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Dear David

Science and Industry Museum: Full Planning Permission and Listed Building Consent for removal of the Power Hall roof

Please find enclosed an application for Full Planning Permission and Listed Building Consent for removal of the Power Hall roof. The Science and Industry Museum is located to the north west of central Manchester, to the east of the River Irwell and is within the Castlefield Conservation Area. The Applicant is the Science and Industry Museum.

1 Background and Context

In December 2020, £4.3 million from the Government's Public Sector Decarbonisation Scheme was awarded to the Power Hall and the wider Science and Industry Museum (SIM) site to substantially improve energy efficiency and lower carbon emissions across this globally significant site. This grant will ensure the museum's environmental sustainability and support Greater Manchester's goal to become carbon neutral by 2038 – 12 years ahead of the national target.

This environmental sustainability will utilise some of its unique site specific opportunities. For example, in 1830 a well was built on the site to harness the power of the ground water. This natural resource will once again be utilised by the installation of new water source heat pumps and boreholes along with the latest green technologies. This is a visionary, sector-leading project where the original and modern combine to create a sustainable museum of the future. Additional funding from the Department for Culture, Media and Sport will help to place carbon literacy and zero carbon technology at the heart of the museum's story and visitor experience, as well as assisting in undertaking urgent and major repairs to the Power Hall. Overall, the project will transform the Power Hall into a landmark symbol of the past, present and future of engineering, inspiring future scientists, entrepreneurs and innovators in developing careers and skills to help achieve a green economy and the next (green) industrial revolution.

The Power Hall and Decarbonisation project is to be delivered as one project. However, the required Planning and Listed Building Consent applications must be split into several separate applications due to

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the different Listings of the buildings and the deadlines for the Government's Public Sector Decarbonisation Scheme which needs to be completed this year. Splitting the consent packages will also allow construction work to start on site earlier and ensure the Applicant meet the Government deadlines.

The proposed applications are as follows:

Works Package	Package Description	Planning and Listed Building Consent Applications	Submission / Determination
1A	Water Source Heat Pump Network (External) Water Source Heat Pump and other associated plant in the Power Hall	Application for Listed Building Consent for alterations to the Grade II Listed Power Hall for the creation of openings and the installation of plant plus the introduction of a services trench within its curtilage.	Due to be determined 18 June 2021
1B	Boiler House External Modifications (to facilitate installation of a new sub-station) Pipework in the 1830 Warehouse (to facilitate installation of a new water source heat pump)	- Application for Listed Building Consent for installation of a new services trench within the curtilage of the Grade II New Warehouse. - Application for Planning Permission external works to the Boiler Room including removal of an external staircase and making good in addition to the installation of a new balustrade and new doors. - Application for Listed Building Consent for alterations to the Grade I Listed 1830 Warehouse for the creation of openings and the installation of pipework plus the introduction of a services trench and borehole cover within its curtilage.	
2	Power Hall Roof (to allow early investigative work)	Application for Planning Permission & Listed Building Consent	May 2021
3	Power Hall New Roof, Windows & Doors and 1980s Platform Removal	Application for Planning Permission & Listed Building Consent	June 2021
4	Power Hall Gallery Refurbishment	Application for Planning Permission & Listed Building Consent	Autumn 2021

This application relates specifically to Element 2 of the works package for the removal of the Power Hall Roof to allow early investigative work, as highlighted in the table above in **bold** text.

The Power Hall is a Grade II Listed building within the Science and Industry Museum complex. The Science and Industry Museum is located to the north-west of central Manchester, to the east of the River Irwell and within the Castlefield Conservation Area.

The Power Hall was erected as a shipping shed in 1855 for the LNWR to provide space for immediate unloading and transportation of goods on to carts, trucks and overnight garaging for locomotives. Offices were built at its western end in the early 1860s to serve the administrative functions of the shipping shed. In 1881, a substantial electrical travelling gantry train was installed by the LNWR, adjoining the northern elevation of the building to support its expanded use. The building remained in use as a goods transfer shed until the mid 1970s.

In the late 1970s – mid 1980s, a series of considerable repairs and alterations were carried out and an extension was added to the north west of the Site to convert the building into a gallery for the Science and Industry Museum. The shipping shed was subsequently renamed the 'Power Hall' and has housed the Museum's collection of locomotives since 1983.

