



OUR TOWN HALL
MANCHESTER CITY COUNCIL
Radiator Audit and Justification Statement
June 2021
OTH-PUR-XX-XX-RPT-A-0143
For information
Rev 01

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Introduction

This document has been prepared by Mark Clifford (IHBC) , Senior Heritage Consultant, Purcell, to provide an assessment of the significance of the radiators throughout the Town Hall, assess the options to reduce or mitigate harm and assess the subsequent impact upon significance.

The proposal under consideration requires the removal of much of the historic heating infrastructure across the building as part of the installation of new services. This approach to locating services behind perimeter boxing and its heritage impact is discussed elsewhere, primarily in OTH-PUR-XX-XX-RPT-A-0131. Where possible historic radiators are to be retained in-situ (or reinstated where they are currently removed), however, clashes with the new services will require the removal of some historic heating elements which is outlined in this report with the associated impact and justification.



Executive Summary

Radiator Audit and Justification Statement

Historic Significance of Existing Building Services

The building services of Manchester Town Hall illustrates the technology of the time. Their significance is to some degree lessened as a result of areas of replacement and modification; however, the remaining historic elements of building services are of some interest in their own right.

The greater weighting of significance lies in how established systems were efficiently and effectively applied to the specific form and design of the Town Hall under the skilful direction of Alfred Waterhouse. For the majority of building services, their significance therefore lies less in their physical elements (designed for renewal) and more in the sophisticated system of operation designed by Waterhouse – including the service routes and heating/ventilation function of the nodal stairs.

The significance of many of the radiators themselves is limited as they are of low aesthetic value and are part of the infrastructure that was not intended to be seen, however, they have historical and evidential value demonstrating the past servicing of the building and are of medium significance.

The level of potential harm through loss of fabric associated with MEP services considers the functionality and finite lifespan of these components. When considering the design intent of Alfred Waterhouse, his use of new technology illustrates his intent for a modern, functional and comfortable building. The concept of perimeter services is a continuation of a historic solution to services, therefore, an expectation follows that when these services fail they should be replaced with modern technology offering a similar solution.

Proposed Approach

The proposed heating strategy and associated calculations dictate a level of heating that we would struggle to provide using the existing heat emitters, along with warranty and servicing issues of using the historic components. By using the existing radiator locations for services, it reduces harm to the building by not having further penetrations or larger perimeter boxing which harms the

aesthetics of the spaces. This approach does mean the loss of most historic radiators as they clash with the new heat emitters, however, this harm is considered to be minor adverse, it is outweighed by the public benefits of servicing the spaces and mitigated by the retention in-situ of example radiators.

Where no change is proposed, historic radiators will be left in-situ. Only those that have an unavoidable clash with the new services are to be removed. One example radiator in the Great Hall will be retained in-situ (with a second in storage) and at least 15¹ others will either be reinstated or retained. 40 will be removed and stored or disposed of following MCC's Historical Asset Retention and Disposal Policy with input from the Building Asset Working Group. Those radiators to be retained in-situ contain at least one example of each of the three main types found on site.

¹ Many radiators are behind boxing that it is not proposed to disturb so the exact number will be higher than this.

Historic Background

Building Services: The National Context

The Victorian period was one of great developments in engineering, including in relation to building services. For heating and ventilation systems, this saw a move from simple stoves to more common use of steam and other more highly engineered systems. From around 1860 onwards, hot water heating boilers were manufactured in quantity, with the first room heaters formed of pipe coils and radiators introduced in the 1880's. Within this national context, Manchester made a notable contribution as a hub of productivity and new ideas. The first 'convoluted' stove was designed by Joseph Constantine in 1866 and the widely used 'Lancashire boiler' was developed by Sir William Fairbairn in Manchester in 1855. The Price Brothers of Bristol are attributed for the spread of wider heating systems of this kind, having secured a patent in 1829 for their system.

Early hot water boilers used for heating were generally low-pressure, and from around the mid-19th century Yorkshire became a centre for the production of heating boilers, with notable names including; Graham & Fleming; Lumby, Soon & Wood; Robert Jenkins and Hartley & Sugden.

An early form of heating distribution was formed of cast or wrought iron pipes, which became increasingly sophisticated throughout the 19th century. However, the unsightly nature of these elements often lead to their covering. The covering of heating pipes with decorative elements was established from as early as 1824, and by the mid-late 1800s, features such as decorative heating pedestals can be found in notable developments such as Cardiff Castle.

Manchester Town Hall's building services

The heating and ventilation services at Manchester Town Hall reflect the technology of its time, following many of the practices of its day. Under the skilful hand of Alfred Waterhouse, the services design is inextricable from the planform and wider design of the building. Services were distributed efficiently through the building using peripheral routes (running under-floor in the principal rooms) and grate covered routes running in the courtyard facing corridors.

Utilising the nodal location of the circular stairs, large heating coils were placed at their base, allowing warm air to be distributed upward through the building at these key points. While two of the heating elements to

the base of the nodal spiral stairs have been removed and replaced, the Cooper Street spiral heating is probably the oldest or original to the building and helps to date other radiators of a similar style. This radiator is being retained in-situ.

However, the heater in the Lloyd Street spiral was manufactured in Hull by the *'Ideal Boilers & Radiators Company'* who were specialist manufacturers of cast iron radiators, boilers and accessories serving the heating and ventilation industry. Ideal Boilers & Radiators formed as company in 1894 with the Hull factory opening in 1904 helping to date this component as a later addition from the early 20th century. It would seem likely that other replacement components would also date from this period or considerably later in the case of the Princess Street spiral.



