Report

B5642r

Condition Survey

Euston Tower, London

18 October 2019

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Revision	Date	Scope of Revision	Prepared by	Approved by	Issued on
	17/10/19	Issue	RPW/JH	MC	18/10/19
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b					
c					

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EXECUTIVE SUMMARY

We have reviewed condition of the MEP and lift services at Euston Tower in line with British Land's brief. This being to identify the funds required to maintain the existing MEP and lift services for a three year period from 2021, and to consider the building being retained indefinitely. After clarification from British Land, we have taken this indefinite period as ten years from 2021. This report also considers the wider impact of carbon reduction policies on the future design and selection of the MEP systems. These considerations are outside of the scope of our brief but unavoidable when developing replacement strategies.

It is our option that before fully committing to either option. British Land will need to agree the longer-term use for the building and their aspirations for the building's carbon and energy reduction strategies.

To meet our brief and to provide an idea of cost, we have included for replacement of the MEP and lift services on a like-for-like basis, albeit that current technology would be specified. Where we feel that further feasibility studies are required, they have been noted.

The first option to extend the life of the existing services for three years, generally includes for a variety of refurbishment and overhaul projects. Where there is evidence of equipment failure or non-compliance, an immediate cost is shown. This short term strategy does not allow for re-design of the systems and may not meet British Land's carbon reduction aspirations. [redacted]

For the longer ten year strategy, a number of major MEP and lift services in the building will require full replacement. We have generally shown these at the start of the ten year timescale. This will both immediately improve efficiency and resilience of the services and also maximise their useful life over the ten year period. As with the shorter strategy, these replacement projects need to be reviewed against the long term aspirations for the property and its use. Due to the size and cost of these projects, detailed feasibility studies will be required to determine the correct solutions. [redacted]

The Energy Performance Certificate (EPC) for the building as a whole was original undertaken in April 2009, this expired in April 2019. We advise that a detailed EPC is carried out prior to the building being handed back to British Land. This will allow British Land to immediately undertake the improvements, such that letting could be enabled as soon as possible following the current lease expiry.

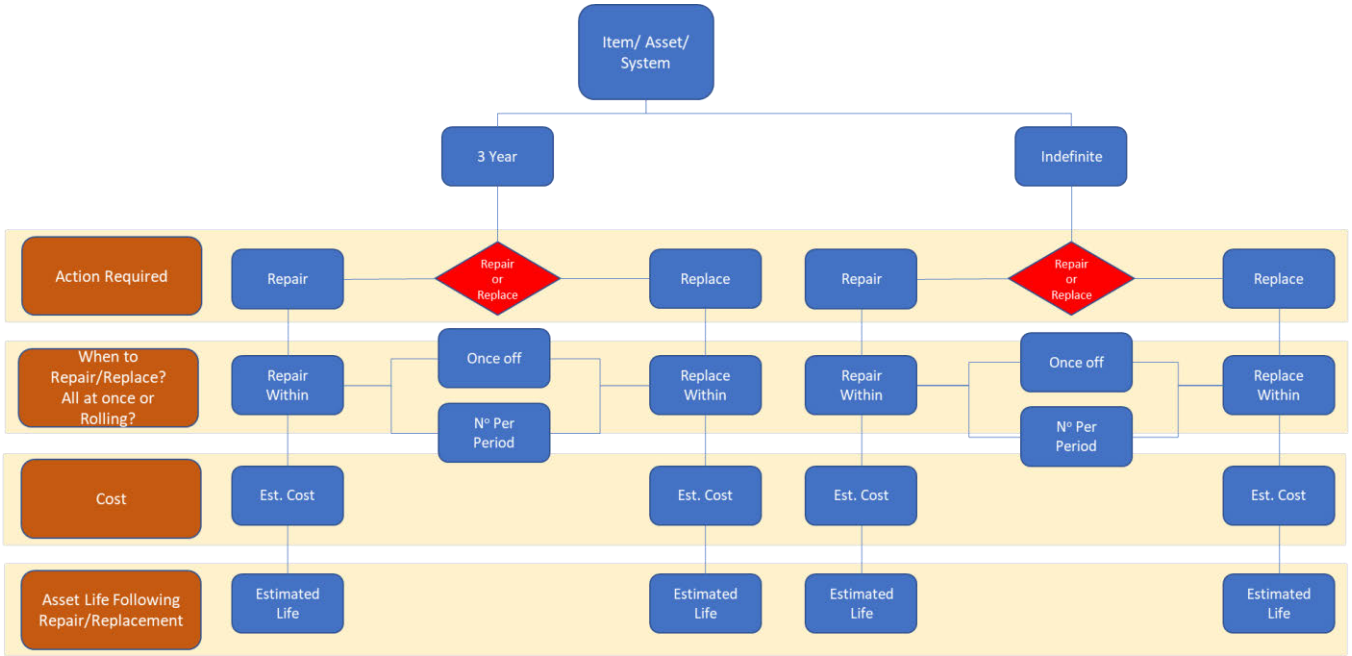
1 INTRODUCTION

This report has been provided at the instruction of Stuart Ball of British Land to undertake a condition survey on the mechanical, electrical and public health (MEP) building engineering services serving Euston Tower, London. We have been instructed to consider extending the lifecycle of the mechanical, electrical and plumbing (MEP) services by either three years, after April 2021, or indefinitely (we have presumed ten years) from the same date. This report has been produced to inform British Land when they make their investment decisions on the building services and systems, subject to the form of lease.

We have been advised that:

- All the current leases are likely to be terminated by April 2021.
- The building is likely to remain as commercial office space, with retail on the ground floors.
- There is no plan to alter the office density from the existing.

The flowchart below has been issued by British Land and sets out the thought process to be followed:



2 INSPECTION

The inspection of the MEP services was undertaken on the 2nd and 11th October 2019. The survey was undertaken by Richard Wilmot, Jim Hamilton and Jack Seddon.

The survey of the building focussed on the existing landlord's MEP services. Floor plates were generally available, and a random sample of these typical floors was taken to generally represent the services. The main plant rooms on floors 1, 12, 34 and 35, together with some basement switch rooms, were accessible during our inspection. We did not gain access to the ground floor retail units, and therefore these have been excluded from this report. The survey was visual only and non-intrusive. Separately we have been instructed to undertake a brief review of the lifts and to undertake non-destructive testing (NDT) of the following pipework systems;

- Medium temperature hot water (MTHW).
- Chilled Water (CHW).
- Condensate Water.

Together with a chemical analysis of the water within them, this report will be updated once these surveys have been completed and the results reviewed.

No other invasive or plant performance tests were undertaken. The limitations of this report are detailed in our standard clauses located within the appendices of this report.

When referencing the projected works required, we have assumed that year one will be the year the building is handed back to British Land.

3 BUILDING DESCRIPTION

Euston Tower comprises of 33,460 (m^2) usable space, constructed in the 1970s and situated in the centre of London. It appears to be constructed from reinforced concrete columns and floors, with curtain external walls and steel framed single glazed casement windows. These have subsequently been provided with secondary double-glazing to some floors. The premises consist of a 34-storey tower standing on top of a ground and first floor podium, which extends beyond the tower footprint.

The ground floor level is occupied by retail outlets, along with the main reception entrance, facilities maintenance offices and goods inwards; the first-floor level consists of seven plant rooms, which service both the ground and first floors, a gymnasium, a restaurant and several meeting rooms. There is also a basement and sub-basement level primarily for the back of house amenities, sub-station, switchgear, meters, water and gas services etc.

The building is serviced by two separate banks of lifts, identified as "Low Rise" and "High Rise"; the low-rise lifts serve floors ground to 19, whilst the high-rise lifts serve ground, 20 to 34. There are two goods lifts, which serve all floors from basement to 35th. The 36th floor is only accessible by stairs.

The 34th floor contains the main heating boiler plant, the air handling plant that serves floors 23 to 34, the water-cooled chillers, chilled water and condenser water pumps. The 35th floor contains the cooling towers, ancillary plant and equipment.

4 REPORT STRUTURE

Our report is structured to show the condition of the MEP services along with our recommendations for a) maintaining the services over the initial three years once handed back to British Land and b) for a longer period of ten years.

Maintaining the services over the ten-year period involves some major plant replacement, this will have to consider changes in available technology, carbon reduction targets and British Land's own strategies. These are likely to include significant re-engineering of the building services, following detailed feasibility studies and design reviews. These fall outside of the scope of this report, and for the purposes of this report we have shown replacement costs for similar technology to the existing, albeit to current standards. Where further feasibility studies are required, we have shown an estimated cost for these and introduced some of the possible options.

5 THREE YEAR PLAN

5.1 General

The following sections provide a brief description of the installed MEP services in the building. A more detailed description of the MEP services is within appendix B.

5.2 Cooling Towers

5.2.1 General

There are four open circuit cooling towers which serve the four main chillers in the plantroom below. In 2005/6 the cooling towers were extensively refurbished, and the cooling tower matrix packs have recently undergone a full replacement. During our survey we did not observe any leaks from the cooling towers.

Due to the age of the cooling towers and taking into consideration their refurbishment in 2005/6. It is our opinion that the cooling towers will operate during years one to three, subject to an increased level of maintenance. However, we recommend that an allowance is set aside for the replacement of one fan motor and the relining of one collection tank during this period.

5.2.2 Water Treatment Plant

The water treatment equipment is located on the 34th floor plantroom. The chemical storage and the injection pumps are showing signs of wear and tear and it is our opinion that the water treatment equipment will require replacement in years one to three.

5.2.3 Condenser Pipework

The condenser pipework date from the original installation. However, some section of the pipework has been replaced as part of the chiller and condenser water pump replacement works. However, there are sections of the pipework showing minor signs of external corrosion. It is our opinion that the condenser water pipework will continue to operate during years one to three.

5.2.4 Condenser Water Pumps

The condenser water pumps have been replaced in the past five years. We do not envisage any works being required to the pumps in years one to three.

5.3 Chillers

5.3.1 34th Floor Plantroom

The four chillers in the chiller plantroom provide CHW to all floors from the 2nd to the 34th floor. Each chiller has a duty of 1,240kW and based upon the estimated cooling requirement of the floors, three chillers are required to meet the cooling demand. The remaining chiller is used as a standby unit.

The installation dates for the chillers range from 1997 up to 2018. This makes the oldest chiller, the York Millennium, 22 years old and at present this chiller is currently switched off. In addition to this, the York MAXE chiller, installed in 2007, is also switched off due to an issue with its controls and it is reaching the end of its economic lifecycle. It is our opinion that both these chillers are in a poor condition.

Based upon the estimated cooling capacity of the building and with only two operational chillers, the building has two-thirds of its cooling capacity with no standby provision. To meet the building's maximum cooling provision for the short term, we recommend that both the York MAXE and the York Millennium chillers are replaced. To ensure that the maximum cooling provision is available during years one to three we recommend that both chillers are replaced.

5.3.2 1st Floor Plantroom

With regards to the two Carrier chillers, these units are 19 to 20 years old and there are obsolescence issues with spare parts for their controls. They have reached the end of their economic life and based on this; it is our opinion that an allowance is set aside for the replacement of one of the units in year one. This will allow for the removed chiller to be used for spare parts for the remaining unit which then can be replaced after year three.

5.3.3 12th Floor Plantroom

On the 12th floor plantroom there are two Carrier chillers. These units serve the comms rooms installed on the 2nd to 12th floors. During our survey we were advised that one of the chillers has failed. It is our opinion that when the tenant vacates these floors after the present lease, the comms rooms will become redundant and that they will be removed.

5.3.4 Refrigerant Gas

All the chillers on site operate with R407c refrigerant gas. Currently there is no ban in place for the use of R407c as it has a global warming potential of 1774. However, there is in place a phase down of the use of refrigerant gas with a GWP of 2500 in 2020. It is our opinion that the GWP may be reduced in the future to a level that it will require the phase down of R407c. If this occurs, then the cost of replacing R407c will increase and this may have an impact on the remaining economic lifecycle of the chillers.

5.4 Boilers

5.4.1 MTHW Boilers

The main heating boilers for the tower are in the boiler room, on the 34th floor. There are eight boilers in total and they are double stacked. The boilers are shell and tube boilers. The boilers are fitted with oil fired, pressure jet burners as there is no gas provision to the boiler room.