In 2018 the Power Hall was closed to members of the public due to health and safety concerns in relation to the poor condition of the roof. In the same year, a £6 million grant from the Department of Digital, Culture, Media and Sport and additional funding from the Science Museum Group was committed to the Power Hall to facilitate urgent and major repairs to the roof and a redisplay of the gallery content to show how Manchester changed the world. To date, the building has remained scaffold and initial surveys have been undertaken alongside design feasibility works.

The below plan identifies where the Power Hall is located within the Science Museum estate.

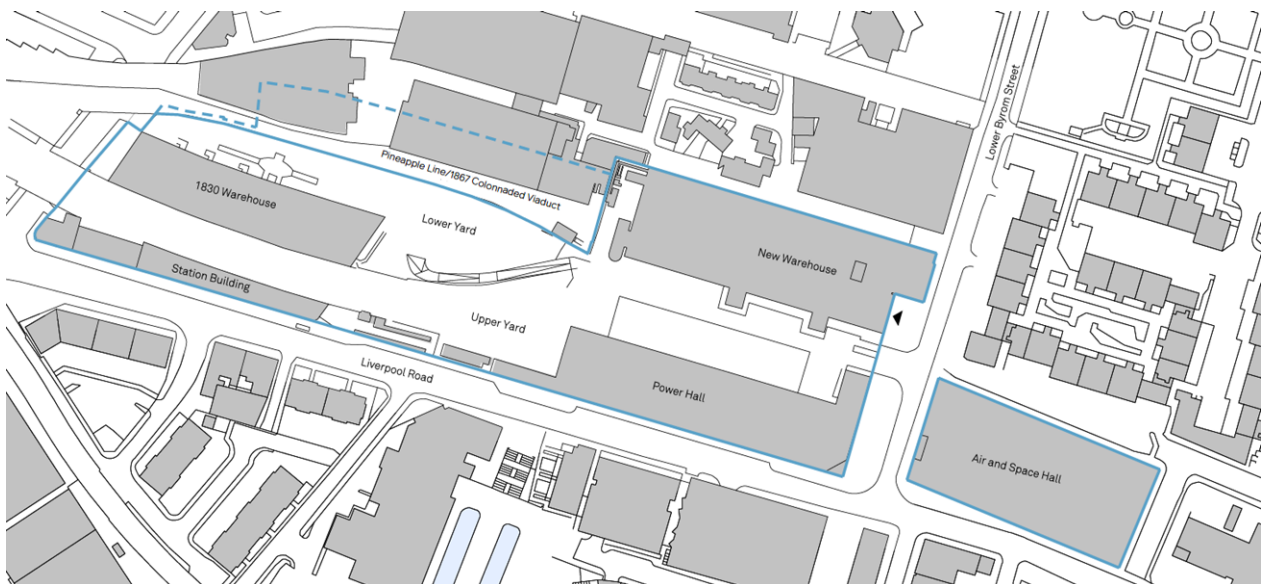


Figure 1 – Site Plan of Science Museum Estate

2 Justification for Separating Elements 2 and 3

Although separating the applications for the roof removal (Element 2) and roof replacement (Element 3) is a highly unusual approach, these are exceptional circumstances caused by the extremely tight programme imposed on the project by Salix funding (Department for Business, Energy & Industrial Strategy). The overall intention of the Museum is to ensure that the received Salix funding has maximum impact and provides public benefit derived from a high-quality refurbishment of the Grade II listed building and the Gallery itself.

There will be significant programme gains from progressing the removal of the roof while final design decisions are made on the roof replacement, reducing the risk of delay from long lead times. Any programme gain will lead to cost savings for the Museum and allow them to attribute more funds to improve the public use and experience of the building. A programme gain of 4 weeks would save up to £40,000 through reducing the time that the contractors are needed on site. This money can then be spent on the Gallery refurbishment element.

There are also clear technical benefits to separating the applications. Stripping the roof early will allow for steel to be measured and pre-ordered to suit site dimensions, minimising the risk of delay of material shortages or long lead times. Further to this, there will be certainty on the number, size and type of slates available for reuse.

Until the roof is completely stripped, the extent of necessary repairs cannot be confirmed. As any additional repairs beyond the current budget of £553,000 will need to be funded from the Gallery refurbishment fund, this will impact the final use of the building for the public and so there is a strong benefit of confirming costs at an earlier stage so that the budget for the remaining elements of the project can be finalised.

Due to the existence of consented scaffolding on site already (PP Ref 124421/FO/2019), any perceived harm in terms of heritage impact is minimal as the building will remain covered at all times. The early roof strip will also allow the scaffolding to be removed sooner. For every month beyond February 2022, scaffolding will cost an additional £20,000 per month which will come out of budget allocated to the Gallery Refurbishment.