Figure 1 Advert for Ideal Boilers from c.1920s

More traditional and passive systems are also present across the building in the form of additional heating through fireplace provision and ventilation masonry provision under many of the windows.

Many of the radiators are concealed by ornate panelling which would appear to be of the first phase Alfred Waterhouse design, but it is also possible that at least some radiators are either later replacements (especially the 'Ideal' examples from the early to mid-twentieth century) as parts failed or are new elements added to improve heating in certain spaces.

Many of the service runs have neat arched collars where perimeter heating pipes run around the room suggesting an original design but equally some spaces have pipework crudely broken through the brickwork suggesting they have been retrofitted. Therefore, dating the heating system and attributing it to Waterhouse is difficult and it could relate to an immediately post construction change or the considerable alterations carried out by Paul Waterhouse in the 1890's.

Significance

The level of significance has been assessed against the values and criteria set out in OTH-PUR-XX-XXRPT-A-0007, 'the heritage engagement and assessment strategy'. Waterhouse's application of these services within the context of the design of Manchester Town Hall were highly integrated, skilful and efficient. Within the wider national context, the majority of building services of Manchester Town Hall reflect the designs of their time. The overall systems were not revolutionary in terms of building services, however they were of a quality befitting the importance of a major civic building. The most notable areas of interest in heritage terms are where Waterhouse applied these services in a bespoke, creative and innovative fashion such as the remaining stair core heating element. Over time, this original system has seen some notable change. The building engineering services have been modified, extended or replaced as a result of condition and developing needs over time.

The original boiler has been removed and replaced. The original distribution routes remain in good use, including the perimeter runs, underfloor routes and below-grill corridor systems. The pipes themselves survive piecemeal, with the original large-diameter cast iron pipes extant in areas and with substantial replacement in others. Evidence of localised failure is evident in areas of repair and replacement.

Larger heating elements including radiators have similarly varied levels of survival – ranging from possibly original elements to earlier and later 20th century replacements. The building services of Manchester Town Hall illustrates well the technology of the time. Their significance is to some degree lessened as a result of areas of replacement and modification, however the remaining original and historic elements of building services are of some interest in their own right.

The greater weighting of significance lies in how established systems were efficiently and effectively applied to the specific form and design of the Town Hall under the skilful direction of Alfred Waterhouse. For the majority of building services, their significance therefore lies less in their physical elements (designed for renewal) and more in the sophisticated system of operation designed by Waterhouse – including the services routes and heating/ventilation function of the nodal stairs. Exceptions to 'system over fabric' form of significance are physical elements which are key surviving features critical to the design or highly bespoke, such as the original heating element at the Cooper Street spiral.

The significance of many of the other radiators themselves is limited as they are of low aesthetic value and are part of the infrastructure that was not intended to be seen, however, they have historical and evidential value demonstrating the past servicing of the building and are of **medium significance**.



Figure 2 The Cooper Street Spiral

Summary of radiator types at the Town Hall

There are a variety of radiators surviving within the Town Hall which can be broadly categorised into three groups –

- The coil radiators
- 'princess' radiators
- Other sectional radiator

(see appendix A for gazetteer)

Dating a type of radiator is difficult as only one radiator within the Town Hall had any maker's mark which is in the Lloyd Street stairwell by Ideal radiators dating it to after 1894, although many other 20th century radiators are identifiable as 'ideal' by their design features. There is also relatively little research on the subject of radiators, with little guidance from Historic England, therefore, the following compiles information from trade catalogues and general typology of design.

Coil Radiators

It appears the coil radiators are the oldest, as they are not a conventional radiator design that developed in the late 19th/ early 20th century. This is not to say they are original as they may have been fitted later to improve heating in certain spaces but they are certainly historic if not original. These may have been custom assembled for spaces, however, they are made from a kit of parts, are modular in design and are still an 'off the shelf' design. The three spiral staircases likely all had large coil heaters with now only one remaining, with the others a series of late 20th century heating pipes and an early 20th century radiator by Ideal Boilers.



Figure 3 A coil radiator

The princess type radiator

The princess type radiator appears to be an off the shelf design. They were first manufactured by the American Radiator Company in 1892 or more commonly called the National Radiator Company in Europe from 1898 with the UK factory opening in 1905 which would later become Ideal Boilers.

The Beeston Boiler Company of Nottinghamshire were the second largest makers of sectional radiators also making a 'Princess & Duchess' range.

These were the first mass produced sectional cast iron radiator, first seen around the turn of the last century. Production of this larger proportioned 'Grand' style ceased toward the end of the 1920's in favour of the slightly more compact Neo Classic range.² The princess type radiators at the Town Hall are likely to date from c.1900. They are predominantly found in the Great Hall and may have been introduced to improve conditions around the mural paintings and heat the large space.



Figure 4 A princess radiator



Figure 5 c.1900 trade catalogue showing a princess radiator

Other sectional radiators

There a number of miscellaneous radiators similar to the princess type but are of a thinner section and are wall fitted, lacking the legs of the princess type. The 'dart' design on the front suggests they are also made by 'Ideal'. These are the most recent radiators. Lacking any maker's marks they are difficult to date but they are likely to be mid-20th century.

Figure 6 A sectional radiator



² <https://www.salvagedoctor.co.uk/princess-and-duchess-range/>

Options Analysis

The following sets out a series of options relating to historic radiators and their potential replacement. Many approaches on site will be unique with bespoke solutions, however, the following is considered an overriding summary for the approaches across the building. With the impact assessed as set out in OTH-PUR-XX-XXRPT-A-0007, 'the heritage engagement and assessment strategy' using the template below.

