of window to wall area.

The relative mass of the wall construction already gives this element a considerable thermal advantage in terms of heat loss over the currently single glazed windows. In addition there

would be difficulties and high costs associated with adding insulation to the walls, and any product chosen to undertake this work would need to be carefully selected so as not to interfere with the construction's ability to 'breathe'.

The listed status of the buildings and detailing of the external envelope makes the addition of external insulation impractical, whilst adding insulation to the internal face would impact on historic features of the assets such as skirtings, dado rails and cornices. Cold bridges would be difficult to avoid with such an approach, and whilst the University will continue to review the possible application of insulation in less historically sensitive areas, and where internal lining will not adversely impact on the space, no significant opportunities have been identified for the Phase 3 works.

There are three alternatives available in respect of improving the thermal efficiency of the roofs:

- Underdraw the existing ceilings with rigid insulation and plasterboard.
- Install quilt insulation above ceilings in roof voids.
- Remove the roof coverings and install insulation between rafters.

The University's Maintenance team is undertaking a rolling programme of installing roof insulation within any available accessible voids, which should be completed over the next 12 calendar months. This work does not form part of the project for which LBC is being sought.

Where it is not possible to underdraw the ceiling, due to the sensitivity of existing fabric in areas such as Whitworth Hall, or where there is no void, the wholesale removal of the roof coverings will be required in order to improve the thermal efficiency of the roof. In such instances insulation will be introduced between the rafters when the roof coverings are due to be renewed. In the case of Christie, however, the existing finishes have already been underdrawn with plasterboard, and there is the opportunity to further line the sloping soffit with rigid insulation and plasterboard without any detrimental visual effect on the exposed timber roof structure. This operation will form part of the Phase 3 works.

There are a number of window types in the elevations subject to this application, and an even greater variety in the heritage assets forming the Museum and Quadrangle as a whole. More will be said about this in the section specifically on windows, but suffice to say this multiplicity makes it impossible to apply a coherent strategy for window refurbishment and replacement across the board.

What has been established are certain ground rules to be applied when considering the approach to the windows, based on the use of the spaces they serve, window type, and glazing type. These are briefly summarised as follows:

- Stained pictorial glass & plain leaded glass into circulation spaces will be refurbished on a like for like basis,
- Leaded glass into teaching spaces will be refurbished on a like for like basis but with the installation of secondary glazing to improve comfort whilst retaining the external appearance.
- Replacement of metal single and double glazed windows with slim line double glazed units in metal frames to maintain appearance whilst improving thermal efficiency.

- Refurbishment of timber framed windows, including removal of single glazing, and the installation of slimline double glazed units in the existing casements, to maintain appearance whilst improving thermal efficiency.
- Single glazing direct into stone surrounds is to be removed and replaced with slimline double glazed units, the retaining angle at the jambs being concealed behind the stone rebates to retain the existing visually frameless appearance of the glass.

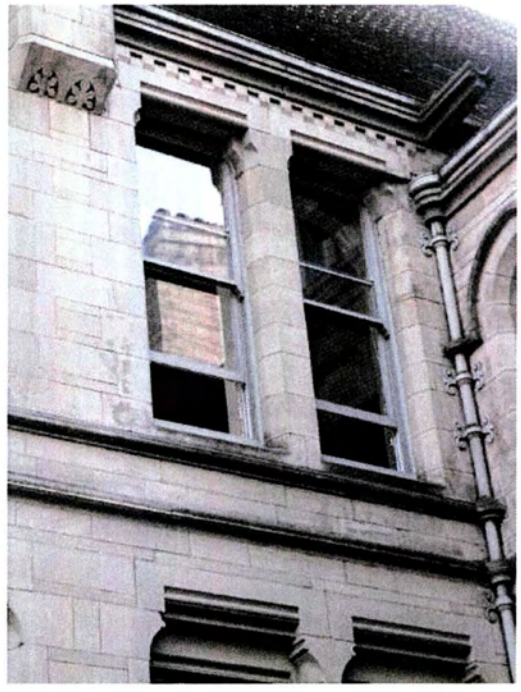
In summary the listed status of the buildings makes improving the thermal efficiency of the heritage assets difficult without in some way compromising the historic fabric. The addition of external or internal insulation to solid walled buildings tends to be difficult to detail and is expensive, with a full payback period estimated at over 30 years. English Heritage guidance on this subject states that 'in the majority of cases it would not be worth considering the insulation of external walls until the full range of easier and more rewarding upgrades to traditionally – constructed buildings have been carried out.'