The MTHW boilers are oil fired and there is no gas supply in the boiler room to convert them to gas fired boilers. However, to convert the boilers to a gas fired option will require a significant increase to the current gas supply to the building. In addition to the increase in the gas supply, new gas boosters will be required in the basement to ensure that there is enough volume of gas and at a suitable pressure on the 34th floor for use with the new boilers. A new gas distribution riser will be required from the basement to the 34th floor.

The mayor of London has identified that London will become a zero-carbon city by 2050. As part of this plan it is intended that central London will be an Ultra-Low Emission Zone (ULEZ) in 2019 and between 2018 and 2022 there will be a 40% reduction of CO_2.

The boilers are 25 years old and based on this, it is our opinion that the replacement of the oil fired boilers could be initiated in year one on a like for like basis. This will extend the operation of the current oil fired installation by another 15 years. However, this option will only delay the replacement of the boilers with a zero carbon option.

5.4.2 LTHW Boiler

The boiler room on the 1st floor contains a Hamworthy gas fired low temperature hot water (LTHW) boiler, which is operational. However, the boiler is over 25 years old and it is not supported by the manufacturer and there are no readily available spare parts for the boiler. It is our opinion that the boiler will require replacement in year one if the floor is retained in its current configuration. However, if this floor is converted to an open plan layout, we recommend that a design review of the heating and cooling to the floor is carried out.

5.5 Ventilation

5.5.1 Air Handling Units

For the purpose of this report we have assumed that there will not be a significant increase in the occupancy level on the floor plates. The air handling units (AHUs) are original to the building. However, it is our opinion that they are in a reasonable condition. However, it is our opinion that to prevent the premature failure of an AHU during year one to three that they are subjected to a general service. The service of the AHUs could include, but are not restricted to, the following:

- Replace all door seals and door handles.
- Internal remedial works to the AHUs.
- Cleaning and repairing of all filter frames and associated filter replacement.
- Cleaning, repairing of the heating and cooling coils.
- Remedial works to the steam humidifiers.

The overhaul of the AHUs will ensure their continued operation during years one and three. However, after year three it is our opinion that the AHUs will require replacement.

5.5.2 Extract Systems

The extract fans which serve the extract to the floor plates are in the 35th and 12th floor plantrooms. The extract fans are original to the building. The extract systems which serve all the floors have been provided with run round coils.

The toilets are provided with their own dedicated extract systems. It is our opinion that these systems will continue to operate for the next three to five years. However, we recommend that an allowance is made for the replacement of some fan motors in years one to three to cover any unexpected failure of the extract fans.

5.6 Building Pipework

5.6.1 Heating and Cooling

The pipework systems are being subjected to non-destructive testing and the findings from this exercise will form part of a separate report.

5.6.2 Drainage Pipework

The main drainage stacks are contained within the service riser. During our survey, no major issues were observed with the drainage stacks. However, it is our recommendation that a full CCTV survey is carried out on the drainage system and an allowance is set aside for some remedial works in year one.

5.7 Hot Water Calorifiers

5.7.1 DHW Calorifiers

The main DHW calorifiers are in the 12th and 25th floor plantrooms. It is our opinion the calorifiers are 19 years old. The calorifiers are fully insulated and therefore we were unable to confirm if they were constructed from copper or galvanised steel. There were several defects observed with the calorifiers and these are detailed in appendix B. It is our opinion that the DHW calorifiers are replaced in year one.

5.7.2 Plate Heat Exchangers

There are two chilled water (CHW) plate heat exchangers (PHE) which serve the fan coil units on the 2nd to 11th floors and the 13th to 19th floors of the tower. The PHEs date from the 2000 fit out and, we recommend that they are subjected to a detailed examination in year one to establish their overall condition. This will involve the removal of the insulation and a visual examination of the PHEs plates for damage, corrosion or leaks.

5.7.3 Gas Fired Water Heater

There is a gas fired domestic hot water (DHW) heater in the 1st floor boiler room. It is our opinion that the heater has been replaced in the past 10 years. The heater serves the DHW for the kitchen area. However, during our survey there was a pool of water adjacent to the safety valve discharge. We recommend that the safety valve is replaced to prevent its premature activation during years one to three.

5.8 Pumps

The heating and cooling pumps are generally contained within the following plantrooms:

- 35th floor plantroom, the AHU CHW pumps.
- 34th floor plantroom, the MTHW pumps, CHW pumps and condenser water pumps.
- 12th floor plantroom. CHW pumps and LTHW pumps.
- 1st floor plantrooms, CHW and LTHW pumps.
- The basement area, cold water booster sets, wet riser pumps and oil pumps.

Generally, there were no major water leaks from the mechanical seals of the heating and cooling pumps. It is our opinion that it will be possible to maintain the operation of the pumps in years one to three.

The oil pumps which serve the boiler have been replaced in the past five years and we do not anticipate any cost expenditure on these pumps in years one to three.

5.9 Valves

Most of the valves are original to the building. However, there are a number of valves which have been replaced in the past. Generally, the valves which have been replaced have formed part of the lifecycle replacement of the chillers. Given that some of the valves are circa 40 years old we recommend that an allowance is allocated during years one to three for servicing and a 5% replacement of the existing valves.

5.10 Ductwork

The supply and extract ductwork are original to the building. During our survey we did not observe any damaged ductwork. It is our opinion that the ductwork will continue to function during years one to three. However, due to the city centre location of the building, and as there is no record of previous internal cleaning of the ductwork, we recommend that the internal ductwork surface is surveyed, samples taken from the internal surfaces, sampled and fully cleaned in year one in accordance with the BESA TR19 Internal Cleanliness of Ventilation Systems:2013.

5.11 Dampers

5.11.1 Fire Dampers

During our survey we were unable to examine any of the existing fire dampers or their service records. It is our experience that fire dampers are not regularly tested in accordance with BS 9999:2017, code of practice for fire safety in the design, management and use of buildings. It is our opinion that several of the fire dampers will have failed in the past or alternatively a significant number of them would fail to activate in a fire condition. Based on this, we

recommend that a detailed survey is carried out, in year one, on all the installed fire dampers and an allowance is set aside for future remedial works.

Following the survey and repair of the fire dampers they should continue to operate for a considerable period, subject to them being inspected and tested on a yearly basis. However, if there are significant changes to the operation or use of the building, this may impact on the current fire damper configuration.

5.11.2 Volume Control Dampers

During our survey we were unable to gain access to the ceiling voids or access the internals of the supply and extract ductwork to establish the condition of the volume control dampers. It is our opinion that these dampers are original to the building. We recommend that a detailed survey is carried out, in year one, on all the installed dampers and an allowance is set aside for future remedial works.

5.12 Floor Plates

5.12.1 General

It is our understanding that there is an issue with poor heating to the 1st floor perimeter offices. Based on this we recommend that a detailed inspection is undertaken to establish what remedial works will be required to improve the heating in these offices. We recommend that the survey is carried out now so that remedial works can be undertaken in year one.

5.12.2 Fan Coil Units

The heating and cooling to the floor plates is by four pipe fan coil units (FCUs). Generally, the FCUs were installed in 2000, but there are FCUs installed on the 2nd to the 12th floors which are original to the building. It is our opinion that the FCUs will continue to operate over the next one to three years. However, we recommend that the FCUs are subjected to a major servicing and cleaning exercise in year one.

5.12.3 Risers

The ductwork service risers are located within the floor plates and are in builders work enclosures; these appear to be original to the building. No major issues were noted in the risers.

5.13 Fire Stopping

As part of our survey we were unable to fully survey the fire stopping of the mechanical services. However, from the areas in which we were able to observe in the risers, the general condition of the fire stopping was poor. During our survey we were unable to view any record drawings which detailed the location of the ceiling smoke barriers or the fire

rated walls. Therefore, we recommend that a detailed survey is carried to identify all the areas where the fire barriers have been breached. We recommend that the survey is carried out in year one.

5.14 Wet Riser

The main pumps which serve the wet risers are in the basement plantroom. The electrical pump set that serves the wet risers is original. However, it is our opinion that the sprinkler pump will continue to operate in years one to three.

The diesel driven unit was replaced in 2010 and no major issues were observed with this unit. It is our opinion that the diesel pump set will continue to operate over the next one to three years without any major expenditure.

With regards to the distribution pipework, we were unable to determine if the pipework was galvanised as it was contained within service risers with no access. Based upon the final connections to the wet riser pumps it is our opinion that the pipework is carbon steel. We recommend, that random samples of pipework sections are removed from the system for testing in year one. This will allow for the detailed inspection of the pipework (internal surface condition and wall thickness). This will allow the determination of the remaining economic life of the wet riser.

The wet riser storage tank is a GRP sectional tank and it is adjacent to the wet riser pumps. There was no suitable access to inspect the internal condition of the tank. However, during our survey we did not observe any water leaks below the tank. It is our opinion that the water tank is in a fair condition.

5.15 Sprinklers

There is a cold-water mains supplied sprinkler system which serves the ground, 1st and 2nd floors of the building. The sprinkler system is approximately 19 years old. During our survey we were unable to review any records on the sprinkler installation. Due to the age of the installation and to comply with the requirements of BS EN 12845:2015 Annexe K, we recommend that the following works are carried out on the sprinkler installation:

- The system is fully drained down, flushed, refilled and pressure tested to 12bar.
- That samples of the existing distribution pipework are removed and subjected to non-destructive testing.
- A sample number of the sprinkler heads are removed and inspected.

The above works will need to be carried out in year one. Any remedial works that arise after carrying out these duties will also need to be carried out in year one.

5.16 Storage Tanks

5.16.1 Oil Storage Tanks

The 35 sec fuel oil tanks in the basement and 35th floor plantroom serve the oil fired boilers. The tanks are fully bunded and they are original to the building and they are constructed from a single skin, rather than double bunded which is typical for modern oil storage tanks. We don't envisage any major works to be carried out on the tanks or their associated plant and equipment in years one to three. However, the retention of the oil storage tanks after year three will be dependent upon the proposed boiler strategy.

5.16.2 Cold Water Tanks

During our survey we were unable to gain access to the maintenance records and the water risk assessments for the cold water storage tanks on the 35th floor and in the basement. During our survey we did not observe any water leaks from the tanks. It is our opinion that the water tanks are in a fair condition and that they continue to operate during years one to three, but we recommend that an allowance is set aside for the internal cleaning and inspection of all the water tanks in year one.

5.17 Building Management System (BMS)

The BMS dates from the 2000 fit out of the building. The BMS outstations are in the motor control centres (MCCs) in each plantroom. The BMS is contained within its own section of the MCC and there are hand/off/auto selector switches, run and trip lights fitted to the doors of the BMS section. There are no digital displays or touch screens fitted to the BMS access doors. The BMS outstations are manufactured by Sauter.

The field devices have been replaced in the past when they have failed or went out of calibration. It is our opinion that the field devices will require Ad Hoc replacement when they fail in years one to three. However, it is our opinion that their replacement costs will be included in any future maintenance contract for the existing BMS installation.

The head end supervisor comprises of a Niagara Framework as supplied and manufactured by Tridium. The head end supervisor has recently been installed in the past five years and it is fully supported by the manufacturer. From our review of the supervisor it is our opinion that the network wiring is operational as the system schematics showed dynamic updating of the graphic pages.

Due to the age of the outstations and that the controllers are no longer supported; we recommend that an allowance is set aside for the replacement of two outstations in years one to three. Any outstations replaced during this period can be reused for spares during years one to three.

5.17.1 Motor Control Centres (MCC)

The MCC panels installed in the 12th, 34th and 35th floor plantrooms date from the 1997 fitout of the M&E services. There is an immediate requirement to rectify the water leaking from the roof onto the MCC located in the 35 plantroom. Due to the potential water damage to the control panel we recommend the MCC panel is replaced. Due to the age and condition of the MCCs within the 12th, 34 and 35th plantrooms we have made allowance to replace them over years one to three. We have assumed to retain the field wiring although original to the 1997 fitout. It has passed the electrical testing and inspection so will remain functional for the next one to three years subject to good maintenance.

The MCCs installed in the first floor plantrooms date from approximately 2000. The MCC panels are in good condition and operational, it is our opinion that the MCC can be maintained during years one to three, subject to them being maintained and serviced in accordance with industry standards.

5.17.2 Inverters

Inverters have been installed to some of the main circulation pumps and AHU plant. The majority of the inverters date from approximately 2005, with the remainder being fitted in more recent years. During the survey the inverters were operational. However, given the age of the earliest installed inverters we recommend that an allowance is made for the replacement of five inverters over years one to three.