MAGNITUDE OF IMPACT	DEFINITION
HIGH BENEFICIAL	The proposed changes will dramatically improve the overall setting and character of heritage assets and historic environment, revealing and/or enhancing important characteristics which were previously inaccessible. There would be a substantial improvement to important elements of the building. Any change resulting in a positive impact should be encouraged.
MODERATE BENEFICIAL	The proposed changes will considerably improve the setting or overall character of the heritage asset and surrounding streetscape. There may be an improvement in key uses and beneficial change (e.g. the creation of coherency) to the visual characteristics of the interior of the building. Any change resulting in a positive impact should be encouraged.
MINOR BENEFICIAL	The proposed changes may cause minimal improvement to the setting or overall character of a heritage asset or area. Any change resulting in a positive impact should be encouraged.
NEGLIGIBLE	The proposed changes will have no impact on the heritage asset.
MINOR ADVERSE	The proposed changes will have minimal impact on the setting or overall character of a heritage asset. Change of this magnitude may be acceptable if suitable mitigation is carried out.
MODERATE ADVERSE	The proposed changes will negatively alter the setting or overall character of the heritage asset or area. It will likely disturb key features and detract from the overall heritage significance. Change of this magnitude should be avoided where possible, but can be neutralised through positive mitigation.
HIGH ADVERSE	The proposed changes will seriously damage the overall setting and character of heritage assets. They will cause a notable disruption to or in some cases complete destruction of important features. Change of this magnitude should be avoided.

Option	Commentary	Impact on Significance
1) Do nothing (re-use existing system)	The pressure of the new heating system can cause problems with historic radiators and in some instance can cause the tanks to burst or explode. They can also contaminate the water supply of the new pipework and radiators that are due to be installed. The rooms will remain underheated and not provide adequate comfort levels for users.	Neutral
2) Retain the existing radiators whilst also installing a modern replacement	In most instances historic radiators are concealed behind ornate panelled boxing (possibly designed by Waterhouse) which enhances the setting of the room by concealing what Waterhouse may have considered unsightly M&E. To install a new system alongside the old would mean major alterations to the boxing which would have a resulting impact on the visual appearance of the spaces.	Whilst this retains the radiators the impact on the spaces due to changes to the perimeter boxing would be minor adverse.
3) Remove the existing radiators but replace with a modern replica / reproduction	To replace with an outdated design would lack many of the efficiencies a modern system can provide. Either the radiator would have to be larger to heat the space adequately (again altering the boxing) or it would be inefficient and may not achieve the required comfort levels. ARUP and NG Baileys were consulted and they were unaware of any contractor able to make a bespoke radiator so whilst feasible to undertake, the cost would be considerable.	Neutral / minor adverse. Whilst there is some loss of historic fabric this is mitigated by the reproduction.
4) Replace the existing radiators with a modern replacement	This would achieve the required comfort levels for the space, retains the appearance and aesthetic of the rooms with no / minimal alterations to perimeter boxing but does result in the loss of the historic fabric of the radiators.	Minor adverse. This results in the loss of historic fabric although as the fabric is mechanical this harm is reduced and means a continuation of a historic solution to services.

The Proposal

The proposal under consideration (option 4 above) requires the removal of much of the historic heating infrastructure across the building as part of the installation of the new services. Where possible historic radiators are to be retained in-situ (or reinstated where they are currently removed), however, clashes with the new services will require the removal of some historic heating elements. Only where there is a clear clash between the new services and an existing historic radiator that cannot be resolved or mitigated will the radiator be removed. For example, where no new services are proposed existing radiators will be disconnected and left in-situ (e.g. Rad55). In the Great Hall one radiator will be reinstated adjacent to the new services (see figure 7). Any radiator identified for removal will follow the MCC 'Historical Asset Retention and Disposal Policy' with input from Building Asset Working Group on whether to store or dispose of each item.

Justification

The service strategy for the spaces and the intended comfort levels of temperature and heating are outlined in document - OTH-ARU-ZZ-ZZ-RPT-M-0037 Design Note – State Room HVAC Strategy.

The heating principles are the same throughout the building but the State Rooms are used as a case study.

The heating design for the State Rooms is based on the heating and ventilation calculations undertaken using the industry's leading thermal modelling software. The results (heat outputs) from the software were then reviewed by the responsible engineer, mechanical discipline lead and MEP team director to ensure the calculations are in line with CIBSE (Chartered Institution of Building Services Engineers) guidance. As a result of the heat output requirements, the heat emitters in each space have been sized and routed accordingly.

The State Rooms have been known to suffer with a lack of ventilation and heating. This was apparent in the surveys undertaken at RIBA 2 using temperature & CO2 monitoring devices. This data is presented in OTH-ARU-TH-ZZ-FN-M-0004 'Thermal Modelling Data'.

The heat outputs cannot be met using the existing emitters. The feedback from the building occupiers and the environmental monitoring data collected during RIBA 2 support this. The building originally relied on significantly sized fireplaces, in some

instances two units per room which will no longer be used. To achieve the indoor comfort temperatures to be able to hold events in these spaces, there is a need to compensate for the loss of the fireplaces. Bearing in mind the heritage considerations, the number and size of the heat emitters were limited and positioned in the most sympathetic way to the building's heritage.

To retain the maximum amount of historic fabric within the building, the option to re-use the radiators was explored (option one), however, as with other radiators on site, the pressure of the new heating system can cause problems with historic radiators and in some instances can cause the tanks to burst or explode.

The historic radiators also comprise components that are not widely available, meaning maintenance and repairs have been an ongoing issue for these spaces and would continue to be a problem if retained.