Finally, Conisbee structural engineers have carried out an assessment on the Power Hall flitch beams, and the ability to fully strip the roof early is imperative to the structural strategy. All the flitch beams in the Power Hall are significantly deflected owing to their large span-to-depth ratio and considerable concentrated loads applied at midspan by alternate roof trusses. While the general condition of the flitch beams is good, partial corrosion at the extremities of the wrought iron plates is concerning as these elements contribute most to the beam's strength and stiffness.

The dimensions, loading, deflection and condition of the flitch beams gives reasonable cause for concern about their structural capacity, and specifically their ability to safely support any additional load – however small – that will be applied to them by the enhanced roof finishes and access requirements (details to be submitted as part of the Element 3 applications).

A detailed structural analysis of the flitch beams has been undertaken based on the known mechanical properties of the wrought iron and timber obtained via material sampling and testing in several different

locations within the Power Hall. This has revealed that the beams have significantly exceeded their serviceability limit (i.e. they have deflected beyond normal acceptable limits) and are operating close to their ultimate limit (i.e. they have almost exceeded their ability to support additional load without material failure). Consequently, it is recommended that each flitch beam will require strengthening to enable them to support additional load.

Several strengthening options have been developed including installation of new steelwork on either side of each beam or beneath each beam, but owing to the significant aesthetic and practical disadvantages presented by these options they have been rejected in favour of a much less obtrusive approach in which steel beams are positioned above each flitch beam, connected to them at midspan by a discrete underslung bracket and supported on them at each end where they bear on the bracketed cast iron columns. The steel beams are designed to provide supplementary strength only where needed and will be pre-cambered to maximise their efficiency and minimise their depth. This is a carefully considered unobtrusive solution which constitutes a reversible, sympathetic, honest and minimally invasive intervention.

The only way to install the steel beams is from above following removal of the existing roof finishes, and in view of the roof structure repairs required elsewhere within the Power Hall coupled with the challenging delivery programme it is essential this occurs as soon as practically possible so that all parts of the fabric can be exposed for inspection, assessment and measured survey. Early completion of this process will enable due allowance to be made in the design proposals for the distortion of the structure and any unexpected discoveries that may be made in currently inaccessible areas, and will also simplify and minimise the temporary loadings and temporary works required in some areas to support parts of the roof structure during their repair.

3 Significance of the Power Hall

The Power Hall is of high historic value for its role as one of Manchester's key hubs for goods transfer and it represents the success of the Liverpool Road Station as part of a wider network of goods distribution across the country and throughout the world. It is also representative of the site's historic development – as the first major building to be erected following the station's transfer to a goods only station in 1844. The building is also significant as the first building to be converted and used by the Museum to celebrate the station's 150th anniversary.

The site and the building are of high evidential value for the continued development of the site for goods and shipping sheds.

It is of high aesthetic value as a rare survivor of an early urban goods transfer shed and is representative of development of the railway good sheds as a building type.

Some of the building's features exemplify LNWR's architectural standards – including the roof lights and the blind arcading to its street-facing elevations, which contributes to its significance.

The former Goods Offices contribute to the building's significance and are representative of the mid-Victorian development of the good station and are a typical example of their type.

The late-19th century travelling crane, located along the north elevation is of high significance as an increasingly rare survivor of its type.

The mid-20th century WC block has little or no architectural value and does not contribute. The early-1980s Visitor Entrance Block was designed to reflect the architecture and detailing of the Power Hall, however it fails to contribute as its details are not well-handled and it features large expanses of smoked brown glazing, which detracts. Overall, this building is of neutral significance.

The Power Hall's extremely long and imposing Liverpool Road elevation forms the frontage of the Museum's site and represents the Victorian phase of its development as a good station. It therefore makes significant contribution to the character and appearance of the conservation area.

The building's Welsh slate roof was re-laid in the late 1970s as part of the major repair works, though some areas appear to retain original, rehung (random size) slates. With the exception of the original slated areas, the slates themselves are of low evidential value.

The central and northern rooflights, although not original glazing and adapted in size, appear in largely original locations and exhibit the LNWR's preference for rooflights rather than windows in the side walls. They are of moderate overall significance.

As the rooflights within the south slopes have been reduced in number, adapted in size and shifted to new lower positions as part of the 1979 works, they are of lower significance.

For further information please see the accompanying Heritage Impact Assessment prepared by Donald Insall.