Since these buildings are multi-storey the application of roof insulation has only limited value, the ability to improve the thermal performance is limited and therefore glazing improvements are necessary to for occupant comfort and to improve the Display Energy Certificates.

The above identifies the strategy the University are following to improve the thermal efficiency of the buildings, and the window improvements are a significant proportion of this. As there is the need to restore the stone and leadwork to the buildings, the University propose to benefit from the economies of scale of using the scaffolding for the dual purpose of the restoration and undertaking the thermal improvements identified as part of this application for Listed Building Consent.

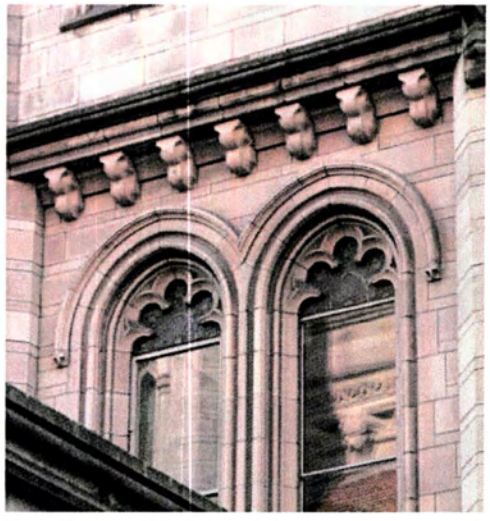
Masonry Repairs:

The 3 No. buildings to which this application relates are built with solid masonry walls comprising an external stone facing on a brick background. The external stone used throughout are sandstones geologically, but from 2 No. different sources. The earlier John Owens building is faced in stone from the Minera quarry in North Wales, characterised by its yellow / buff colour, whilst the stone used on the Christie Building and Whitworth Hall is Derbyshire Darley Dale, which has a pink hue. Whilst the overall condition of the facings is reasonable there are now localised areas of decay which need addressing to prevent further deterioration of the fabric.



Welsh Minera sandstone to John Owens.

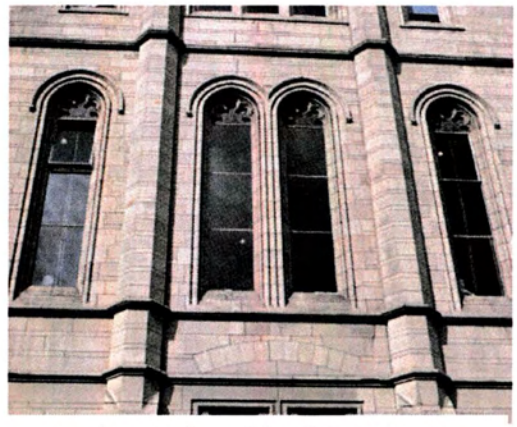
The stone coursing is consistent across all the main quadrangle buildings, with alternate thick and thin bands of ashlar with very fine joints. All elevations have string courses, features and details in the form of projecting mouldings which perform a weathering function, and most have carved decorative features to corbels, parapets and window/door openings.



Derbyshire Darly Dale to Christie.

Generally speaking, the yellow Welsh sandstone of the older Alfred Waterhouse building has stood the test of time better than the pinkish sandstone, the accelerated deterioration of which could be attributable to a number of factors. The stone could be of a less durable quality (technically) than the yellow, accounting for the contour scaling seen on all elevations, but, as Christie and Whitworth Hall were the last pieces in the quadrangle jigsaw, it is possible a cementitious mortar mix was used, restricting the ability of the fabric to 'breathe' through the joints, thus making the stone rather than the mortar the 'sacrificial' element of the wall. Aggressive cleaning techniques have contributed to the accelerated weathering of both sandstones.

Cracking is also noted through joints, and in some instances through stones in all buildings. This is most likely due to a combination of initial settlement and thermal movement, the ability of the building to accommodate both being restricted by the very tight ashlar joints. Whilst this movement is not considered serious or progressive any cracking should be pointed up to prevent water entering the fabric and accelerating decay. Other cracking, around window mullions and copings, can be directly attributable to the oxidisation of embedded iron. In these instances fixings will cut out and renewed in stainless steel.