The existing heating system components are well past their normal life expectancy. Connecting these components to a new system would cause significant issues with water quality, as any contamination (detritus, rust, bacteria etc.) would spread to the rest of the system. This would inevitably damage other system components in other rooms, which could be as critical as the control valves, causing significant issues related to the operation and maintenance of the building. The existing heat emitters would require abrasive cleaning, possibly affecting their wall thicknesses. Hence, impacting their pressure rating.

All components are required to withstand a certain pressure rating for the system to operate safely. Due to rusting and microcracks over time, we anticipate that the existing heat emitters are not on par with the modern materials. From a CDM perspective, it is not possible for us to accept anything less than what is specified for the rest of the building to eliminate any health and safety risks associated with overbuilding pressure. The existing heaters can be pressure tested, but pressure tests on old components are fraught with problems and warranty issues.

By re-using these existing radiators, it also does not solve the ongoing issue of the lack of comfortable heating for these spaces.

"The staterooms are the main income generator for the building and will be key to

ensuring we have revenue to maintain this historic building in the future. It is imperative that the environmental conditions in the rooms are what you would expect for a premier events venue in one of the world's leading cities in the 21st century."

– Carl Buls, FCMI CIWFM, Project Manager, Our Town Hall Project

With the possibility of re-using the existing radiators discounted, option two was considered to retain them in-situ amongst the new heating elements. This approach creates problems as a core part of the services strategy entails re-using existing pipework runs to minimise disruption to historic fabric and without creating new intrusions in historic fabric the location of the new services needs to be in the same location as the existing radiators. The heritage boxing has also been carefully designed to minimise the size and impact upon the spaces and retaining multiple radiators and heat emitters would impact upon this design. Therefore, retaining the radiators and installing the new heat emitters in the same space is not considered possible without significantly increasing the perimeter boxing which would negatively impact the rooms they are in. In the State Rooms, retaining one example radiator in-situ (not connected) was also considered, however, this wouldn't provide the space with the required heat output and would cause comfort issues. One coil type radiator is being kept in-situ in the Banqueting Room as an example.

It is proposed to re-open the air bricks throughout the building to provide a healthy level of ventilation for the occupants. This is in line with the building's original ventilation strategy. In winter, the cold air coming from the air bricks will cause discomfort and without all the heating specified it isn't possible to keep the room at the required comfort temperature. The design does not have spare capacity in these rooms which can be used to keep any heritage emitters in-situ.

Connecting these components, or a reproduction (option three), to the new system will cause issues related to the contractor and manufacturer warranties. This could, as a worst case, help the warranty providers build a strong case to refuse any claims in the future and in some instances the pressure can cause radiators to explode.

It is accepted that the least harmful approach may be to have reproduction radiators made (option three), however, unless they are increased in size, potentially affecting the

boxing, they will still not provide adequate comfort levels. Whilst cost is not an overriding factor it should also be emphasised that whilst feasible to have a new radiator cast there is no known contractor who replicates existing radiators and financially the cost is likely to be high for an item that will be hidden behind boxing.

Option four, to replace most historic radiators with modern heat emitters is considered the most practical solution to the requirements of the spaces and the building's heritage.

Summary

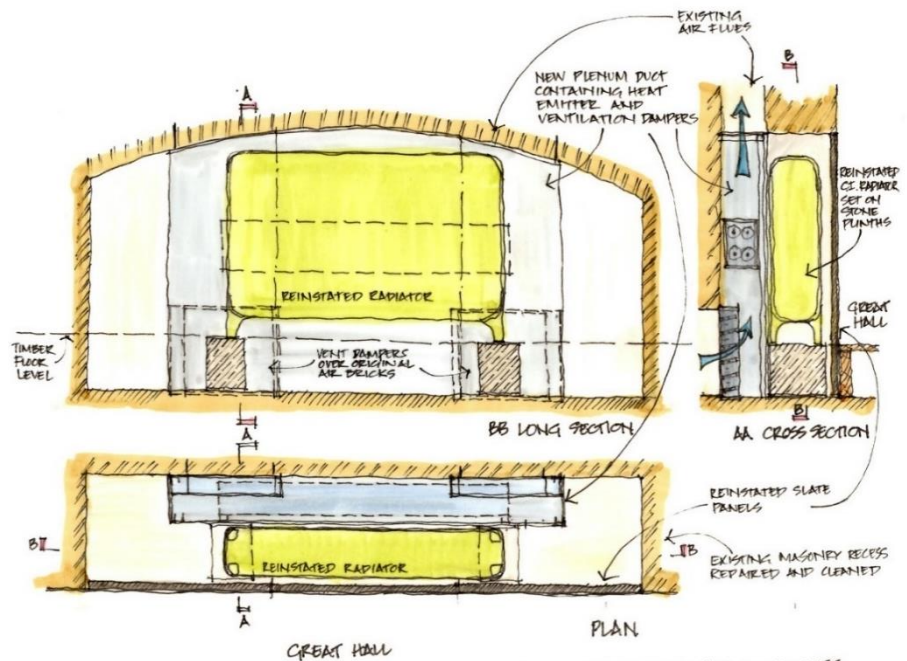
To summarise the above:

- The calculations dictated a certain level of heating that we struggle to provide due to the heritage constraints. Therefore, we cannot leave the existing emitters in situ.
- The issues related to re-using the existing emitters are as follows: ongoing maintenance, warranties, possible damage to other system components, health and safety risks and operational risks related to comfort.