4 Pre-application Engagement

The scope of this application has been discussed and agreed with Manchester City Council as the Local Planning Authority on 04 March 2021. A Planning Officer and Conservation Officer from Manchester City Council were also taken on a tour of the site on 12 May 2021 and 27 May 2021 where the proposals were explained in more detail.

Andrew Davidson from Historic England was also invited to an initial site visit on 24 March 2021, however they advised that Historic England would not need to be consulted further as overall the proposals did not meet the statutory requirements for consulting Historic England and therefore the statutory responsibility for dealing with the proposals would rest with Manchester City Council. Historic England also noted that overall the proposals are an opportunity to inform and educate the public about climate change and its interaction with historic buildings. Historic England and the Victorian Society have been issued with further briefing emails on these specific applications (Element 2).

5 Proposals and Methodology

The description of development as written on the application form is:

"Full Planning Permission and Listed Building Consent for removal of Power Hall roof."

5.1 Stripping of Roof

A full description of the proposed methodology is provided in the accompanying Method Statement prepared by H.H Smith and is summarised below.

Recording

The roof will be fully photographically recorded prior to any works. When stripping the roof, logs will be made to record any significant discoveries and any relevant photographs and logs will be collated into a report and deposited in the Museum archives and shared with Manchester City Council.

Structural Monitoring Works

The roof structure will undergo a slight upward movement as the finishes are stripped and the load on it is gradually reduced. This is expected and normal and gives no cause for concern.

The reduced roof load will lead to a reduction of the friction resistance that helps prevent the truss bearings from sliding and there is a small risk that outward or inward lateral movement of the roof or wall could occur at some of the truss bearings. Due to the superior connection of the trusses to the columns, the risk of possible movement at those locations is low.

To enable detection of any unexpected or excessive movement that might occur beyond agreed threshold levels as the roof finishes are removed, Movement Monitoring Equipment producing remotely accessible data in real time has been installed at the wall and column heads along the full length of the Power Hall. The data will be reviewed on a daily basis and if any concerning data is observed the relevant works will be halted and the relevant area of the structure inspected by the structural engineer and contractor. Works will only be allowed to proceed following the approval of the structural engineer together with the implementation of any mitigation measures that may be necessary.

Protecting Historic Fabric

The original roof structure and cast-iron columns will be protected with a combination of correx sheeting and timber hoarding to protect them against any falling objects during the strip. However, the priority will be to prevent through careful working by operatives.

The Historic Machines below will be protected from the works by scaffold crash deck.

Skips will be placed within the hoarding and sat on plywood boards to prevent any damage to cobbles. The access routes into the building and to the skips will also be protected by plywood.

Removal of Roof Lights

Roof lights are to be removed from the roof underside one at a time and carefully lifted on to the scaffold crash deck used for access. The rooflight framework is to be carefully removed by cutting it with an electrical hand saw while ensuring that it does not come into contact with the slates, timber roof structure and cast iron columns so that no historic fabric is damaged.

Removal of Slate

The main slate areas are to be stripped using a slate ripper tool with care being taken not to damage the slates and ensure that as much as possible is reusable. Slates are then to be moved to the New Warehouse using hand carts and then stacked on slate pallets on the scaffold loading bays.

The section of diminishing slate is to be photographically recorded prior to removal and marked up in order to be identified clearly at a later date for reuse on the hip ends. The slate which is to be retained will

be securely wrapped and stored safely onsite in order to increase the percentage of reclaimed slate and reduce wastage.

Any slates which cannot be salvaged for reuse will be recycled.

Removal of Ventilation Cowls

Once the slates have been removed and the base of the ventilation cowls are fully exposed, they will be cut out using a metal grinder with care being taken not to damage any structure below. Care is to be taken when cutting near the timber roof structure and cast-iron columns to ensure historic fabric is not damaged.

Removal of Roof Build Up

Batten, counter batten and insulation is to be removed sectionally following the slates as this provides fall protection whilst working. Battens will be removed by pulling out fixings using a combination of crow bars, claw or pry bar. Following the removing of fixings, any felt or membrane is also to be lifted.

Removal of Metal Gutters, Timber Gutter Supports and Lead Flashings

The existing modern metal gutters and flashings are inadequate with repeated issues of water ingress to the building and so they will be removed (along with the modern timber gutter supports) in order to allow for a more robust detail to be installed to protect the heritage elements of the building for future use.