Cracking in the gable of the Christie building over the left hand centre window.

The above defects are related to the original construction, however there are a number of issues attributable to more recent intervention, such as repointing in cementitious or linseed oil based mortars. Such areas will be renewed in lime mortar. There are localised areas where the stone is saturated from water ingress, indicating defects in the rainwater disposal system which will also be addressed as part of the works.

The approach to masonry repairs will be one of minimum intervention and like for like replacement, concentrating on the structural and weathering components of the facades. Localised cleaning will be undertaken to remove organic growth where it has taken hold on string courses, buttress caps and boundary walls. The anticipated scope of works is illustrated on drawing Nos. 4106/GA-01 to GA-13, and GA-01J to GA-13J submitted in support of this application, but to summarise, the techniques to be adopted will be as follows:

- Cleaning (using steam – the DOFF System, allowing gentle removal of algae etc).
- Pointing and mortar renewal in lime mortars.
- De-scaling (brushing down and rubbing up stone to remove friable surfaces).
- Re-dressing (using tools to re-dress stone that is severely deteriorated).

- Indenting of new stone to replace carved sections of badly deteriorated weathering mouldings, tracery etc.
- Indenting faces of ashlar stones where deterioration is severe.
- Replacement of full stone blocks where required for structural purposes or integrity.
- Addition of lead dpc below all flat coping stones to protect wallheads.
- Checking of all finials for stability.
- Checking of all finials, mullions/transoms for evidence of iron.

Window Repairs / Renewal

As summarised under the 'Heritage Assets and Climate Change' section of this statement improving the performance of the windows is one of the only practical means open to the University to upgrade the thermal efficiency of the heritage assets towards their target of reducing the carbon emissions of their building stock by 40% by 2020, and improving the comfort of the building occupiers.



Whitworth Hall south gable window.

The principal window types included in this phase of the works can be summarised as follows on a building by building basis:

Burlington Street gable of Whitworth Hall:-

Plain and pictorial leaded light glazing direct into stone reveals / tracery, supported by internal ferramenta, and with some glazing retained internally by timber beads.

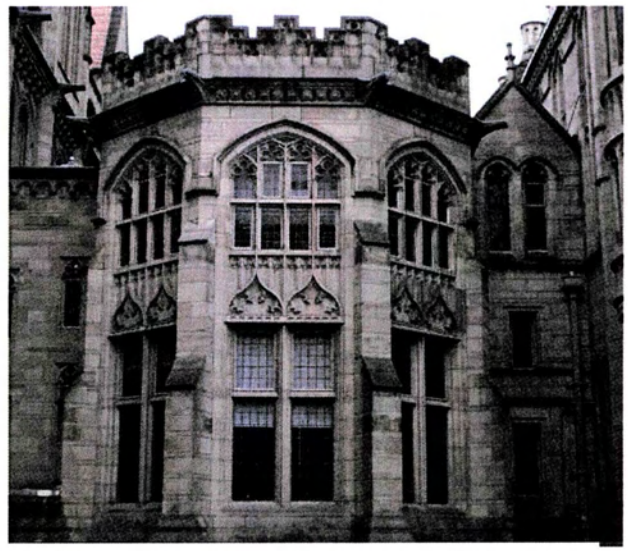
Some lights have built in metal opening casements, and, with the exception of the main west window into the ceremonial space, all serve circulation areas.

Christie Building Link to Whitworth Hall:-

Plain leaded light glazing direct into stone surrounds and tracery, supported by internal ferramenta and retained internally by timber beads, and with metal framed opening casements.

One fixed metal framed light.

With the exception of the windows into the projecting bay, all serve circulation areas.



Link between Christie and Whitworth Hall.



Christie building south gable.

Burlington Street gable of Christie Building and short eastern return:-

Plain plate single glazing direct into stone surrounds, broken vertically by metal 'T' section transoms between panes and retained internally by timber beads, and incorporating metal opening casements. Where window openings have arched heads leaded lights are glazed into rebates in the cusped stone tracery.

All are into cafe / office areas.