The level of potential harm through loss of fabric associated with MEP services considers the functionality and finite lifespan of these components. When considering the design intent of the original architect Alfred Waterhouse, his use of new technology illustrates his intent for a modern, functional and comfortable building. It should be noted that the concept of perimeter services is a continuation of a historic solution to services, therefore, an expectation follows, that when these services fail they should be replaced with modern technology offering a similar solution.

For example,

'Keeping a large machine, like a water mill or boat lift, in use, may require replacement and modification of structural or moving parts which could be retained if it ceased to operate, producing a tension between authenticity of fabric and function'³.



MANCHESTER TOWN HALL - GREAT HALL - PROPOSED REINSTATED RADIATOR IN RECESS
(C) PURCELL JUNE 2021

Figure 7 The arrangement to retain a historic radiator in-situ within the Great Hall

³ Historic England (2008: 45), Conservation Principles, Policies and Guidance

In this instance the overriding value of adequately servicing the building and improving aesthetics of the spaces outweighs the loss of mechanical historic fabric, therefore, replacement of this historic fabric does constitute a loss, but is not considered harmful in the same way as the loss of architectural or decorative features would be. The proposal is considered the best outcome for the 11 key considerations of the service strategy (opposite). The principles and detail of the perimeter services have been carefully considered as part of the project as a whole and are considered to represent the solution that best meets the project objectives, including conservation of heritage significance.

The radiators for removal will be recorded and follow the MCC Historical Asset Retention and Disposal Policy following input from the Building Asset Working Group (see appendix B).

Whilst Waterhouse's M&E design is of significance not all the current components are original, and some are known to be later replacements. The significance predominantly relates to the strategy and approach rather than the built fabric which are of components that are generally not unique or rare and were widely manufactured. However, it is acknowledged there will be harm to significance by the proposals, but this is considered to be minor adverse and is outweighed by the public benefits of servicing the spaces and is preferable to the other options outlined.

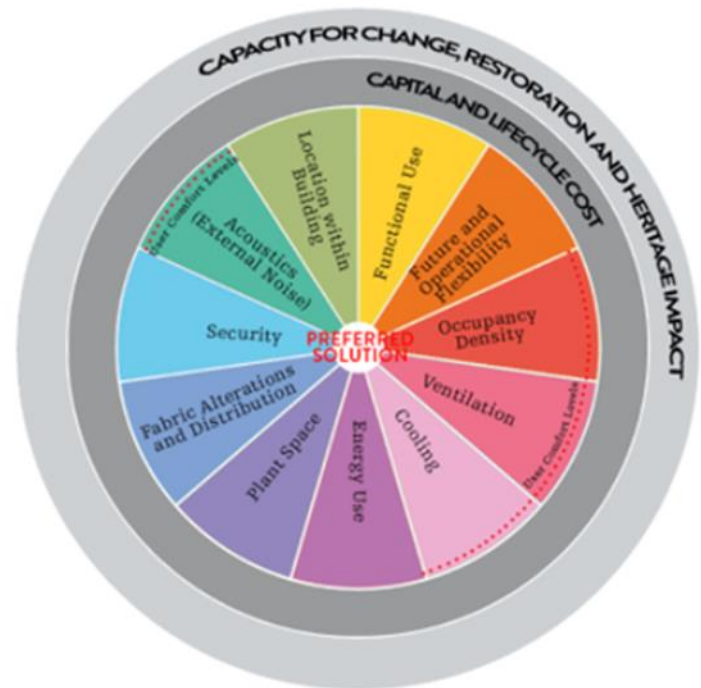


Figure 8 the many considerations that lead to a preferred solution, including heritage impact

Appendix A - Gazetteer

Please note that not all spaces were accessible due to construction work taking place on site. For example, the lower ground floor and the Great Hall were not accessed due to the high-risk works being undertaken at the time. However, a full audit of the remainder of the building was undertaken and any visible radiators were recorded in the list below. The list is not definitive as some spaces have radiators still behind perimeter boxing and they are not easily visible without the removal of the boxing, they have been noted as to be retained, however, the exact number and type is unknown.

Radiators have been recorded in the locations they were found, however, many have been removed and stored elsewhere so this may not be their original location.

Room Name / Number	Radiator type and reference	Image	Comments	Proposed Approach
Albert Square Entrance	Coil type (Rad1)		Radiator only partially visible behind iron grate	Retain in situ. New services not required in this location.
Albert Square Entrance	Coil type (Rad2)		Radiator only partially visible behind iron grate	remove
Princess Street Spiral Staircase	Modern pipework (Rad3)		Modern pipework (mid-late 20 th century) probably a replacement for the coil type.	remove

Lloyd Street Spiral	Sectional radiator (Rad4)		Maker's mark 'ideal radiators' therefore post-1894. Style squared and almost art-deco possibly suggesting 1920/30s.	Remove
Cooper Street Spiral Staircase	Coil type (Rad5)		Vertical coil type radiator from basement through to the ground floor. Probably the original or an early heating system. Late 19 th century.	Retain in situ. New services not required in this location.
Removed radiator found in the hallway of princess street corridor	Princess type radiator (Rad6)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.

07-001	Sectional radiator (Rad7)		This room was not identified as having a use on the Waterhouse plan but has since had shelving installed suggesting it may have been used to store documents hence the requirement for heating. Radiator lacks the ornate style of the one other radiator in the room suggesting it may be a later replacement. Probably. C.1900	Retain in situ. New services not required in this location.
07-001	Sectional radiator (Rad8)		This room was not identified as having a use on the Waterhouse plan but has since had shelving installed suggesting it may have been used to store documents hence the requirement for heating. Radiator lacks the ornate style of the one other radiator in the room suggesting it may be a later replacement. Probably. C.1900	Retain in situ. New services not required in this location.
07-001	Sectional radiator (Rad9)		Radiator has 'ears' and embossed castings of a floral and leaves pattern on the panels. Probably the original design for the radiators in this space. Late 19 th / early 20 th century. It is, however, possible this was salvaged from elsewhere.	Retain in situ. New services not required in this location.