5.17.3 Main LV Distribution Panels

The original LV switch panels in the basement have been replaced within the last five years. The condition of all six LV distribution panels is very good. We have made allowance to undertake general planned preventive maintenance to the main switch panels over years one to three.

During the site inspection we noted that there are several pools of rainwater on the floor of the electrical intake room, we did not see any evidence that the water has ingressed or damaged the LV panels. The water appears to be entering the plantroom from the pedestrian footpath above. Given the nature of the equipment located in the area we recommend that further investigation is made to stop the water entering the area.

5.17.4 Electrical Intake Room

There are two main electrical switch panels and associated cabling installed with the electrical intake room, these appear to form part of a previous tenant's fitout. We recommend that these are subject to a detailed investigation, safely isolated, removed, and the electrical services made good.

5.17.5 Standby Generator

The standby generator was installed in 2008. The generator appears to be in good condition with no obvious defects noted at the time of the survey. Given that the generator is maintained and serviced regularly in line with the manufacturer's recommendation, we do not envisage any additional costs to maintain this asset over years one to three.

5.17.6 Tenant's Distribution Boards and Busbar

The tenant's electrical distribution boards and busbar systems vary in age, with floors 2 – 11 being original to the construction of the building in the 1970s. The busbar and distribution boards are manufactured by Ottermill, these are obsolete, and spares are not available. The installation is in good working order with the last electrical test and inspection carried out in February 2019. We recommend that the existing rising bus bar and tenant distribution boards are replaced throughout floors 2 -11 in years one to three due to their obsolescence.

The tenant's electrical distribution busbar system for floors 12 – 19 again is original, however the distribution boards have been replaced in approximately 2001. We have been unable to determine the manufacturer of the distribution boards. The installation is in good working order with the last electrical test and inspection carried out in February 2019. The rising busbar is manufactured by Ottermill and dates from the 1970, and given we are unable to identify the manufacture of the distribution boards. We recommend that the existing rising bus bar and tenant distribution boards are replaced throughout floors 12 -19 in years one to three due to the busbar being obsolete and parts availability for the distribution boards.

The tenant's electrical distribution boards and bus bar serving floors 20-34 was replaced in approximately 2010. The installation is in good working order with the last electrical test and inspection carried out in February 2019. We do not envisage any additional costs to maintain these assets during years one to three, subject to regular maintenance.

5.17.7 Landlord Sub Distribution Boards

The majority of the Landlord's sub distribution boards are manufactured by Square D and are still supported by the manufacture. We see no further investment required in years one to three other than normal repairs and general maintenance.

5.17.8 Small Power

The small power serving the tenant's floor plates 2 -11 is general in fair condition and dates from approximately 2001. During the survey the majority of the socket outlets were operational, although a small percentage of sockets have been damaged. We have therefore made an allowance for the repair of the defective power points. It is our opinion that small power can be maintained for the next one to three years, subject to it being maintained and serviced in accordance with industry best practices.

The small power serving the tenant's floor plates 13-34 is general in good condition and dates form approximately 2010. During the survey the majority of the socket outlets were operational, although a small percentage of sockets have been damaged. We have therefore made an allowance for the repair of the defective power points. It is our opinion that small power can be maintained for years one to three, subject to it being maintained and serviced in accordance with the manufacturer's requirements.

5.17.9 Lighting

Lighting within the floors occupied by the tenant's, i.e. floors 2 to 33, is predominantly the old CIBSE Lighting Design Guide category 2 type of fluorescent luminaires, flush within the suspended ceilings. The lighting is in a varying level of condition, dependant on the floor level. The majority of the light luminaires are fitted with T5 type tubes and running gear, therefore not as energy efficient as LEDs. Generally, the lighting system has been modified and replaced during varying refurbishment of the floor plates. It is our opinion that the general lighting can be maintained for years one to three, subject to it being maintained and serviced in accordance with the manufacturer's requirements.

The general lighting within the majority of plant rooms is baton type fluorescent luminaires fitted with T5 tubes, therefore not as energy efficient as LEDs. In general, the lighting is in fair condition, and when luminaires fail, we recommend that these are replaced with LED type luminaires. It is our opinion that the plant room lighting can be maintained for the next one to three years, subject to it being maintained and serviced in accordance with the manufacturer's requirements.

Emergency lighting is provided by a combination of self-contained bulkhead luminaires distributed throughout the back of house areas, floor plates, and recessed luminaires fitted with emergency battery conversion packs. Given the various ages and quantity of emergency lighting we have made an allowance for replacement of a percentage of luminaires with energy efficient units on an annual basis. In general, it is our opinion that the emergency lighting can be maintained for years one to three, subject to it being maintained and serviced in accordance with the manufacturer's requirements.

5.17.10 Chiller HV Electrical Power Supply

The four chillers located in the 34th floor plantroom is electrically fed via a dedicated high voltage power supply located in a substation on the same floor. The two HV transformers, HV switches and associated LV switchgear all date from the original construction of the building in the 1970s. Although the electrical equipment is 50 years old, it has been regularly maintained. We see no further investment required in years one to three other than regular maintenance.

In addition to the transformers and associated switchgear, two power factor correction units have been installed. These are manufactured by PFC Engineering and date from approximately 2014. They are both in good condition and have been regularly maintained, with no defects noted. We see no further investment required in years one to three other than regular general maintenance of the electrical equipment.

5.17.11 Fire Alarm

The fire alarm system was replaced throughout the building in 2012 and is approximately 7 years old, it should note that the recommended period for the replacement of a fire alarm system's smoke detectors and associated devices is every 10 years. For Euston Tower this requirement to replace the field devices will fall in 2022. We consider that the fire alarm system shall then require significant maintenance works in year one.

5.17.12 High Rise Passenger Lifts

The lifts in their present state should prove relatively reliable for the next three-year period. This is dependent on intensive and good quality maintenance being provided, along with expert product knowledge, technical support and parts continuing to be available. Additional expenditure on proposed upgrades or improvements other than maintenance and safety items during this period will not be cost effective.

The existing critical spares stored on site are the property of Mapeley. It will be prudent to purchase the parts to ensure a speedy resolution to particular fault conditions as they arise. This will also help to mitigate immediate obsolescence risks.

5.17.13 Low Rise Passenger Lifts

The low-rise lifts were installed at the same time as the high rise lifts and are in a similar condition and have similar equipment installed. The description of the maintainability is the same for the low rise as the high rise as described in the sub-section above.

It will be prudent to purchase the critical spares for these lifts as well.

5.17.14 Goods Lifts

These lifts were modernised 10 years ago in existing shafts and are generally in good condition.

The lifts will provide a good level of service depending on a good quality of maintenance being provided during the next three years. There is a low risk of any obsolescence issues.

The lifts have been installed to provide firefighting and evacuation service for the building. However, the water management of the lifts in terms of prevention of water entering the lift shafts from the building entrance area requires addressing. The lift entrances either require drain gulley's to be installed across the threshold of each entrance or a bund ramp to be installed. This will reduce the risk of water entering the lift shaft during a fire incident.

6 TEN YEAR PLAN

The age, condition and technology of the building services serving Euston Tower makes planning for a replacement over an indefinite period a complex process. After discussions with British Land since our instruction, we consider this indefinite period to be ten years from the end of the present lease.

The basis of the future strategy will have to refer to:

- British Land's Sustainability Policy.
- British Land's Sustainability Brief for Developments and its minimum requirements based on project value.
- British Land's Office Design Guide.
- British Council for Offices Guide to Specification – Best Practice for Offices.
- Approved Document L2B: Conservation of fuel and power in existing buildings or dwellings.
- The Mayor of London's Energy Assessment Guidance.
- Ultra-Low Emission Zones.

As well as the usual regulations, standards, approved codes of practice and guidance notes.

These prevent like-for-like replacement of many of the existing systems. To meet British Land's aspirations, the replacement of the systems is likely to require an integrated approach.

For example, the existing oil fired boilers will need to be replaced in year one of a ten year programme. Replacing them with similar oil fired boilers is problematic due to their emissions characteristics, which do not satisfy The Mayor of London's Energy Assessment Guidance. If natural gas technology is then considered, whilst meeting the present low NOx requirements for London, it does not meet British Land's aspirations to be natural gas free.

This therefore requires an alternative means of generating heat which could be through electric boilers, heat pumps or a combination of both. Installing this type of technology has a knock on effect on the cooling towers, circulation pumps and electrical power supplies. Investigating, reviewing and selecting these systems is a project in itself and falls outside of the brief of this report. In these instances, and to meet our brief, in the longer term cost schedule we have shown like for like replacement costs for similar technology along with a feasibility study cost in the short term. Our report is generally based on retaining the existing methods of providing building services.

Outside of the current short term scenario, addressed within the earlier section of this report, the indefinite (ten year) period from the end of the present lease is discussed below.

6.1.1 Cooling Towers

The present cooling towers reject heat from the existing water cooled chillers. So, unless there is a fundamental shift in how cooling is provided to the building, we have allowed to retain them. To ensure they are reliable for the foreseeable future, a cost for their replacement is included within the schedule. As the chiller replacement strategy for the property may result in a change in the cooling duty to accurately match the building load and the perceived standby capacity, the cooling tower duty will need to be reviewed at that point. The structure of the cooling towers is enclosed/restricted by the building structure, and as they are located on the building roof, their replacement will require careful consideration and planning.

6.1.2 Chillers

The four existing main chillers in the 34th floor plant room are of differing ages ranging from 1997 to 2018. Due to their age and condition the two older units should be replaced in year one. This will maximise their use. We have shown costs for their direct replacement, but as with the boilers, a feasibility study should be carried out to investigate alternative solutions. As an example, simultaneous heating and cooling units could be installed. These would produce both chilled water for cooling and heating water to supplement the boiler plant.

Replacing the chillers will involve dismantling of the new equipment and the transporting of the compressors, condensers, and evaporators through the lift shafts. This will cause disruption to tenants who use the high rise lifts to access their floors. Typically, this disruption will be for three to four weeks whilst the chiller sections are moved through the lift shafts. Once in the plant rooms, the chillers have to be rebuilt by the manufacturer and tested prior to their installation. For this instance, we have shown costs for replacing the three oldest units with similar equipment.

The four existing chillers in the 1st and 12th floor plant rooms provide cooling to the local areas, comms rooms in the case of the 12th floor. These units are air cooled and much smaller than the 34th floor units. Due to their age and condition these four units should be replaced in year one of the longer term scenario to maximise their use. The 12th floor units serve tenant's comms rooms which we feel could be removed at the end of the current lease so their replacement may not be required. But if replacing, units with a lower global warming potential to the existing (R407c) should be selected. This is subject to a feasibility study.

Should the areas served by these units alter, then the use of VRF/hybrid VRF system could be investigated. This would reduce the reliance on the centralised boiler plant as the system will provide both heating and cooling to the areas.

6.1.3 Boilers

The eight existing (MTHW) boilers serving Euston Tower are oil fired and due to their age, condition and technology require replacing in year one. As discussed earlier, the low emissions aspirations for London and British Land's decarbonisation targets will have a major effect upon selecting a suitable heating source for Euston Tower in the longer term. For the purpose of this report and to meet the brief, we have shown costs for replacement of the existing boilers

with similar technology. However, it is important to consider the following points concerning the heating strategy for the building.

At present and in terms of emissions, the Mayor of London's Energy Assessment Guidance (2018), low NOx (nitrogen oxides) plan states that plant NOx emissions should not exceed 40 (mg/kWh). At present, oil fired boilers only achieve 120 (mg/kWh) at best, although they are termed as low NOx.

Traditional thinking would replace these existing oil fired boilers with gas fired technology. Current low NOx gas boilers have NOx figures lower than 40 (mg/kWh), circa 38 (mg/KWh) is achievable, they are modular and efficient. However, as they are gas fired, they do not meet British Land's gas free aspirations. Also, in this case, installing new gas fired boilers may involve upgrading the existing gas supply to the building and will involve extending the new gas main to the 34th floor plantroom by the formation of a new ventilated gas riser running from a new gas booster room in the basement area.