Burlington Street wing of John Owens:-

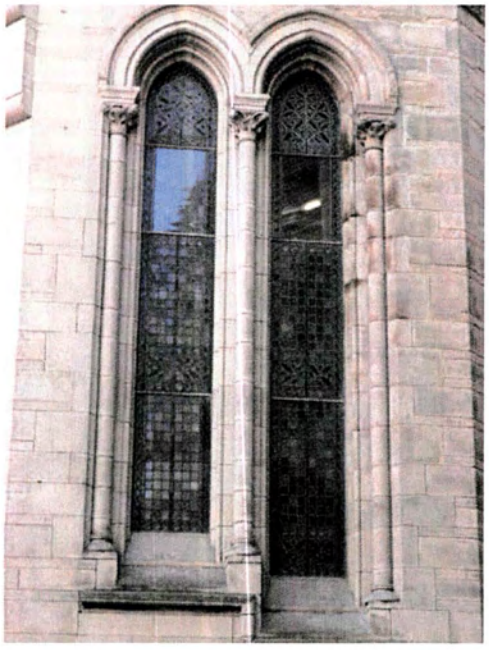
Lower windows are composite single glazed steel framed windows incorporating opening lights and small make up blanking panels below the lower transom, and a separate fixed single glazed arched headed steel window over the upper transom.

The upper floor windows are single glazed timber vertically sliding sashes, and timber casement windows are incorporated into the roof dormers.

All serve office spaces.



Burlington Street façade of John Owens.



Stairwell windows into John Owens.

Quadrangle Facades of John Owens:-

Stairwells and circulation areas are lit by pictorial leaded light glazing direct into stone reveals / tracery, supported by internal ferramenta and broken vertically by metal 'T' section transoms, with some glazing retained internally by timber beads. Some lights have built in metal opening casements. Basement sections have leaded glass / plain plate single glazing, in timber casements.

Office areas have single glazed timber vertically sliding sashes, some with square / arched headed bottom hung inward opening casements above the stone transoms of the larger ground floor window openings, and timber casement windows are incorporated into the roof dormers. A number of single glazed sash and casement windows serve the basement accommodation.

The approach to window repairs will be, as far as possible given the prerequisite to improve the thermal efficiency of the components, one of minimum intervention and like for like replacement. Whilst this is possible in many cases, where double glazing is a requirement of the use of the room this will be sympathetically introduced, using 'slim line' sealed units, to maintain the current elevational appearance of the Heritage Assets.

It should be noted that no historic glass has been identified in the windows where double glazing is proposed. The multiplicity of window types and configurations means that the proposed scope of works to each has to be treated largely on an individual basis, and this is illustrated on drawing Nos. 4106/WR-01 to WR-16 submitted in support of this application.



Windows into office areas, John Owens.

Such is the nature of the works that the precise detail of some of the proposals will need to be developed further with the appointed contractor's specialist sub-contractor, but from consultation with specialists prior to tender we are confident that the current appearance can be maintained incorporating the proposed thermal upgrades. To summarise, the techniques to be adopted will be as follows:

- Refurbishment of stained glass & plain leaded glass in circulation spaces and Whitworth Hall by removal from the existing openings, re-leading the glass, and building back into their structural openings. Opening lights and 'T' section mullions will be blast cleaned and redecorated, and ferramenta will be renewed.
- Refurbishment of leaded glass as above with the installation of secondary glazing to improve comfort to office spaces in the Christie link to Whitworth Hall. The secondary glazing will be carefully designed to minimise visual impact.
- Replacement of metal single glazed windows to John Owens with slim line double glazed units in Crittall Corporate W20 Range metal frames, incorporating make up panels where necessary to obscure the edge of an inserted floor.
- Refurbishment of timber framed windows, to John Owens, whether sash or casement, and removal of single glazing in lieu of slim line double glazed units in the existing casements, routed out to accommodate the greater section depth of the glass if necessary.
- Single glazing direct into the stone surrounds of the Christie building is to be removed and replaced with slim line double glazed units, incorporating transoms and opening lights from the Crittall Corporate W20 Range. The retaining angle at the jambs will be concealed behind the stone rebates to retain the existing visually frameless appearance of the glass.