07-001	Sectional radiator (Rad10)		This room was not identified as having a use on the Waterhouse plan but has since had shelving installed suggesting it may have been used to store documents hence the requirement for heating. Radiator lacks the ornate style of the one other radiator in the room suggesting it may be a later replacement. Probably. C.1900	Retain in situ. New services not required in this location.
07-001	Sectional radiator (Rad11)		This room was not identified as having a use on the Waterhouse plan but has since had shelving installed suggesting it may have been used to store documents hence the requirement for heating. Radiator lacks the ornate style of the one other radiator in the room suggesting it may be a later replacement. Design has elements of art-deco and square design suggesting possibly 1920s/30s.	Retain in situ. New services not required in this location.
The State Rooms / Banqueting rooms	Coil Radiator (Rad12)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove

The State Rooms / Banqueting rooms	Coil Radiator (Rad13)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
The State Rooms / Banqueting rooms	Coil Radiator (Rad14)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
The State Rooms / Banqueting rooms	Coil Radiator (Rad15)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove

The State Rooms / Banqueting rooms	Coil Radiator (Rad16)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
The State Rooms / Banqueting rooms	Coil Radiator (Rad17)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
The State Rooms / Banqueting rooms	Coil Radiator (Rad18)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove

The State Rooms / Banqueting rooms	Coil Radiator (Rad19)		A series of heating pipes with coils to increase surface area and dispense heat. This unit is triangular in shape to fit in the corner of the room. Probably late 19 th century.	remove
The State Rooms / Banqueting rooms	Coil Radiator (Rad20)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove

The State Rooms / Banqueting rooms	Coil Radiator (Rad21)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
Lord Mayor's rooms	sectional radiator (Rad22)		The design and the valves suggest these are later additions. Probably mid-20 th century.	remove
Lord Mayor's rooms	sectional radiator (Rad23)		The design and the valves suggest these are later additions. Probably mid-20 th century.	remove
Lord Mayor's rooms	sectional radiator (Rad24)		The design and the valves suggest these are later additions. Probably mid-20 th century.	remove

Lord Mayor's rooms	sectional radiator (Rad25)		The design and the valves suggest these are later additions. Probably mid-20 th century.	remove
Lord Mayor's rooms	sectional radiator (Rad26)		The design and the valves suggest these are later additions. Probably mid-20 th century.	remove
Lord Mayor's rooms	sectional radiator (Rad27)		The design and the valves suggest these are later additions. Probably mid-20 th century.	remove
Great Hall	Large princess type (Rad28)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.

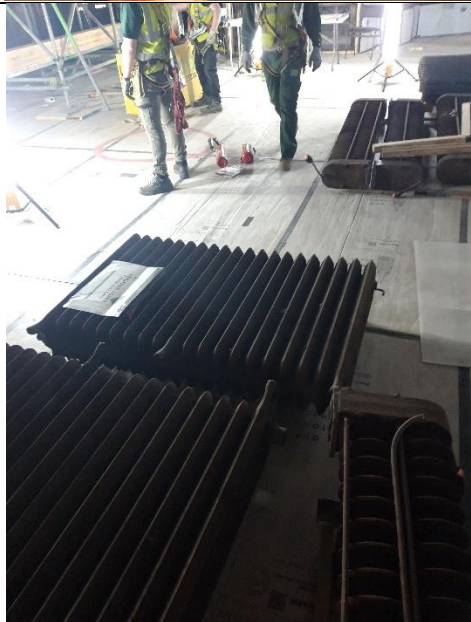
The State Rooms / Banqueting rooms	Coil Radiator (Rad29)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
Great Hall	Large princess type (Rad30)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.

The State Rooms / Banqueting rooms	Coil Radiator (Rad31)		A series of heating pipes with coils to increase surface area and disperse heat. Probably late 19 th century.	remove
Great Hall	Large princess type (Rad32)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.

Great Hall	Large princess type (Rad33)			From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.
The State Rooms / Banqueting rooms	Coil Radiator (Rad34)			A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
The State Rooms / Banqueting rooms	Coil Radiator (Rad35)			A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove

The State Rooms / Banqueting rooms	Coil Radiator (Rad36)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
Great Hall	Large princess type (Rad37)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.

The State Rooms / Banqueting rooms	Coil Radiator (Rad38)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove
The State Rooms / Banqueting rooms	Coil Radiator (Rad39)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove

Great Hall	Large princess type (Rad40)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.
Great Hall	Large princess type (Rad41)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.

The State Rooms / Banqueting rooms	3 Coil Radiator / 1 princess type (Rad42,43, 44,45)		Princess type from the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century.	Remove
Great Hall	Large princess type (Rad46)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.