Another logical stage in achieving a low carbon solution is to consider electric hot water boilers. Whilst electric water boilers of this capacity are unusual in commercial offices, they are used within process industries. Installing electric hot water boilers as a replacement of the existing oil fired boilers will require a number of major considerations. There is insufficient power local to the boiler house and probably to the building as a whole. Therefore, the supply authority's approved supply capacity for the building needs to be determined and an increase may need to be applied for. Furthermore, moving any new boilers up to the 34th floor plant room will involve a similar methodology as the chillers (i.e. via a lift shaft). New three phase power supplies will also need to be run from the basement to the 34th floor. As described in the chiller section, it is possible that simultaneous heating cooling water sourced heat pumps could be installed to efficiently supplement whichever boiler option is chosen

The existing LTHW boiler serving the lower floors, due to its age, condition and technology requires replacing in year one of the longer term scenario. This boiler is gas fired so does not suffer the same restrictions as the oil fired units. However, being gas fired, it still suffers the same restrictions in terms of British Land's zero gas aspirations and in the longer term, an electric boiler may be a consideration along with heat pump technology integrating it with the local chiller equipment. It is possible that the use of the existing area may change once the current lease expires, as it is heavily cellularised. Therefore, the heating strategy for the area may alter and alternative low carbon technologies can be considered.

6.1.4 Air Handling Units

The main AHUs are designed and sized to suit the existing use and occupancy density for the property. From our brief, we understand the longer term use and occupancy density of the building will not alter. As described elsewhere in this report, the ventilation systems serving the building require an overhaul to ensure their continual use during years one to three. It is our opinion that all the AHUs are replaced in the long term to comply with current regulations and in line with the proposed long-term energy strategy for the building.

The floor plates at Euston Tower are served by FCU terminal units, elsewhere in this report we have recommended that the FCUs are subject to a major service and clean in the short term. Within the longer term scenario, the FCUs should be replaced due to their technology, age and condition. These costs are calculated from a m^2 rate within our cost schedule. Again, this replacement should be in year one of the period to maximise the useful operational life and the benefits of the improved efficiency.

6.1.5 Building Pipework

Our survey on site did not identify any immediate problems with the building pipework. As a separate instruction, we are completing non-destructive testing of the chilled, heating and condense water systems within the building. At the same time chemical analysis of the water systems is to be carried out. The findings from this exercise will be discussed in a separate report. For the purpose of this report we have noted long term replacement of the main chilled, heating and condense water systems but have not included a cost.

6.1.6 Foul Water Drainage

The foul water drainage is in excess of 50 years old. This will require a replacement throughout the building in year 1.

6.1.7 Chilled Water Plate Heat Exchanger

Due to the age of the plate heat exchangers, we have allowed to replace both in year one of the ten-year plan.

6.1.8 Hot Water Calorifiers

Due to their age and condition, the domestic hot water calorifiers will require replacing in year one. As with the chiller and boilers, the strategy for the domestic hot water generation is dependent upon the strategy for the building. Should the office floor plates be refurbished, then it is likely that local electric hot water heaters will be installed across the floors, and the 12th floor calorifiers will be removed. Furthermore, British Land's aspirations to be gas free prevent the installation of new central gas fired water heaters on the 12th floor. For the purpose of this report we have included for the replacement of the existing hot water calorifiers with a similar type, heated from the boilers.

As with the domestic hot water calorifiers, the eight non-storage calorifiers in the 12th floor plantroom should be replaced with plate heat exchangers early in the longer term scenario. This is due to their age, condition and type, with the plate heat exchangers requiring significantly less maintenance than the existing calorifiers.

6.1.9 Pumps, Motors and Valves

We have discussed separately elsewhere in this report, the short term strategy for pumps, motors/valves and plate heat exchangers. For the longer term strategy, the replacement of these system will be incorporated within replacement of the main core services, so individual costs are not shown.

The exception to this are the cold water booster sets in the basement, these will remain serviceable in the short term. However, based on the expected lifecycle for this type of equipment, the booster sets will require replacing towards the end of the ten year period.

6.1.10 Ductwork and Dampers

We have identified elsewhere that, in the short term, the ductwork and damper systems (fire dampers and volume control dampers) within the building require attention. Following this, we have made allowance for cleaning the main supply and extract ductwork and allowance for access doors to be cut to be carried out in year one of the ten year plan.

6.1.11 Fan Coil Units

Due to the replacement of the chillers as part of the long-term plan, we would need to replace the existing fan coil units as part of the overall heating and cooling plan.

6.1.12 Wet Riser

Based upon the final connections to the wet riser pumps it is our opinion that the pipework is carbon steel. We recommend, that random samples of pipework sections are removed from the system for testing in year one. This will allow for the detailed inspection of the pipework (internal surface condition and wall thickness). This will allow the determination of the remaining economic life of the wet riser.

6.1.13 Sprinkler

Due to the age of the system, we will need to fully drain down, flush, refill and pressure test the system. We will also need to carry out NDT for samples of the existing distribution pipework, and to remove and inspect a sample of sprinkler heads.

6.1.14 Storage Tanks

In the long-term, the cold-water storage tank will require flushing, refilling and chlorinating to remain compliant.

6.1.15 Building Management System (BMS)

We have recommended that an allowance is set aside for the replacement of an outstation which may fail in years one to three. It is our opinion that the BMS outstations will need to be replaced in the long term. This is due to the controllers in the outstations being no longer supported by the manufacturer. We also recommend regular software upgrades and general maintenance. We have made allowance in the cost plan for one software upgrade during the ten year period.

6.1.16 Motor Control Centres (MCC)

We have recommended that the MCCs installed in 1997 are replaced in years one. The remaining MCC panels installed in the first-floor plantrooms shall be in excess of twenty years old in 2021. We have therefore made allowance to replace the existing plantroom MCC panels within year one of the ten-year investment plan.

6.1.17 Main LV Distribution Panels

There are six low voltage sub distribution switchgear panels located in the basement electrical plantroom. These have been replaced in the last five years. In our opinion, we see no further investment required within the next twenty years, other than normal repairs and general maintenance.

6.1.18 Electrical Intake Room

Given that the redundant electrical switchgear has been removed in the first three years, it is assumed there is no further works required in this plantroom.

6.1.19 Standby Generator

The standby generator located in the basement plantroom was replaced in 2008. In our opinion, we see no further investment required within the next ten years, other than normal repairs and general maintenance.

6.1.20 Tenant's Distribution Boards and Busbar

We have made allowance to replace the rising bus bar and tenant's distribution boards serving floors 2 – 19 in the years one to three plan. In our opinion we see no further investment required within the next ten years, other than normal repairs and general maintenance.

6.1.21 Small Power

The small power in the office floor plates are in good condition albeit with some damaged floor boxes. With the ten-year plan, the floor boxes can be stripped out and returned to a cat A fitout to meet the requirements of any prospective new tenants. We have provided a budgetary cost to install cleaner sockets to the office floor plates.

6.1.22 Lighting

The lighting is predominantly the old CIBSE Lighting Design Guide category 2 type of fluorescent light fittings in the office areas, fitted into the suspended ceilings. For the purposes of this report we have assumed that the existing lighting would be replaced with energy efficient luminaires (LEDs) in year one of the ten year investment plan.

6.1.23 Landlord's Sub Distribution Boards

The landlord's sub distribution boards shall be in excess of twenty years old by 2021 and shall be at the end of their economical and serviceable life. In our opinion the landlord's distribution boards shall then need to be replaced throughout the building with new boards. We have assumed to replace these distribution boards as part of the long-term strategy for the building.

6.1.24 Chiller HV Electrical Power Supply

The chiller HV electrical switchgear shall be in excess of sixty years old by 2021 therefore the equipment shall be at the end of its economical and serviceable life and will need to be replaced in years one of the ten year investment plan.

6.1.25 Fire Alarm System

The fire alarm system was replaced in 2012 and therefore as part of the ten-year plan, the field devices and controllers will require replacement and a software upgrade to the fire alarm system in 2022. This is coupled with significant maintenance works in year one.

6.1.26 High Passenger Lifts

The high rise lifts have exceeded the expected economical and serviceable life by approximately 25 years. There is a high risk of component obsolescence. There is also a significant risk in terms of skills obsolescence. There are very few lifts with this type of equipment left in service within the UK and as a result there is an ever decreasing necessity to have skilled engineers trained on this type of equipment.

The lifts should be modernised to allow a reliable and improved performance for the building. This will eliminate the skill and parts obsolescence issues.

Depending on the strategy for the building there are two options available which are comprehensive modernisation or complete replacement with machine-room-less type lifts.

The cost effective approach will be to modernise the group of lifts and retain the existing lift car, counterweight and guides of each lift in the group. The alternative approach will be the full replacement of the lifts with machine-room-less types. However, given there are already machine rooms available and the cost would be increased we do not currently recommend this option.

6.1.27 Low Rise Passenger Lifts

The low rise lifts were installed at the same time using the same equipment as the high rise groups. Similar modernisation and stabilisation works have been completed and therefore the same description of lifecycle as described in the sub-section above applies.

The difference with the low rise when compared to the high rise is the machine room position. The machine room for the low rise is currently accessed in the centre core of a tenant occupied floor.

The position of the machine room may drive the requirement to install machine-room-less lifts in lieu of modernisation to avoid the tenant area having to be accessed. This will depend on the strategy for the building going forward.

6.1.28 Goods Lifts

The goods lifts were comprehensively modernised 10 years ago and are in good condition. The lifts should provide a further 10 years of reliable service dependent on a good quality of ongoing maintenance being provided and parts remaining available. We believe the risk of obsolescence is low.

However, the lift entrances either require drain gulley's to be installed across the threshold of each entrance or a bund ramp to be installed. This will reduce the risk of water entering the lift shaft during a fire incident.

6.1.29 WC Facilities

The male and female WC facilities are provided on each of the office floor plates, these are accessed form the demised tenant areas. The toilet facilities on each floor are designed to meet the requirements of an occupancy rate of one person per 10m^2. Should this occupancy level be exceeded, these facilities will not be sufficient, and alternative provision will need to be considered. It should be noted that access arrangement needs to carefully be considered if there is an intention to change the usage of the space.

The majority of the hot and cold-water services serving the toilets dates from approximately 1997. Therefore, we have made allowance to strip out and replace the hot and cold-water services serving both male and female toilets in year one of the ten-year plan.

6.2 Builders Works

We have excluded builder's works in association with the removal and disposal of the M&E services within plant rooms, floor plates and service risers. Given that perimeter fan coil units are removed, and heating and ventilation systems are subsequently installed in the ceiling voids, this will benefit in providing a small gain in net internal area (NIA) to the tenant's floor plates.

Our costs have excluded making good of the building fabric following the works for either the three-year or ten-year plan.

7 EPC

The Energy Performance Certificate (EPC) for the building as a whole was original undertaken in April 2009, this expired in April 2019. The original EPC rating was banded as 'E' scoring 101 rating.

Various other EPC have been uploaded by tenants onto the Landmark site the table below provides a sample of the more recently lodged EPC.

Area	EPC Rating	Score	Date Lodged
The Building	E	101	20 April 2009
Podium	C	62	4th July 2018
Floors 14 -19	E	119	11 Sept 2018
Floor 24	D	98	31 Aug 2018
Floor 32	E	120	31 Aug 2018
Floor 20	D	99	27 Aug 2019
Floor 14	D	99	31 Aug 2018
Floors 24-32	E	121	11 Sept 2018

As of the 1 April 2018, all rented property (both domestic and non-domestic) which is to have a new tenancy currently must have an EPC rating of at least "E". This requirement also applies to all renewal tenancies to the same tenant for the same property on or after 1 April 2018.

Given that the Energy Performance certification model (SBEM) is continuously changing and becoming more onerous for property owners it will only becoming harder to achieve the higher bands such as 'B'. It will be increasing important for tenant and landlords to achieve this requirement and will have a commercial impact on the letting of many properties.

Given that the last EPC was based on a detailed assessment, and that the criteria has become more onerous, we recommend a high quality EPC assessment is undertaken now to assess the current position. An allowance should also be made now for an element of cost-effective improvements to the building – following this initial assessment. This will allow British Land to immediately undertake the improvements, such that letting could be enabled as soon as possible following the current lease expiry.

8 ASBESTOS

On reviewing the Mapeley asbestos management report for Euston Tower dated 7th August 2018 it should be noted that the report has identified deleterious materials being present in many elements of the mechanical and electrical services installed in the building.