In order to remove lead flashing fixed into masonry, a plugging chisel and club hammer will be used to chip out the mortar holding it in place. Sections of old flashing will be stripped and the mortar joint where it sat will be cleaned out using a wire brush. The internal edges of the flashing will be carefully prised up using a small prybar and moved to loading bays. It will then be recycled or sold for reuse.

Removal of Central Valley Gutter

Once the central valley gutter has been exposed sufficiently, flashing will be cut out using a small grinder. Sections of aluminium gutter will be removed, with these works being carried out from the plant deck to ensure that care is taken to avoid any damage to the historic roof.

Removal of Modern Rafters and Gutter Supports

Following the removals, a survey will be completed with Donald Insall Associates to establish which rafters and gutter supports are modern. A full photographic survey will be completed to record the location of the modern rafters and gutter supports.

Access to remove these will be from the crash deck and where necessary from a tower scaffold on top of the crash deck. The surrounding structures will be protected with correx and timber hardboard.

Future Roof Proposals

Another application detailing the future roof reinstatement proposals (Element 3) is in preparation and an indicative proposal is provided on page 30 of the accompanying Design & Access Statement prepared by

Carmody Groarke. The Element 3 application is likely to be submitted c. 4 weeks after this Element 2 application.

We suggest that a planning condition is imposed on any potential consent of this application for the roof strip which requires the roof to be fully reinstated or for an application for Planning Permission and Listed Building Consent to be submitted for the replacement of the roof within an agreed timescale from the grant of consent for its removal. We would suggest the timescale for the submission of the follow-up application is 4 weeks from submission of this application, and the full reinstatement of the roof is February 2022.

6 Accordance with Planning Policy

Heritage and Conservation

The key material planning consideration for this application is the impact on the designated assets on site and therefore adherence to planning policy regarding the historic environment.

Paragraph 192 of the NPPF (2019) states that *“in determining applications, local planning authorities should take account of:*

- *the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;*
- *the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and*
- *the desirability of new development making a positive contribution to local character and distinctiveness.”*

Paragraphs 193-196 place great weight on the conservation of designated heritage assets, emphasising the need to avoid “substantial harm” in terms of demolition, significant alteration, or compromise the setting unless that harm is clearly justified (via four specific tests) or there are substantial public benefits that outweigh that harm. Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits.

The accompanying Heritage Impact Assessment states that whilst the fabric to be removed is of mostly low evidential significance given its date, its aesthetic value is high and its role as a principal element of the building’s envelope cannot be underestimated. As such, the physical impact of removing the Power Hall’s roof coverings could be perceived to result in harm to the significance of the listed building and character of the conservation areas through water damage to the building and aesthetically by losing one of its defining features.

However, this is a temporary state (as can be controlled via applying conditions to any decision notice) which would be mitigated in the first instance by the presence of temporary covered protection, ensuring that the significant historic fabric below is protected from the elements. Further to this, any perceived harm would be mitigated by the forthcoming proposals for the repair of the roof structure and its recovering in reclaimed natural slate.

The Heritage Impact Assessment therefore concludes that the proposals would result in no harm to the significance of heritage assets overall should the reinstatement of the roof be delivered within a timely manner. However, should Manchester City Council disagree with this, any perceived harm would be considered less than substantial harm and would be outweighed by the public benefits associated with the scheme.

As previously explained, there are significant public benefits arising from separating the applications for roof removal (Element 2) and roof replacement (Element 3). The cost savings for the Museum from the programme gain will allow more funds to be attributed to improving the public use and experience of the building. The money saved from reducing the amount of time that the contractors are on site can then be spent on the Gallery refurbishment, again improving the experience for visitors to the Museum.

Further to this, by being able to confirm the extent of necessary repairs to the roof and costs of this at an earlier stage, the budget for the remaining elements of the project can be finalised and the budget for the Gallery refurbishment and required design work can be finalised.

Reducing the roof loadings at an earlier stage, and ensuring a minimally intrusive structural solution to be proposed, will also help to ensure the building's good conservation. This has a public benefit and specifically a heritage benefit, in that it will allow the building to continue to be enjoyed by visitors in a safe and comfortable condition and environment and enable the public to not only benefit from the educational function of the new Gallery, but also enable increased understanding of the significance of this Grade II listed building.

Taking this into account, the proposals are in accordance with Paragraph 192-196 of the NPPF.

This approach is in line with Policy CC9 Design and Heritage within the adopted Manchester Core Strategy (2012). This policy sets out that development in Manchester City Centre should protect or enhance the heritage assets that have been identified, including listed buildings, conservation areas and scheduled ancient monuments. The Policy also supports the need to ensure buildings are of the highest standard in terms of appearance and function, and all reinstatement works will repair the listed fabric to match the original like-for-like.