Great Hall	Large princess type (Rad47)		From the Great Hall. Great Hall radiators sit on the stone blocks emphasising how these are 'off the shelf' and not bespoke. Probably late 19 th / early 20 th century. In the Great Hall two are proposed to be retained.	In the Great Hall one radiator is proposed to be reinstated in situ. One to be retained on site in an alternative location.
The State Rooms / Banqueting rooms	Coil Radiator (Rad48)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	remove

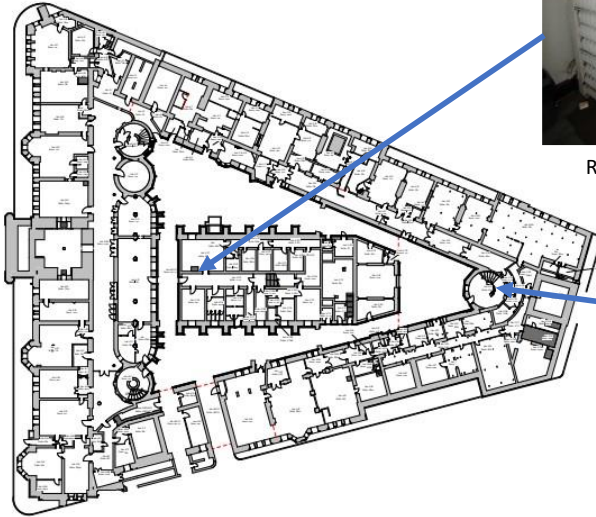
Treasure r's Rooms	(Rad49) (unknown number)		Radiators concealed behind historic grill unknown number	Retained in situ. New services not required in this location.
Ground floor corridor (beneath benches)	Sectional radiators (Rad50) (unknown number)		Not accessed due to temporary protection and storage in the area.	One example to be retained in situ. The remainder to be removed.
Central Stairs	Coil type (Rad51)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	Retained in situ. New services not required in this location.
Central Stairs	Coil type (Rad52)		A series of heating pipes with coils to increase surface area and dispense heat. Probably late 19 th century.	Retained in situ. New services not required in this location.

Lord Mayor's stair	(Rad53)		Radiator type not known	Retained in situ. New services not required in this location.	
Lord Mayor's stair	Coil type (Rad54)	Not pictured due to construction work in the area		Radiator type not known	Remove
State Rooms	Coil type (Rad55)		Large coil type radiator concealed behind historic joinery and screen.	Retain in situ. New services not required in this location.	
From unknown location	Sectional radiator (Rad56)		It was located as a loose item on level 6 Lloyd St elevation. C.1930s style radiator with a deflector to increase heat emission.	To be stored off site.	

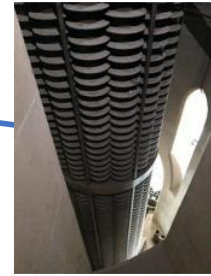
LG-046	Coil type (Rad57)		Upright coil type radiator	Temporarily removed for constructio n work and will be reinstated.
Cooper Street Spiral	Coil type (Rad 58 and 59)		Two coil type radiators previously removed and stored as loose items behind the Cooper Street Spiral.	Remove. These radiators are the same as those found in the State Rooms.

Radiators to be retained in-situ or reinstated (approximate location shown) – (The Lower Ground Floor has not been surveyed due to construction work)