The primary areas that the report identified are as follows;

- Boilers
- Pipework gaskets
- Perimeter heating back and facer boards
- Wet riser duct
- Lift shafts

Given that a major refurbishment is carried out to the M & E service the addition cost for the safe removal of the deleterious material shall need to be allowed for as a separate exercise. We have excluded any cost associated with the safe removal and disposal from the budgetary costs provided in this report.

APPENDIX A - BUDGET COSTS

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 3	Years 1 - 3
1	MEP	Roof	Cooling Towers	Allow for the replacement of 1 fan motor.	Isolate a tower, remove the old motor, refit new and commission.	[redacted]				
2	MEP	Roof	Cooling Towers	Allow for the relining of 1 of the ponds.	Drain the tower, remove any damaged sections of the ponds, treat with suitable corrosion paint. Pant the ponds and refill and commission.					
3	MEP	35 Plantroom	Water Treatment	Allow for the replacement of the existing water treatment plant	Replace					
4	MEP	Level 34	Chillers	Allow for the remedial works to bring the York MAXE chiller into repair.	Replace the controls to the existing unit.					
5	MEP	Level 34	Chillers	Replace the York Millennium chiller.	Removal of the existing unit and the transportation of the new chillers up through the lift shaft and for the rebuild and commissioning of the system.					
6	MEP	Level 34	Chillers	Replace the York Millennium chiller.	Removal of the existing unit and the transportation of the new chillers up through the lift shaft and for the rebuild and commissioning of the system.					
7	MEP	Level 34	Chillers	Allowance for replacing 1 of the Carrier chillers on the 1st floor plantroom	Isolate, remove and install a new chiller on a like for like basis					
8	MEP	Level 34	Chillers	Allow for the removal of both the redundant chillers and their ancillary services.	Isolate and remove the existing chillers.					
9	MEP	Level 34	Boilers	Allowance for the remedial works to the non-operational, oil fired boiler.	Allow for the repairs and modification to the boiler controls.					
10	MEP	Level 34	Boilers	Allowance for the replacement of like for like oil fired boilers and their commissioning	Each boiler is 600kW. Allow for the draining down, replacement, commissioning of new oil fired boilers.					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 3	Years 1 - 3
11	MEP	Level 34	Boilers	Allowance for the replacement of the existing gas boiler in the 1st floor plantroom.	Replace the existing boiler on a like for like basis.	[redacted]				
12	MEP	Throughout	Air Handing Units	Allowance for the complete overhaul of 11 AHUs.	Allow for the works associated with the AHUs.					
13	MEP	Throughout	Air Handing Units	Allowance for remedial works to the existing extract systems.	Provisional sum					
14	MEP	Throughout	Building Pipework Heating	TBA						
15	MEP	Throughout	Building Pipework Cooling	TBA						
16	MEP	Throughout	Foul water drainage	Allowance for the inspection of the existing drainage stacks and an allowance for remedial works.	Carry out a CCTV inspection.					
17	MEP	Throughout	Domestic Hot Water	Allowance for the remedial works to the eight existing DHW calorifiers.	Carry out repairs to the immersion heaters and the safety valve.					
18	MEP	Throughout	CHW Plate Heat Exchangers	Allowance for the detailed inspection of the existing CHW plate heat exchangers.	Remove the insulation and carry out a detailed inspection of the 2 PHEs					
19	MEP	Plantroom	Hot water Calorifiers	Allowance for the replacement of the existing DHW calorifiers.	Replace the calorifiers on the 20th and 12th floors.					
20	MEP	Plantroom	Gas fired water heaters	Allowance for the remedial works to the gas fired water heater	Repair the safety valve					
21	MEP	Plantroom	Pumps, Motor and Valves	Allowance for remedial works to be carried out on the existing pumps.	Provisional sum					
22	MEP	Throughout	Ductwork	Allowance for the cleaning of the main supply and extract ductwork.	Allow for cutting additional access doors and the like					
23	MEP	Throughout	Fire Dampers	Allowance for the detailed inspection and reporting on the existing fire dampers.	Inspection and reporting only					
24	MEP	Throughout	Fire Dampers	Allowance for possible remedial works to the fire dampers.	Provisional sum					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 3	Years 1 - 3
25	MEP	Throughout	Heating	Survey and report on the poor heating to the 1st floor.	Inspection and reporting only	[redacted]				
26	MEP	Throughout	Fan Coil Units	Survey and reporting on the existing horizontal and vertical fan coil units in the floor plates.	Inspection and reporting only. Allow 50 FCUs per floor and 32 floors.					
27	MEP	Throughout	Fan Coil Units	Allowance for remedial works to the FCUs following the initial inspection.	Allow for £250 (average cost) for the remedial works to the FCUs.					
28	MEP	Throughout	Wet Riser	Allowance for testing and reporting on the condition of the wet risers.	Provisional sum					
29	MEP	Throughout	Sprinkler	Allowance for the draining and flushing of the sprinkler installation to the ground to 2nd floor.	Provisional sum					
30	MEP	Throughout	Sprinkler	Allowance for the removal of the sprinkler pipework and the NDT testing of the pipework.	Provisional sum					
31	MEP	Throughout	Sprinkler	Allowance for the inspection and replacement of the existing sprinkler heads	Provisional sum					
32	MEP	Throughout	Water Tanks	Allowance for the draining, cleaning and inspection of the existing cold water storage tanks.	Provisional sum					
33	MEP	Throughout	BMS	Allowance for remedial works to the existing outstations.	Provisional sum					
34	MEP	35 Fl Plantroom	MCP South West MCC	Replace MCCP	Replace					
35	MEP	35 Fl Plantroom	MCP Panel 1 West	Water leaking onto panel from roof above. Repair leaking roof	Repair					
36	MEP	345Fl Plantroom	MCP Panel 2 East	Water leaking onto panel from roof above. Repair leaking roof	Repair					
37	MEP	34 Fl Plantroom	Inverter 1							
38	MEP	34 Fl Plantroom	Inverter 2							
39	MEP	34 Fl Plantroom	Inverter 3							
40	MEP	12 Fl West Wing Plantroom	MCP	Replace MCC panel	Replace					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 3	Years 1 - 3
41	MEP	12 Fl West Wing Plantroom	MCP North	Replace MCC panel	Replace					
42	MEP	12 Fl West Wing Plantroom	MCP South Wing Control	Replace MCC panel	Replace					
43	MEP	12 Fl West Wing Plantroom	MCP North Wing Control	Replace MCC panel	Replace					
44	MEP	12 Fl West Wing Plantroom	Inverter Panel P6/P7	Replace inverter	Replace					
45	MEP	12 Fl West Wing Plantroom	Inverter Panel P38/39	Replace inverter	Replace					
46	MEP	12 Fl West Wing Plantroom	Inverter Panel P20A/P20B	Replace inverter	Replace					
47	MEP	12 Fl West Wing Plantroom	Inverter Panel P40/1.2	Replace inverter	Replace					
48	MEP	12 Fl West Wing Plantroom	Inverter Panel P15/P16	Replace inverter	Replace					
49	MEP	1st Fl South West Plantroom	MCP							
50	MEP	Basement	Main LV Distribution							
51	MEP	Level 34	Main LV Distribution							
52	MEP	Basement	Electrical Intake Room	Several large isolator assumed to be tenants. Remove the redundant electrical switch gear	Remove					
53	MEP	Basement	Standby Generator	No works noted						
54	MEP	East Riser 2- 11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
55	MEP	East Riser 12- 19	Electrical							
56	MEP	East Riser 20-33	Electrical							
57	MEP	North Riser 2-11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
58	MEP	North Riser 12-19	Electrical							
59	MEP	North Riser 20-33	Electrical							
60	MEP	West Riser 2-11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
61	MEP	West Riser 12-19	Electrical							
62	MEP	West Riser 20-33	Electrical							
63	MEP	South Riser 2-11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
64	MEP	South Riser 12-19	Electrical							
65	MEP	South Riser 20-33	Electrical							
66	MEP	Throughout 2- 32	Small Power	Allowance to repair damaged floor boxes assume 5 per floor	Repair					
67	MEP	Throughout	Floorplate Lighting	Allowance for repairs of the existing lighting	Repair					
68	MEP	Throughout	Landlords Lighting	General lighting is over 20 years old allowance made for failures	Repair					
69	MEP	Throughout	Landlords Sub Distribution Boards							
70	MEP	Throughout	Emergency Lighting	Allowance for battery failures	Repair					
71	MEP	Level 34	Chiller HV Electrical Distribution							
72	MEP	Level 34	Chiller Power Factor Correction Units							
73	MEP	Throughout	Data							
74	MEP	Throughout	Fire Alarm System		Replace					
75	MEP	Throughout	High rise passenger lifts	Purchase critical spares						
76	MEP	Throughout	Low rise passenger lifts	Purchase critical spares						