Feedback from pre application consultation was generally supportive of the proposals, but with some reservations in respect of the treatment of the Burlington Street facade of John Owens. Historic research has proved inconclusive as to the original glazing pattern to the

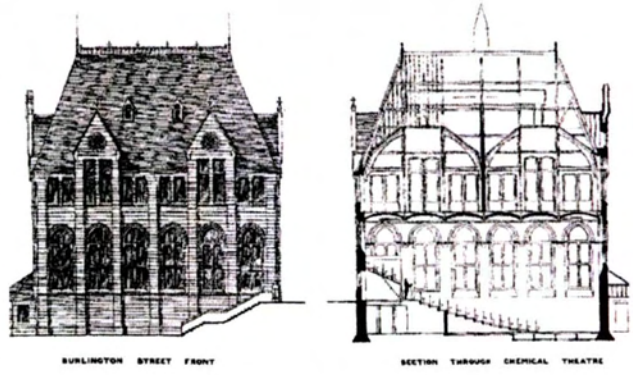
lower windows, being unclear on Waterhouse's drawings, and early photographs. What is clear is that by the time the site on the south side of Burlington Street was being developed in 1961 the window configuration is clearly different to that seen today, incorporating additional sub division of the lower lights.



View towards Burlington Street in 1961, with the south façade of John Owens on the left.

What can be ascertained from Waterhouse's drawings is the fact that the space behind this facade was originally a lecture theatre, the former raking seating having long since been removed and the floor levelled. A mezzanine has subsequently been introduced behind the lower transom, the date of this work being unclear but likely to correspond to the fitting of the current windows, as these incorporate a slim panel to mask the floor edge.

The relationship of the lower stone transom to the position of the window in the stone opening suggests that the original window pattern within each arch headed opening would have been 2 No. vertically sliding sashes where the sash boxes were continuous behind the transom, which concealed the meeting rails of each casement, and the double sash boxes were in turn masked by the centre mullion. A separate arch headed bottom hung inward opening casement would have filled the arched opening over the top transom.



Waterhouse drawings showing the Burlington Street elevation and original section through the lecture theatre showing the former tiered seating arrangement.

The upper floor windows have changed little, but historic photographs suggest that the bottom sash casements of the large twin windows in the gables had no subdivision in the form of timber transoms on the line of the meeting rails of the adjacent sash windows, and this seems to be confirmed by the images of the front of John Owens at this level..

With the insertion of the floor and resultant compartmentation and ventilation requirements for the accommodation on both levels, reinstatement of the windows to what is believed to be the original design is clearly impractical. The required continuity of the sash frame is interrupted by the inserted floor, the exposed edge of which would be seen across the opening if the glazing pattern was replicated. Similarly ventilating air would not easily be afforded to each floor, as radiators are placed in front of the windows at mezzanine level. For these reasons

we have decided to follow the existing window configuration whilst improving the thermal efficiency of the glass and panel masking the floor edge.

Works to Rainwater Goods:

Rainwater run off from the roof areas within this phase of the proposed works is collected and conveyed to ground in the following manner:

- John Owens: Cast iron eaves gutters sitting on stone corbels on the wall head, with localised areas of flat roof with parapet gutters, into circular section cast iron rainwater pipes which discharge via shoes over lower roofs / enclosed lightwells, or gullies.
- Christie: Cast iron eaves gutters sitting on stone mouldings at the wall head, into rectangular section aluminium downpipes discharging over a roofed over lightwell.
- Link between Christie and Whitworth Hall: Flat roofs with parapet gutters into cast iron hoppers and rectangular section aluminium downpipes discharging via shoes over a roofed over lightwell.
- Whitworth Hall: No rainwater goods included in this phase of the works.



Cast iron rainwater goods to John Owens (left) and aluminium downpipes to Christie (right).

Whilst in most areas the system appears to be working efficiently, many of the individual components are reaching the end of their useful lives both in terms of decoration and material wear. As with the masonry works minimum intervention and like for like replacement is largely envisaged, with the anticipated scope of works illustrated on drawing Nos. 4106/GA-01 to GA-13 submitted in support of this application. The principles to be adopted will be as follows:

- All cast iron gutters and rainwater pipes will be removed from the building for blast cleaning, dipping to coat all surfaces as part of the redecoration process, and refixing.

Many surfaces, particularly those to the rear of the pipes and underside of gutters will not have been decorated since being fitted, and it is likely that corrosion may be evident in these areas. An allowance of 40% renewal of components across the board has been made to cater for such eventualities.