Lower Ground

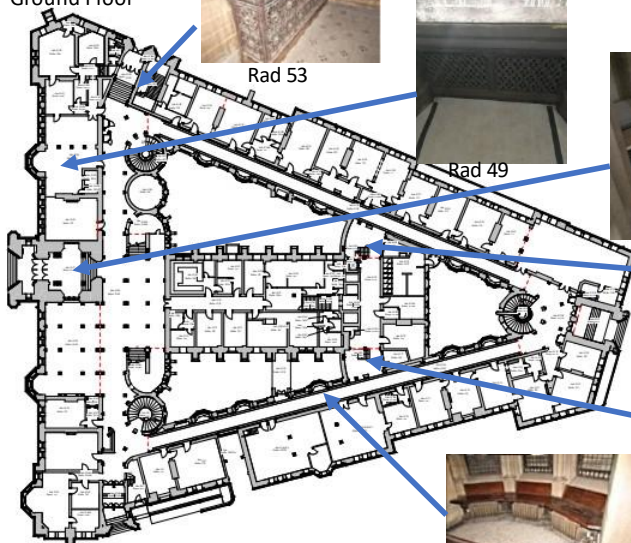


Rad 57



Rad 5

Ground Floor



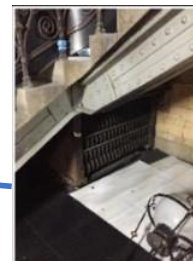
Rad 53



Rad 49



Rad 1



Rad 52



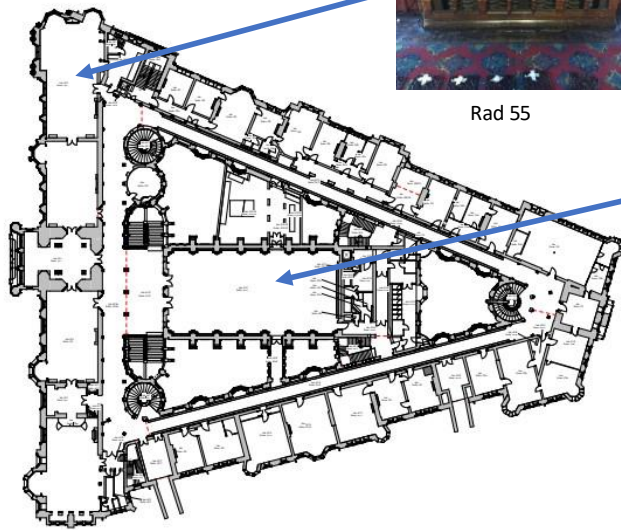
Rad 51

Rad 50



One example to be retained. Location to be confirmed

Level 1

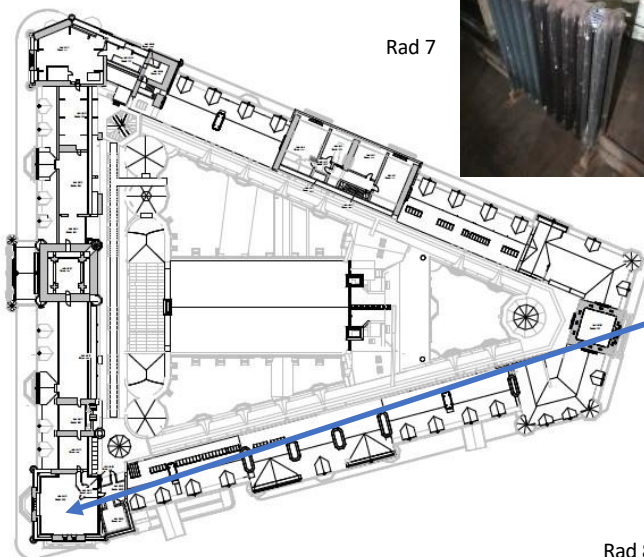


Rad 55



One example to be reinstated. Location to be confirmed

Level 7



Rad 7



Rad 10



Rad 11



Rad 8

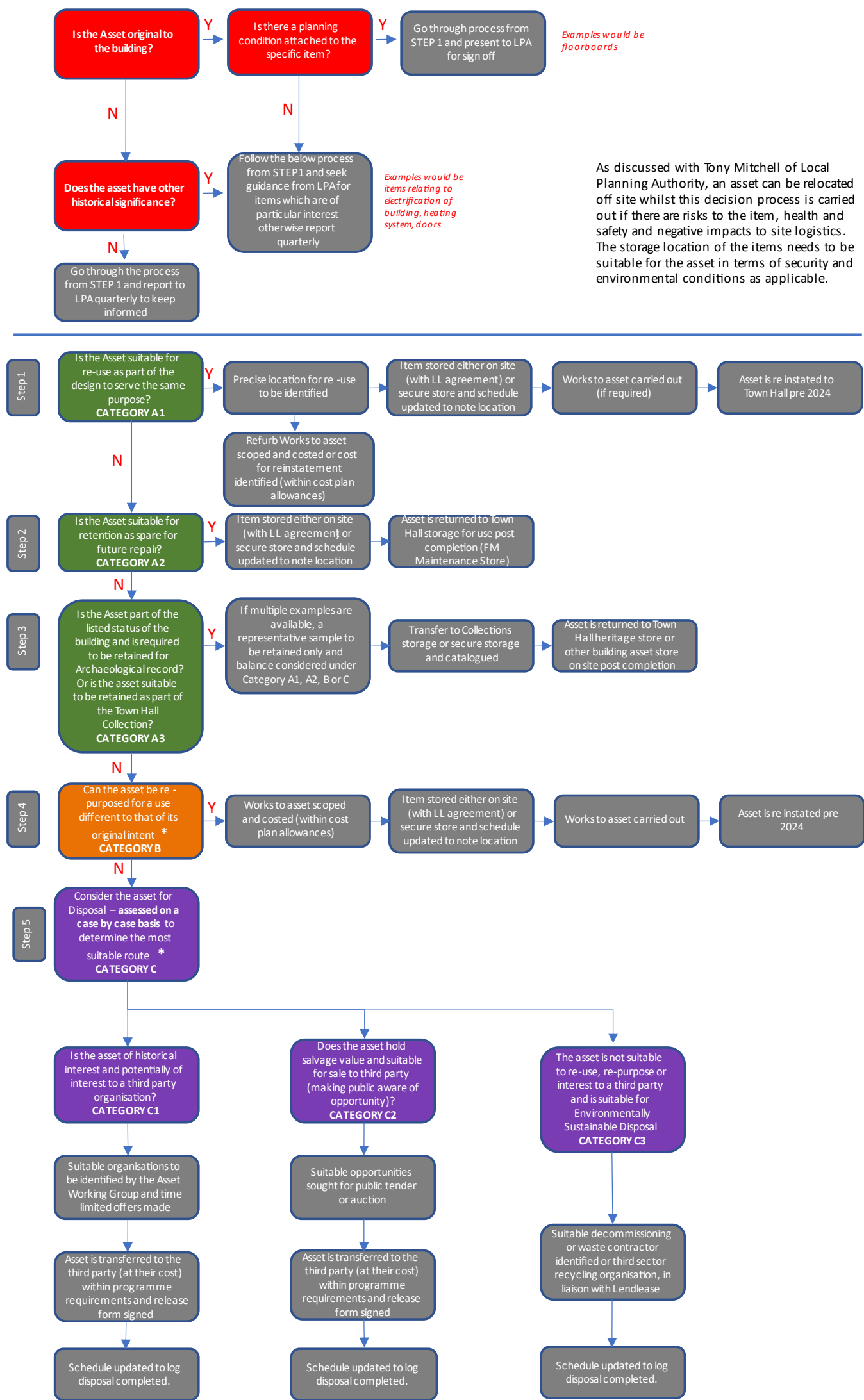


Rad 9

Appendix B - Historical Building Assets Retention and Disposal Policy Flow Chart

V5 10/12/2020

This flow chart is a summary of the policy process however please refer to the full policy wording for full implementation criteria



* In accordance with the policy, if the item is of very high significance and is to be categorized as Category B or C then it should be consulted with at the regular forum.

Example 1 – Great Hall Radiators (ARCHAEOLOGICAL RECORD AND DISPOSAL)

12 no. historic radiators are located within the Great Hall underneath the Ford Madox Brown Murals. The timber panelling located in front of the radiators has now been removed and the radiators disconnected and removed.