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 3	Years 1 - 3
77	MEP	Throughout	Good lifts x 2	Install water management gutters						
78	MEP	Throughout	EPC	To carry out detailed survey						
79	MEP	Throughout	EPC	Provisional sum for remedial works						
					TOTAL					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 10	Years 1 - 10
1	MEP	Roof	Cooling Towers	Allow for the replacement of 1 fan motor.	Isolate a tower, remove the old motor, refit new and commission.					
2	MEP	Roof	Cooling Towers	Allow for the relining of 1 of the ponds.	Drain the tower, remove any damaged sections of the ponds, treat with suitable corrosion paint. Pant the ponds and refill and commission.					
3	MEP	35 Plantroom	Water Treatment	Allow for the replacement of the existing water treatment plant	Replace					
4	MEP	Level 34	Chillers	Determine strategy for chilled and heating water equipment	Carry out feasibility study					
5	MEP	Level 34	Chillers	Allow for the remedial works to bring the York MAXE chiller into repair.	Replace the controls to the existing unit.					
6	MEP	Level 34	Chillers	Replace the York Millennium chiller.	Removal of the existing unit and the transportation of the new chillers up through the lift shaft and for the rebuild and commissioning of the system.					
7	MEP	Level 34	Chillers	Replace the York Millennium chiller.	Removal of the existing unit and the transportation of the new chillers up through the lift shaft and for the rebuild and commissioning of the system.					
8	MEP	Level 34	Chillers	Allow for the removal of both the redundant chillers and their ancillary services.	Isolate and remove the existing chillers.					
9	MEP	Level 34	Chillers	Allow for the removal of both the redundant chillers and their ancillary services.	Isolate and remove the existing chillers.					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 10	Years 1 - 10
10	MEP	Level 34	Boilers	Allowance for the replacement of like for like oil fired boilers and their commissioning	Each boiler is 600kW. Allow for the draining down, replacement, commissioning of new oil fired boilers.					
11	MEP	Level 34	Boilers	Allowance for the replacement of the existing gas boiler in the 1st floor plantroom.	Replace the existing boiler on a like for like basis.					
12	MEP	Throughout	Air Handing Units	Allowance for the complete replacement of 11 AHUs.	Allow for replacing the AHUs.					
13	MEP	Throughout	Building Pipework He	TBA	TBA					
14	MEP	Throughout	Building Pipework Co	TBA	TBA					
15	MEP	Throughout	Foul water drainage	Allowance for the replacement of the foul water pipework	Replace foul water stacks					
16	MEP	Throughout	Domestic Hot Water	Allowance for the installation of plate heat exchangers	Install new heat exchanges					
17	MEP	Throughout	CHW Plate Heat Exch	Allowance for the replacement of the plate heat exchangers.	Remove and install 2 PHEs					
18	MEP		Hot water Calorifiers	Allowance for the replacement of the existing DHW calorifiers.	Replace the calorifiers on the 20th and 12th floors.					
19	MEP		Gas fired water heate	Allowance for the replacement of gas fired water heaters	Replace 8 non storage calorifiers with plate heat exchangers					
20	MEP		Pumps, valves and me	Replace cold water booster set	Provisional sum					
21	MEP		Pumps, valves and me	Make allowance for remedial repairs to valve.	Provisional sum					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 10	Years 1 - 10
22	MEP	Throughout	Ductwork	Allowance for the cleaning of the main supply and extract ductwork.	Allow for cutting additional access doors and the like	[redacted]				
23	MEP	Throughout	Fire Dampers	Allowance for the detailed inspection and reporting on the existing fire dampers.	Inspection and reporting only					
24	MEP	Throughout	Fire Dampers	Allowance for possible remedial works to the fire dampers.	Provisional sum					
25	MEP	Throughout	Heating	Survey and report on the poor heating to the 1st floor.	Inspection and reporting only					
26	MEP	Throughout	Fan Coil Units	Allowance for the replacement of the existing FCU's throughout the building	Allow for £250 (average cost) for the remedial works to the FCUs.					
27	MEP	Throughout	Wet Riser	Allowance for testing and reporting on the condition of the wet risers.	Provisional sum					
28	MEP	Throughout	Sprinkler	Allowance for the draining and flushing of the sprinkler installation to the ground to 2nd floor.	Provisional sum					
29	MEP	Throughout	Sprinkler	Allowance for the removal of the sprinkler pipework and the NDT testing of the pipework.	Provisional sum					
30	MEP	Throughout	Sprinkler	Allowance for the inspection and replacement of the existing sprinkler heads	Provisional sum					
31	MEP	Throughout	Water Tanks	Allowance for the draining, cleaning and inspection of the existing cold water storage tanks.	Provisional sum					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 10	Years 1 - 10
32	MEP	Throughout	BMS	Allowance for replacement of the BMS outstation and field devices and software upgrade	Provisional sum					
33	MEP	35 Fl Plantroom	MCP South West MC	Replace MCCP	Replace					
34	MEP	35 Fl Plantroom	MCP Panel 1 West	Water leaking onto panel from roof above. Repair leaking roof	Repair					
35	MEP	345Fl Plantroom	MCP Panel 2 East	Water leaking onto panel from roof above. Repair leaking roof	Repair					
36	MEP	34 Fl Plantroom	Inverter 1							
37	MEP	34 Fl Plantroom	Inverter 2							
38	MEP	34 Fl Plantroom	Inverter 3							
39	MEP	12 Fl West Wing Plantroom	MCP	Replace MCC panel	Replace					
40	MEP	12 Fl West Wing Plantroom	MCP North	Replace MCC panel	Replace					
41	MEP	12 Fl West Wing Plantroom	MCP South Wing Con	Replace MCC panel	Replace					
42	MEP	12 Fl West Wing Plantroom	MCP North Wing Con	Replace MCC panel	Replace					
43	MEP	12 Fl West Wing Plantroom	Inverter Panel P6/P7	Replace inverter	Replace					
44	MEP	12 Fl West Wing Plantroom	Inverter Panel P38/39	Replace inverter	Replace					
45	MEP	12 Fl West Wing Plantroom	Inverter Panel P20A/B	Replace inverter	Replace					
46	MEP	12 Fl West Wing Plantroom	Inverter Panel P4D/1	Replace inverter	Replace					
47	MEP	12 Fl West Wing Plantroom	Inverter Panel P15/P1	Replace inverter	Replace					
48	MEP	1st Fl South West Plantroom	MCP							
49	MEP	Basement	Main LV Distribution							
50	MEP	Level 34	Main LV Distribution							
51	MEP	Basement	Electrical Intake Room	Several large isolator assumed to be tenants. Remove the redundant electrical switch gear	Remove					
52	MEP	Basement	Standby Generator	No works noted						
53	MEP	East Riser 2- 11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
54	MEP	East Riser 12- 19	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
55	MEP	East Riser 20-33	Electrical							
56	MEP	North Riser 2-11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
57	MEP	North Riser 12-19	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
58	MEP	North Riser 20-33	Electrical							
59	MEP	West Riser 2-11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
60	MEP	West Riser 12-19	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
61	MEP	West Riser 20-33	Electrical							
62	MEP	South Riser 2-11	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
63	MEP	South Riser 12-19	Electrical	Replace rising bus bar and tenants distribution boards	Replace					
64	MEP	South Riser 20-33	Electrical							
65	MEP	Throughout 2- 32	Small Power	Allowance to install cleaner socket to Cat A fit out.	Replace					
66	MEP	Throughout	Floorplate Lighting, landlords lighting and emergency lighting	Allowance for the replacement of the existing lighting with new LED	Replace					

Ref	MEP	Floor Level	Main Element / Area / Service	Comments / Observations / Assumptions	Work Item / Recommendation	Base Cost (£)	Year 1	Year 2	Year 10	Years 1 - 10
67	MEP	Throughout	Landlords Sub Distribution Boards and electrical services for M&E services	Replace the DB's and field wiring	Replace	[redacted]				
68	MEP	Level 34	Chiller HV Electrical Distribution	Replace the HV cable and associated gear	Replace					
69	MEP	Level 34	Chiller Power Factor Correction Units							
70	MEP	Throughout	Data							
71	MEP	Throughout	Fire Alarm System							
72	MEP	Throughout	High rise passenger lifts	Fully modernises the passenger lifts						
73	MEP	Throughout	Low rise passenger lifts	Fully modernises the passenger lifts						
74	MEP	Throughout	Good lifts							
75	MEP	Throughout	W C Hot and cold water services	Remove and replace hot and cold water service						
76	MEP	Throughout	Disabled alarms and refuge alarms	Install						
77	MEP	Throughout	EPC	Carry out detailed survey						
					TOTAL					

APPENDIX B - MEP CURRENT SERVICES DATA

INSTALLED ENGINEERING SERVICES

Introduction

The following sections provide a brief description of the M&E services installed in the building. They only identify the core items of plant installed, due to the changing nature of the building and the previous tenants that have occupied it. There are several tenants installed services which have been installed to serve their requirements. However, there are no detailed records recording what has been installed and what it serves. During our visual, non-intrusive survey we observed some items of plant that may have served specific tenant's requirements which have been switched off, rather than been removed.

General

Record Documentation and Inspections

The following descriptions in this section of the report are based upon our visual, non-intrusive inspections. No plant performance testing or validation works has taken place on the mechanical services. During our survey we were unable to obtain access to record drawings other than those installed in the plantrooms, or any design details relating to the core services.

Lifecycle

We have detailed in the following table the key items of plant installed. Based on our experience and subjected to normal operation and maintenance regimes being carried out, we have indicated a typical lifecycle for the plant. The following table is a general aid and within the body of our report we may have reduced an item of plants economic life due to its visual appearance or signs of wear and tear.

Item	Equipment	Economic life/years
1.0	Waste pipes, plastic	30
2.0	Waste pipes, ductile iron	40
3.0	Storage tanks, galvanised steel	15
4.0	Storage tanks, plastic/non-metallic	20
5.0	Heating pipework, unvented	25
6.0	Boilers, MTHW	20
7.0	Boilers, LTHW	20
8.0	Oil fired burners	15
9.0	Gas fired burners	15
10	Boiler flues, steel	30
11	Heat exchangers, shell and tube	25
12	Heat exchangers, plate	15
13	DHW storage calorifiers, copper	25
14	Expansion vessels, closed system with membrane	15
15	Pipework distribution, copper	45
16	Pipework distribution, stainless steel	35
17	Radiators, steel panel	20
18	Air cooled chillers	20
19	Water cooled chillers	20
20	Cooling towers, plastic coated metal	25
21	Pumpsets, MTHW, LTHW and CHW	20
22	Air handling units, internal	20
23	Air handling units, external	15
24	Fan coil units	20
25	Ductwork	20
26	BMS Controls	15
27	Wet riser and landing valves	20
28	Sprinklers, pipework and heads	30
29	Sprinkler pump sets	20

Item	Equipment	Economic life/years
1.	Building Management System	10
2.	Motor Control Centres (MCC)	20
3.	Inverters	15
4.	Electrical Distribution	25-30
5.	Standby Generator	30
6.	Tenants Distribution Boards	25-30
7.	Bus Bars	35
8.	Small Power	25
9.	Lighting	20
10.	Landlord Sub Distribution Boards	20
11.	Chiller HV Electrical Power Supply	35
12.	Power Factor Correction	20
13.	Data	10
14.	Fire Alarm	10
15.	Intruder Alarm	15
16.	CCTV	15
17.	Lifts	20

Cooling Towers

There are four open circuit cooling towers which serve the four main chillers in the 34th floor plantroom. The cooling towers are manufactured by Balmoral, their AQ22549 range and they were installed in 1993. In 2005/6 the cooling towers were extensively refurbished. The cooling tower matrix packs have recently undergone a full replacement and during our survey we did not observe any leaks from the units. Due to the age of the cooling towers and taking into consideration their refurbishment in 2005/6.

Depending upon the long term strategy for the building's future heating and cooling provision will have an impact on the remaining economic life of the cooling towers i.e. if all the chillers were to be replaced it would by sensible to replace the cooling towers at the same time. This would ensure the maximum reliability of the cooling provision to the building than compared to replacing the cooling and retaining the cooling towers.

Chillers

General

The tower is served by four water cooled chillers and these units are in the 34th floor plantroom. These chillers serve the cooling requirements of the offices in the main tower block. There are a further two chillers which serve the cooling requirements for first floor area. These are in the chiller plantroom on the first floor. In addition to these main chillers there are two other chillers, located on the 12th floor plantroom. These two chillers serve the cooling requirements for the comms rooms on the 2nd to 12th floors. It is our understanding that the computer rooms have been removed. The following table details the current chillers provision and operational status:

Item	Location	Manufacturer	Model	Type	Refrigerant	Year of manufacture	Status
1.0	34th floor plantroom	Systemair	E166-18	Water cooled screw	R134a	2018	On
2.0	34th floor plantroom	York	YMC²	Water cooled centrifugal	R134a	2012	On
3.0	34th floor plantroom	York	MAXE	Water cooled centrifugal	R134a	2007	Off
4.0	34th floor plantroom	York	Millennium	Water cooled screw	R134a	1997	Off
5.0	12th floor plantroom	Carrier	RA 30 series	Air cooled reciprocating	R407c	2000	On
6.0	12th floor plantroom	Carrier	RA 30 series	Air cooled reciprocating	R407c	2000	Off
7.0	1st floor plantroom	Carrier	GV 30 series	Air cooled reciprocating	R407c	1999	On
8.0	1st floor plantroom	Carrier	GV 30 series	Air cooled reciprocating	R407c	1999	On

Typically, all the chillers, above, provide chilled water (CHW) at 6°C on the flow and 12°C on the return.

34th Floor Plantroom

During the writing of this report we have been unable to establish the reason why the York MAXE chiller has been isolated. However, we noted that there appears to be an issue with its controls as the control panel was open and PCB boards removed. If the York MAXE chiller is beyond economic repair, then this unit will require replacement.

Based upon the above table, it is our opinion that the oldest two chillers will require replacement due to their age and the availability of economic spare replacement parts in year one. The two remaining chillers will operate during years one to three (i.e. the York YMC² 2012 and the Systemair 2018).

The replacement of these chillers will involve the dismantling of the chillers and the transportation of the compressor, the condenser and evaporator sections up through the lift shafts. This will involve disruption to any tenants which require the use of the high rise lifts to access their floors. Typically, this disruption will be for three to four weeks whilst the chiller sections are moved through the lift shafts. Once the sections have been transported to the plantroom, the chillers will have to be rebuilt by the manufacturer and tested prior to their installation to the existing system.

1st Floor Plantroom

The two Carrier chillers in this plantroom are air cooled units. The heat rejection from the chillers are ducted to the external louvre of the façade of the 1st floor. The chillers are 19 to 20 years old and they have reached the end of their economic life. Due to their age, there are obsolescence issues with spare parts for their controls.

12th Floor Plantroom

On the 12th floor plantroom there are two Carrier chillers. The chillers have remote air cooled condensers which are located on the roof of the building. The chillers serve the comms rooms installed on the 2nd to 12th floors. During our survey we were advised that one of the units had failed. It is our opinion that when the tenant vacates these floors the comms rooms will be removed.

Local Cooling Units

There are several local cooling units installed throughout the building. However, for the purpose of this report we have assumed that these are tenant installed equipment and therefore we have excluded the local cooling units from our report.

Boilers

MTHW Boilers

The oil fired boilers are located in the boiler room on the 34th floor. The boilers are manufactured by Hoval and are their SR Plus 600 Heatpack range and were manufactured in 1999. The boilers are served by oil fired burners and the burners are manufactured by either Bentone (three units) or Nuway (five units). The boilers main source of heating for the following services:

- The main MTHW heater batteries on the air handling units on the 35th, 34th and 12th floor plantrooms.
- The DHW calorifiers which are on the 12th and 25th floor plantrooms.
- The vertical and horizontal, four pipe, fan coil units in the office area.