In addition the following design defects have been identified and will be addressed as part of the forthcoming phase:

- The lead lined parapet gutters draining the flat roofs each side of the John Owens stairwells discharge through constricted outlets in the gutter base through the parapet walls and branch into the adjacent rainwater pipes. The outlets can readily block, and the pipes are surcharged in times of heavy rainfall. With no overflow water builds up in the gutter and is drawn into the wall head by capillary action.
- The eaves gutters to both John Owens and Christie sit directly on stone mouldings at the head of the wall. Any leakage at the gutter joints or outlets, or failure of any components will result in concentrations of weathering accelerating decay of the masonry, and saturation of the wall head.
- The rectangular section rainwater pipes, formerly cast iron, have been renewed in thin gauge metal, most likely aluminium. These have suffered from impact damage and general distortion as the gauge and quality of the material has clearly proved insufficient for purpose.

The proposal for each is as follows:

- The rainwater outlets to the stairwell roofs in John Owens will be reconfigured to bypass the existing outlets. Discharge will be routed into new rainwater pipes with shoes at the base via lead chutes with weir overflows. This requires introducing deep catchpits to the parapet gutters by digging pockets in the wall head to allow the chutes to penetrate the wall under the carved decorative band below the parapet, whilst minor redressing of string courses will be necessary to accommodate the new rainwater pipe. Refer to sketch detail 4106/SK01 included in support of this application.
- Where gutters rest on stone corbels a lead flashing/dpc will be introduced under the gutter prior to the components being refixed. This will protect the wallhead from any future water ingress due to overflowing or leakage due to defects in the system.
- All rectangular rainwater pipes in inferior gauge metals will be renewed in cast iron, retaining the section sizes and general layouts of the components as original. The existing strap fixing brackets are still available as a casting and will be renewed.



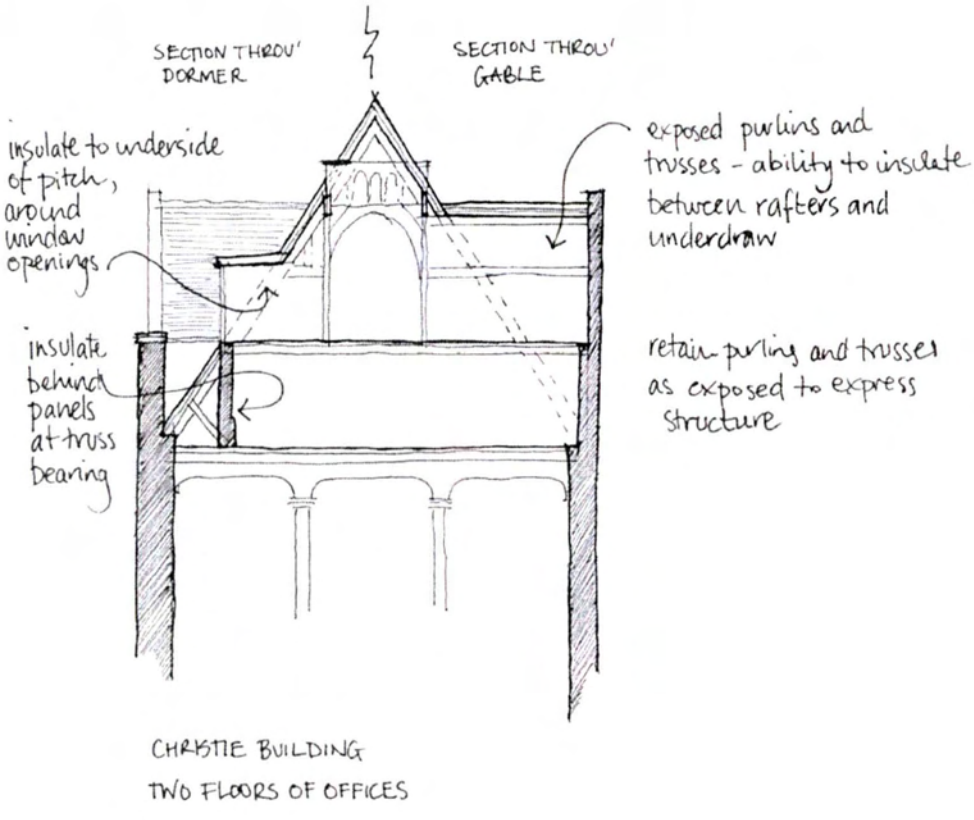
Lead roof and parapet gutters over John Owens Stairwells. Note parapet outlet branching into rainwater pipe serving adjacent eaves gutters.