Saved UDP Policy DC18.1 states that the Council give particularly careful consideration to development within Conservation Areas and will seek to preserve and enhance the character of these designated areas, while saved UDP Policy DC19.1 states that applications for listed building consent involving or having an impact on buildings of Special Architectural or Historic Interest will have regard to securing the retention, restoration, maintenance and continued use of such buildings and to protecting their general setting.

The removal of a series of failed and inappropriate materials including plasterboard, Georgian wired glass and polycarbonate panels, redundant modern pipework and mushroom vents – which detract for the significance of the listed building – would result in a heritage benefit.

The works proposed to facilitate the future repair and reuse and conservation of the building will in fact see the significance of the building preserved and its contribution to the character and appearance of the conservation area enhanced long term despite the temporary removal of this fabric.

The proposals can therefore be considered to be in accordance with Policy CC9 Design and Heritage of the Manchester Core Strategy (2012) as well saved UDP Policies DC18.1 and DC19.1.

To conclude, this is an unusual instance whereby the temporary removal of the roof coverings is an act of conservation rather than destruction in that it forms a necessary step to enable the adequate funding of later stages in this major refurbishment project.

The proposed works are temporary, protective and are associated to future reinstatement and repair works which would overall preserve the special interest of the listed building and character of the conservation area.

Other Considerations

A Bat Survey was carried out for the Power Hall in August 2019 and concluded that no evidence of bat activity was found and that the building is considered to offer negligible bat roost suitability. A review of this and additional site visit has been undertaken by ERAP Consultant Ecologists to verify the original conclusion of this report.

It is therefore considered that the proposed development is compliant with national planning legislation and guidance as well as with Manchester's local policies. Taking this into account, it is concluded that the proposed development should be recommended for approval.

7 Application Documents

The following information is provided in support of this application:

- Covering Letter, prepared by Deloitte Real Estate;
- Application Drawings (see Appendix A), prepared by Carmody Groarke;
- Design & Access Statement, prepared by Carmody Groarke;
- Power Hall & Decarbonisation Vision document, prepared by Science & Industry Museum;
- Heritage Impact Assessment for The Power Hall Part of the Power Hall and Decarbonisation Project, prepared by Donald Insall Associates;
- Risk Assessment and Method Statement ('Roof Strip'), prepared by H.H Smith;
- Daytime Bat and Nesting Bird Survey of the Power Hall (August 2019), prepared by Rachel Hacking Ecology; and
- Letter re Bat Survey (June 2021), prepared by ERAP

The Planning Portal Reference is: PP-09880242 and the requested planning application fee has been paid online.

We look forward to receiving your confirmation that the application has been formally registered. In the meantime, if you have any queries or require any further information, please do not hesitate to contact me or my colleague, Katie Wray (0161 455 6350 / kawray@deloitte.co.uk).

Yours sincerely

A handwritten signature in blue ink, appearing to read "J Cooper", enclosed within a light gray rectangular border.

John Cooper

For Deloitte LLP

Appendix A – Power Hall Roof Removal – Drawings Schedule

Drawing Description	Reference
06-GA Existing	
Existing Roof Plan	PHL-CGA-00-RF-DR-A-06101
Existing Reflected Ceiling Plan	PHL-CGA-00-00-DR-A-P06120
Existing Section 01-02	PHL-CGA-00-XX-DR-A-P06200
Existing Elevation 01-02	PHL-CGA-00-XX-DR-A-P06300
Existing Elevation 03-04	PHL-CGA-00-XX-DR-A-P06301
Existing Roof Detail	PHL-CGA-00-00-DR-A-P06500
Existing Parapet and Gutter Detail	PHL-CGA-00-00-DR-A-P06501
00-GA Demolition	
Demolition Roof Plan	PHL-CGA-00-RF-DR-A-P00101
Demolition Reflected Ceiling Plan	PHL-CGA-00-00-DR-A-P00120
Demolition Section 01-02	PHL-CGA-00-XX-DR-A-P00200
Demolition Elevation 01-02	PHL-CGA-00-XX-DR-A-P00300
Demolition Elevation 03-04	PHL-CGA-00-XX-DR-A-P00301
Demolition Roof Detail	PHL-CGA-00-00-DR-A-P00500
Demolition Parapet and Gutter Detail	PHL-CGA-00-00-DR-A-P00501