- The steel panel radiators in the common parts.
- All non-storage calorifiers.

The boilers are served by a day tank which is in a tank room, located on the 35th floor. The boilers operate on 35 sec fuel oil. During our survey there were no oil or water leaks in the boiler room. There is a pressurisation unit, located in the plantroom which serves the MTHW heating installation.

The boilers are double stacked, and they are served by a common stainless steel flue arrangement. The boiler room is naturally ventilated by external louvres, mounted on the external façade of the boiler room.

There are limited spares available from the manufacturer i.e. rope seals and gaskets.

LTHW Boiler

The first floor plantroom has been provided with a LTHW gas fired boiler. The boiler is manufactured by Hamworthy, their Wessex modular boiler range. The boiler serves the heating to the first floor. We were unable to identify the age of the boiler, but it is our opinion that the boiler is over 19 years old. The heating system to the 1st floor is served by a pressurisation unit, expansion vessel, an end suction pumps all which date from circa 2000.

The boiler is served by a stainless steel flue which terminates externally.

There is a gas meter located in a small cupboard in the plantroom.

Non-Storage Calorifiers

There are eight non-storage calorifiers, in the 12th floor plantroom which provide LTHW to the FCUs, staircase radiators, ground floor heating and the heater batteries in the 1st floor AHUs. The calorifiers date from the 2000 fit out. We do not anticipate any remedial works to the non-storage calorifiers in years one to three.

Ventilation Systems

General

The main supply and extract air handling units (AHUs) are in the 35th floor, 12th floor and 1st floor plantrooms. Generally, the ventilation systems are configured as two systems i.e. a north/east zone and a south/west zone. These AHUs serve the 23rd to 34th floors with each unit serving two wings. These AHUs operate with 100% fresh air. However, the AHUs have the facility of the installation of a run around coils arrangement between it and the extract from the floor plates.

The AHUs on the 12th floor serve the 2nd to 11th and 13th to 22nd floors. There are eight AHUs; four serve the 2nd to the 11th floors, one for each wing. The remaining four AHUs serve the 13th to 22nd floors. These AHUs have been provided with run around coil arrangements.

The AHUs consist of a filtration section, heating and cooling sections and a steam humidifier section.

The 1st floor is served from the first floor ventilation plantrooms.

There are separate AHUs, in the 35th floor plantrooms, which serve the toilets on the 13th to 34th floors and these have an independent toilet extract system. The 12th to 2nd floor toilets are served by a dedicated AHU which is located in the 12th floor plantroom.

Air Handling Units

During our survey we were unable to establish the age of the AHUs. However, it is our opinion they date from the original install of the building. The AHUs operate on 100% fresh air. The general condition of the AHU units is fair, and it is our opinion that they will continue to operate for a further one to three years subject to them receiving a major overhaul. However, we were unable to isolate the AHUs and carry out an internal inspection of the units.

The AHUs which serve the remaining floors down to the 2nd floor are on the 12th floor. These AHUs have been provided with run round coils.

Extract Systems

The extract fans serving floor 23rd to 34th floor are on the 35th floor and they are original to the building. The extract fans which serve the remaining floors are on the 12th floor. The various extract original to the building. There are dedicated extract systems which serve the common areas and the toilets on each floor plate and independent systems which serve the office area, and these are located on either the 34th or 12th floor plantrooms

Building Pipework

In general, most of the pipework is original. Heavy weight carbon steel pipework has been used on the heating and cooling installations with copper pipework being used on the hot and cold water services. There are pipework risers in in each wing of the building and these risers contain the vertical pipework to the various MEP services. From the risers the heating and cooling pipework is contained within the ceiling voids or in the service voids around the external perimeter of the floor plates. No major leaks were observed on the pipework distribution during our survey. During our survey we were unable to review any records on the water treatment or sampling of the water systems.

Calorifiers

DHW Calorifiers

The domestic hot water calorifiers (DHW) are in the 25th floor, three calorifiers, and the 12th floor plantroom, four calorifiers. The primary heating source to the calorifiers is from the MTHW system and they are provided with supplementary electrical heaters. The calorifiers are horizontal units and they date from the 2000 fit out of the building. During our survey we observed water staining and pooling water local to the 12th floor calorifiers which appears to be coming from the safety valve discharge pipe and that some of the immersion heaters have been disconnected. During our survey we were advised that there have been no issues with the legionella sampling on the DHW.

Gas Fired Water Heater

In the 1st floor plantroom there is a gas fired water heater which provides domestic hot water (DHW) to the kitchen area. It is our opinion that the heater has been replaced in the past 10 years.

Plate Heat Exchangers

There are two, CHW, PHEs installed in the 12th floor plantroom. The units were fully insulated, and we were unable to visually examine the units. The units were installed as part of the 2000 fit out.

Pumps

35th Floor Plantroom

Typically, the heating and cooling pumps are in the 35th and 12th floor plantrooms and they are a combination of long and close coupled units, dependent upon their age. During our survey we noted that some of the pump motors have been changed in past.

Originally the MTHW pumps were fitted with mechanical cooling to their bearings. However, these systems have all been decommissioned albeit they are still in-situ. We have excluded for the re-instatement of the cooling systems from our cost tables.

34th Floor Plantroom

The CHW and condenser water pumps are in the chiller plantroom. These pumps have been replaced in the past five years with in-line, single headed, mechanical seal, pumps. [redacted]

Booster Pumps

The main cold water booster pumps are in the basement, cold water tank room. The booster pumps appear to have been replaced in the past five years and it is our opinion that the booster sets will continue to operate during years one to three.

Valves

The valves serving the water distribution services are original to the building and have exceeded their normal economic life. However, from our inspection, no major issues were observed on the valves. However, we were unable to open or close the valves as the water distribution systems were in operation.

On the MTHW systems, the valves are configured in a double valve arrangement. However, as part of any long term strategy with the heating and cooling systems, the use of MTHW systems may be removed.

Generally, the valves are gate valves but there are instances when later pipework modifications have been carried out, the use of butterfly valves has been employed on the later installed systems.

Ductwork

The supply and extract ductwork systems are in a fair condition, and it is our opinion that these systems will continue to operate for a considerable period.

Dampers

Fire Dampers

Fire dampers have been installed throughout the building where the ventilation system breaches the buildings fire barriers. During our survey we were unable to examine any fire or their service records. It is our experience that fire dampers are not regularly tested in accordance with BS 9999:2017 code of practice for fire safety in the design, management and use of buildings.

Volume Control Dampers

Volume control dampers are installed in the supply and extract ductwork systems. These dampers are original to the building. No internal access was available to these dampers.

Floor Plates

General

During our survey we were unable to determine if there were any issues with the current heating and cooling provision to the tenant areas in the tower block. However, it is our understanding that there are some underheating issues with the perimeter offices on the 1st floor. Currently the 1st floor is predominately meeting rooms and we recommend that the issues with the heating is addressed in year one.

Fan Coil Units

The heating and cooling to the tenant areas is using four pipe fan coil units (FCUs). A mixture of ceiling mounted, and wall mounted units have been employed throughout the floors. During the survey we were unable to identify the age of the FCUs. However, it is our opinion that the ceiling void mounted units were installed as part of the 2000 refit of the building with the wall mounted units being original to the building. We recommend that the FCUs are fully overhauled and cleaned in year one.

Wet Riser

There are two wet risers that serve the building. The wet risers are in the east and west protected lobbies. In general, the wet riser consists of a water storage tank in the basement, an electrically driven pump and a separate diesel driven pump and these pumps are in the same plantroom as the water storage tank. No pressure or water flow rate tests were carried out on the risers. However, it is our understanding that the current FM provider service and test the systems in accordance with the current regulations.

Sprinklers

There is a cold water main supplied sprinkler installation that serves the ground, 1st and 2nd floor office areas. The installation consists of main distribution pipework, range pipework and sprinkler heads. Most of the pipework is concealed in ceiling voids and therefore there was limited access to the sprinkler installation. It is our opinion that the sprinkler installation dates from the 2000 fit out of the building.

Storage Tanks

Oil Storage

The MTHW boilers are oil fired and the main oil storage is in the basement of the building. The oil storage is original to the building. However, the main oil pumps in the basement have recently been replaced in the past five years. There is a further daily, oil storage tank located on the 35th floor and again this is original to the building. This tank then serves the boilers which are on the floor below. Both these tanks are of a single skin construction. The overall condition of the oil storage and distribution is fair. We do not anticipate any major issues with this system during years one to three.

Cold Water Storage

The main water storage tanks are located on the 35th floor plantroom and in the basement water tank room. Typically, the tanks are GRP section units and during our survey we did not observe any leaks from the tanks. It is our opinion that the water tanks date from around the year 2000 fit out and there were probably sized for a 24 hour water storage capacity. It is now normal practice to size water tanks on a maximum storage capacity of 6 to 8 hours of usage.

During our survey we were unable to review the water risk assessment or any water sample records.

Building Management System (BMS)

The building management system (BMS) dates from the 2000 fit out of the M&E services. The original BMS is a Saulter system. In general, the system consists of local outstations contained within the motor control centres (MCCs) and these outstations contain all the software and controllers to control the M&E services served by the MCC. All the outstations are linked using area network cables. The networked outstations allow their controls to be viewed by a remote computer which has the supervisor software. The supervisor software allows the various control routines to be adjusted remotely. The supervisor also allows for the remote monitoring of alarms and plant failure. The outstations controllers are no longer support by the manufacturer.

The supervisor uses a Niagara Framework as supplied and manufactured by Tridium. The supervisor has been installed in the past five years. The system supports the older network protocols as used by the Saulter controllers.

For the long term, we anticipate that all the outstations will require replacement on a phased basis. We recommend that a BACNET protocol system is installed as this provided the most flexibility with third party control systems. The current supervisor would be retained and adapted to work with the new outstations when they are installed.

Electrical Services

Electrical Distribution

The building is served by a number of 11,000(V) three-phase and neutral (TPN) supplies, which enter the property from the sub-basement area. These are divided into landlord's and tenants' 11,000(V) supplies feeding transformers on the 34th floor to serve tenant plant. The 415(V), 400(A) TPN supplies to common parts, plant on the 1st, 12th , 33rd and 34th floors and other ancillary areas are routed via dedicated switch rooms to the different service risers throughout the property.

The tenants' supply risers are located in each wing, via a propriety type of busbar distribution system serving at every level a compartmented, single-phase distribution board. These are located within the fire escape stairwells, and serve small power to sockets, lighting and the comfort conditioning fan coil units. Additional distribution boards are located within the floor plates and serve additional small power works, i.e. the Sauter controls for the comfort conditioning system located on the floor plates, comms rooms supplies etc.

Main LV Distribution Panels

The main LV distribution panels are located in a dedicated electrical switchroom in the sub- basement of the building. The LV distribution panels consist of six individual sectional panels identified LV-1 to LV-6 serving the retail units, landlord's services and tenant's electrical services. With the LV essential power boards being fitted with automatic changeover switchgear.

Electrical Intake Room

Located in a separate electrical plantroom are several LV switch panels, these appear to have been installed by a tenant some years ago and appear to be redundant.

Standby Generator

The property is served by a dedicated standby diesel powered generator, this is located in the sub-basement of the building. The generator dates from 2008 and is manufactured by Perkins Ltd and rated at 800 (kVA). The standby generator set has been installed retrospectively and has been installed to provide essential power to serve the fireman's lifts in the event of power failure. Any future scheme for the building will have to consider retaining the generator set, this will need to based on the recommendation of a future Fire Risk Assessment.

Tenant's Distribution Boards and Busbar

The busbar distribution system is fed from the basement switchgear room and is supplied from several 400 (A), three phase isolators; the busbar systems are separated into four distinct systems per wing, based on floor levels, i.e. floors 2 to 11, 13 to 19 and 20 to 34.

Generally, the distribution boards and associated busbar distribution system serving floors 2 to 11 dates from the original construction of the building in the 1970s.

The distribution boards serving floors 12 to 19 date from approximately 2001, with the associated busbar distribution system still being original to the construction of the building. With the distribution boards and associated busbar distributions system serving floors 20 to 34 having been replaced within the last 10 years. The bus bar is manufactured by Barduct, with the distribution boards being manufactured by Square D from their Load Centre range of products.