Works to Improve the Thermal Efficiency of Roofs:

There is little opportunity for improving the thermal efficiency of the roofs of the building contained in this phase of the works. Whitworth Hall would be impractical to insulate without renewal of the roof coverings due to the significance of the boarded ceiling within the space, whilst the complexity of the upper storeys of John Owens have resulted in a decision to include any such upgrades in a later phase of works to this building.

The internal spaces of the Christie Building are also significant, but could be considered already compromised by the addition of plaster to the underside of the original ceiling, which appears as if it may have been boarded on the underside of the original rafters. This intervention may be associated with the building's change in use from library to offices, but the exact date of the installation is not clear. As the ceiling is plastered and plain, there would be little detrimental effect if insulation were to be added to the underside of the pitch, internally.

The exposed purlins and trusses are at present, substantial, therefore a layer of rigid-board insulation, underdrawn with plasterboard is proposed. The plasterboard will be skimmed with gypsum. Gypsum will not be used on any of the existing external walls directly.





2 No. views of the ceiling in Christie from the second floor mezzanine.

The insulation and plasterboard are to be fitted to a depth that retains approximately 50mm depth of the exposed purlins. Exact depths to be confirmed following survey.

The thickening the depth of the roof build-up will impact on the small dormer window reveals at high level, large dormers at office floor level, and the lancet windows to the gables. The finishing of the reveals will be made good by either extending window liners or plastering. Specific details to be confirmed once the survey of each area has been carried out.

Walls that box-in in the base of the trusses will also be insulated behind. Sheepswool quilt insulation is proposed to these areas.

During the pre-application consultation it was accepted that there was no likelihood of the plaster in the affected areas being original or having any historic merit.

Pre- Application Advice.

During the development of the schemes forming both this phase of the works and the wider programme of fabric repairs to the Quadrangle buildings and Museum, the Local Authority were consulted and the Conservation Officer attended 2 No. meetings where the overall scope of works across the Heritage Assets as a whole was discussed.

The first meeting was held on 15 July 2011, in the Beyer building meeting room, followed by a brief walk round site to look at the Christie building ceiling and John Owens porch roofs. The attendees were:

- Paul Mason, Manchester City Council Conservation Officer.
- Sam Johnson, Manchester University Design Services.

- Duncan Sanderson, Lloyd Evans Prichard.

The main points to come out of this meeting were as follows:

- The strategy for window repairs needed to be developed further, as the information available at this time had only been produced for inclusion in the Stage C Report, the information contained in for all elements of fabric formed the basis of the discussions. It was also requested that a follow up meeting be held with Nick Grimshaw of English Heritage to review the window proposals.
- The proposals to rationalise the means of rainwater disposal to the John Owens porch roofs were acceptable in principle.
- The insulating of the sloping soffit of the Christie building was similarly approved.

Prior to going out to tender for the Phase 3 works a second meeting was held, on 10 August 2011, which took the form of a walk round Quadrangle, Museum, Rear Quadrangle, Burlington Street and Coupland Street. The attendees at this meeting were:

- Nick Grimshaw, English Heritage
- Paul Mason, Manchester City Council Conservation Officer
- Sam Johnson, Manchester University Design Services.
- Duncan Sanderson, Lloyd Evans Prichard.

The main issues arising from this meeting were:

- The treatment of the proposed replacement windows to the Burlington Street elevation of John Owens, in particular the glazing pattern of the lower composite lights.
- Whether the plain glass built into the stained glass of the stairwell lights in John Owens should be replaced with leaded glazing.
- Whether string courses to be cut out for the new rainwater pipes to John Owens should have new stone sections inserted which enclose the pipes.

The first issue has been addressed by research which proved to be inconclusive in respect of the original glazing configuration, which has been much changed over the years, so we propose to replicate the current layout. Refer to the relevant section of the report for further details. Similarly in the case of the stairwell windows we have found no photographic or other information so far which confirms the original glazing pattern of the lancets, which we propose to restore 'like for like'.

In the case of the string courses we feel that carefully cutting out for the new rainwater pipes is a more 'honest' intervention than replicating an original moulding around the pipe, which may lead to confusion in future interpretation of the fabric. Our proposals reflect this.