Small Power

Small power distribution on the floor plates is via a propriety type of 1990s busbar distribution type within an intercell type shallow false floor serving floor boxes throughout the floor plates. This system carries single-phase 13 (A) double-switched socket outlets, together with voice and data points. The compartmented distribution boards have typically two compartments dedicated to serve small power for each particular floor wing.

Lighting

The general office lighting on the office floorplates is generally comprised of modular fluorescent luminaires laid in the suspended ceiling grid.

The plantrooms, staircases and general back of house area are illuminated with a mixture of surface mounted baton florescent light fittings and bulkheads. In general, these are in are in poor condition with many fittings damaged or not functioning.

Emergency lighting is provided by a combination of self-contained bulkhead luminaires distributed throughout the back of house areas, floor plates, and recessed luminaires fitted with emergency battery conversion packs. There is sufficient provision of luminaires in most areas; the operation of the system was not verified at the time of visit.

The directional exit signage throughout the back of house areas and floor plates comprises of a mixture of pictogram styles, including those with 'Exit' wording that have now been superseded by European standards. These are in fair condition although their operation was not verified at the time of visit.

We understand that a programme of testing and inspection of the emergency lighting system is in existence in accordance with BS 5266-1: Emergency Lighting, Code of Practice for the Emergency Lighting of Premises.

Landlord Sub Distribution Boards

The majority of the Landlord's sub distribution boards are feed by SWA emanating from the main LV distribution panels located in the basement. The majority of sub distribution boards are manufactured by Square D from their Load Master range, they are generally 200 amp TP& N fitted with MCBs and are in good condition.

Chiller HV Electrical Power Supply

The four chillers located in the 33rd floor plantroom is electrically fed via a dedicated high voltage power supply located in a substation on the same floor as the chillers. The two HV transformer and associated chiller LV switchgear all dates from the original construction of the building in the 1970s.

In addition to the chiller transformers and associated switchgear, two power factor correction units have been installed. These are manufactured by PFC Engineering and date from approximately 2014. They are both in good condition with no defects noted during the site inspection.

Data

The existing data cabling which serves each floor and each wing of the tower is routed via a dedicated service riser, which is generally within the fire escape stairwell of each wing and is distributed throughout the floor plate via the local comms rooms and floor boxes.

Fire Alarm System

The property is provided with general smoke detection throughout the floor plates together with a limited number of the services risers. The automatic smoke detection system is supplemented with manual call points at all of the final exist points at each floor level into all stairwells. In addition, the fire alarm installation is provided with numerous sounders and voice annunciation that will activate when a fire is detected. The system operates as phased evacuation was originally designed to meet the requirements BS5839 Part1: 2002 for life protection system category L1 system.

Vertical Transportation

We have separated the lift provision at Euston Tower into three distinct groups, the high rise group, low rise group and the goods lifts.

The high rise is a group of five lifts serving floors ground, 20-34. The motor room is located on level 36 and is accessed via level 36 plant room

The low rise is a group of five lifts serving floors ground, 1 to 19, The motor room located over 2 floors on levels 21 and 22 within tenanted floors.

The two goods lifts are situated in the fire escape stairwells, one within the east stair well and one within the west stair well. Both lifts serve floors basement, ground, 1 to 34.

High Rise Lifts

The group of five lifts within the high rise group are designated A through to E and are passenger lifts. The lifts travel from ground floor to the 20th floor without stopping, this section of the lift shaft is known as the express zone. Escape doors are fitted periodically within the express zone.

Each lift has a rated load of 23 persons or 1590kg and rated speed of 5 metres per second. The lifts operate as a fully collective group.

The lifts were originally installed when the building was originally built in 1970. A significant modernisation was undertaken in 1990 and further stabilisation works undertaken in 2017. Much of the equipment is the original design, including the guides, lift cars, counterweights, machines, divertors compensation and buffers.

The controllers were replaced in 1990 along with all car and landing signalisation. The generators were removed but the dc motors were retained. The stabilisation works in 2017 allowed for a full overhaul of the lift machines, replacement door operators and significant health and safety upgrades, along with the provision of critical spares.

The landing doors have had some modification and improvements over their lifetime, including replacement rollers, lock components and air cords.

Low Rise Lifts

The group of five lifts within the low rise group are designated as A through to E and are passenger lifts. Each lift has a rated load of 19 persons or 1425kg and a rated speed of 3.5 metres per second. The lifts operate as a fully collective group. The lifts were originally installed when the building was originally built in 1970. A significant modernisation was undertaken in 1990 and a further stabilisation in 2017. Much of the equipment is the original design, including the guides, lift cars, counterweights, machines, divertors, compensation and buffers.

The controllers were replaced in 1990 along with all car and landing signalisation. The generators were removed but the dc motors were retained. The stabilisation works in 2017 allowed for a full overhaul of the lift machines, replacement door operators and significant health and safety upgrades, along with the provision of critical spares.

The landing doors have had some modification and improvements over their lifetime, including replacement rollers, lock components and air cords.

Goods Lifts

The two goods lifts are designated the east and west goods lifts. Each lift was installed during the building construction in 1970 and since that time have undergone a comprehensive modernisation in 2010. The equipment installed is the same for each lift.

During the modernisation only the car and counterweight guides were retained, all other equipment was replaced. The lifts have a capacity of 20 persons or 1360kg and serve basement, ground, 1-34, the machine rooms are each located on level 35. Each lift has a rated speed of 2.5 m/s.

The lifts are installed with 'Kollmorgan' manufactured microprocessor control systems incorporating variable voltage variable frequency drives. The drive system is regenerative type. The lifting machine is a gearless type manufactured by 'Thyssen' Lifts. The car and landing door were manufactured by 'Meiller' and are centre opening type. The car door operator is a variable voltage, variable frequency type.

APPENDIX C - SVM CLAUSES

SVM ASSOCIATES

LIMITATIONS TO SURVEY

The surveys were undertaken on a visual basis. This does not allow an in-depth assessment of condition and further assessments may reveal defects that would affect the operation or life cycle of the building and equipment.

- SVM did not inspect parts of the building which are covered, unexposed or inaccessible excepting sample areas of suspended ceiling tiles and raised floor tiles where it is reasonable to do so and therefore no advice will be given as to, nor responsibility accepted by SVM for the condition of such areas. The exterior of the building was inspected from ground level only unless access was available to a higher level. Below ground drainage was not inspected as part of this survey, unless otherwise stated.

- The survey was limited to a surface examination of accessible parts of the building and the report describes the form and present condition of the services, drawing attention to visible defects in design and installation and where appropriate, recommendations have been given by SVM upon the need for repair. Should it appear from the survey that any opening up works or further investigation is desirable, SVM has advised accordingly and if so instructed and the necessary consent obtained, make a further examination for which a supplementary fee will be charged.

- SVM has not commented upon minor defects associated with normal wear and tear of the services or defects except where such matters have a bearing upon the general condition of the property.

- Unless SVM are specifically instructed and the building owner's written consent was obtained, SVM did not move any heavy furniture or disturb fittings, remove articles from cupboards or like areas, raise any floor coverings or remove any floorboards. If in SVM's opinion further investigations are necessary, they will advise accordingly as noted.

- SVM have not considered the premises in relation to apparent contravention's of the Building Regulations and will only report in broad terms on any shortcomings noted in this respect.

- No formal enquiries have been made to the local authority to obtain historical information, existing user rights, proposed use etc. legal interests, fire certificate, effluent agreements, easements and wayleaves. SVM have relied upon the client's solicitors to undertake these normal enquiries and searches.

- Where the property is leasehold and the demised premises form part of a larger building or estate, SVM have made a limited inspection of accessible common parts of the building or estate, for the purpose of assessing their general condition.

- Unless otherwise instructed, testing of components within the services for taking of samples of materials for analysis to establish their make-up and consideration as to whether they may prove prejudicial to the use or value of the building has not been undertaken.

- SVM were not required to determine whether asbestos, calcium chloride, high alumina cement, woodwool slabs (used as permanent shuttering) or other deleterious materials are used within the premises. Advice regarding condition has been given on the assumption that such materials are not present. However, where SVM believe deleterious materials are present they will advise of their suspicions to the client, so that a specialist can be appointed and appropriate action can be undertaken.

- SVM's report is confidential to the party whom it is addressed and it is intended for the use of that party only. However, the client may assign its sole rights and benefits once only with the written agreement of SVM, which will not unreasonably be withheld.

- SVM are entitled to rely upon all information given to them and consider it to be accurate.

Or

No site documentation was available concerning the services, and the condition of equipment was based upon non-intrusive observation of the systems. As no tests or measurements of equipment performance was made our comments are indicative only.

- SVM's inspection specifically excludes an analysis and review of environmental considerations as they relate to the property, site and surrounding areas.

- The economic working life quoted for the plant, equipment and building fabric is based on professional judgement, visual assessment of the plant conditions and published data. Operation of plant beyond its economic working life is possible, however the risk of failure is increased leading to higher operating costs and the possibility of catastrophic failure presenting business risk. If there is poor maintenance or unusual environmental conditions then this can reduce the economic working life of items.

ASBESTOS

- Where SVM was not advised of the presence of asbestos containing material (ACM) by the client, either in the form of a written statement or an asbestos register, SVM assumed that ACM's may be present. This restricted the areas accessed by SVM during the survey i.e. inspection covers, ceiling tiles etc in an effort to avoid the disturbance of possible ACMs.

- Where SVM was advised of the presence of ACM by the client, either in the form of a written statement or an asbestos register, SVM took appropriate measures to avoid disturbing the ACM, should SVM disturb an ACM in an area not previously identified by the client, SVM will not accept any liability for any contamination subsequently caused.

Liability not to Exceed amount of Insurance

Further and notwithstanding anything to the contrary contained in this agreement and without prejudice to any provision in this agreement whereby liability is excluded or limited to a lesser amount, the liability of SVM Associates under or in connection with this agreement whether in contract or in tort, in negligence, for breach of statutory duty or otherwise for any claim shall not exceed the amount, if any, recoverable by SVM Associates by way of indemnity against the claim in question under professional indemnity insurance taken out by SVM Associates and in force at the time of the claim or (if earlier) circumstances that may give rise to the claim is or are reported to the insurers in question. This limitation shall not apply if no such amount is recoverable due to SVM Associates having been in breach of his obligations to maintain professional indemnity insurance under this agreement or the terms of any insurance maintained in accordance therewith or having failed to report any such claims or circumstances to the insurers in question timeously.

Limitation of Liability

Further and notwithstanding anything to the contrary contained in this agreement and without prejudice to any provision in this agreement whereby liability is excluded or limited to a lesser amount, any liability under or in connection with this agreement, whether in contract or in tort, in negligence, for breach of statutory duty or otherwise, for any claim for loss or damage wholly, partly, directly or indirectly arising out of or resulting from or associated in any way with asbestos or any product or waste that contains asbestos (including without limitation the costs of testing for, monitoring, abatement, mitigation, removal, remediation or disposal of any asbestos or product or waste that contains asbestos) shall not exceed the amount, if any, recoverable by SVM Associates by way of indemnity against the claim in question under professional indemnity insurance taken out by SVM Associates and in force at the time the claim or (if earlier) circumstances that may give rise to the claim is or are reported to the insurers in question. This limitation shall not apply if no such amount is recoverable due to SVM Associates having been in breach of his obligations to maintain professional indemnity insurance under this agreement or the terms of any insurance maintained in accordance therewith it having failed to report the claim or such circumstances to the insurers in question timeously.

Indemnity from the Client in relation to Asbestos Claims

The client will indemnify SVM Associates against liability for any claim for injury, death, loss or damage wholly, partly, directly or indirectly arising out of or resulting from or associated in any way with asbestos or any product or waste that contains asbestos (including without limitation the costs of testing for, monitoring, abatement, mitigation, removal, remediation or disposal of any asbestos or product or waste that contains asbestos) in excess of the amount, if any, recoverable by SVM Associates by way of indemnity against the claim in question under professional indemnity insurance taken out by SVM Associates and in force at the time that the claim or (if earlier) circumstances that may give rise to a claim is or are reported to the insurers in question, or un the event that no such amount is recoverable due to SVM Associates having been in breach of his obligations to maintain professional indemnity insurance under this agreement or of the terms of any insurance maintained in accordance therewith or having failed to report the claim or such circumstances to the insurers in question timeously, the client will indemnify SVM Associates against any such liability in excess of the amount which would have been so recoverable but for such breach or failure.