

**IN THE FIRST-TIER TRIBUNAL
PROPERTY CHAMBER
(RESIDENTIAL PROPERTY)**

Case ref: LON/00BJ/LSC/0286

In the Matter of: The Landlord and Tenant Act 1985; Section 27A

B E T W E E N:

**THE MAYOR AND BURGESSES OF THE
LONDON BOROUGH OF WANDSWORTH**

Applicant/ Landlord

and

**VARIOUS LEASEHOLDERS OF
100 HIGH-RISE RESIDENTIAL BLOCKS
IN THE LONDON BOROUGH OF WANDSWORTH**

Respondents/ Leaseholders

**APPENDIX [26 – Provision of sprinkler systems to all high-rise
blocks ten storeys in height or greater; Design Service]**

**TO THE STATEMENT OF CASE
ON BEHALF OF
THE LONDON BROUGH OF WANDSWORTH**



Survey Report

**Provision of Sprinkler Systems to all High
Rise blocks ten storeys in height or greater
August 2017**

**For and behalf of
Housing and Regeneration Department
Document Reference: 02-17001-S-RPT-001-R01**

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CONTENTS

1.00	INTRODUCTION.....	4
2.00	LIMITATIONS OF THE SURVEY/INSPECTION	4
3.00	PROPERTY TYPE	4
4.00	ELEMENTS TO BE CONSIDERED	4
5.00	SPRINKLER SYSTEMS	5
6.00	SPRINKLER DESIGN FLATS	6
7.00	SPRINKLER DESIGN COMMUNAL AREAS	6
8.00	WATER SUPPLY	7
9.00	SPRINKLER BUDGET COST SUDBURY HOUSE.....	9
10.0	OVERALL BUDGET COST FOR SPRINKLERS TO 100 BLOCKS	9
11.0	THAMES WATER.....	10
12.0	ASBESTOS.....	10
13.0	INSTALLATION TIME SPRINKLERS & MIST PER FLAT	10
14.0	PROCUREMENT.....	10
15.0	BUILDING CONTROL.....	11
16.0	MIST SYSTEMS	11
17.0	MIST SYSTEM BUDGET COST SUDBURY HOUSE	13
18.0	OVERALL BUDGET COST FOR MIST INSTALLATION TO 100 BLOCKS	14
19.0	MONITORING.....	14
20.0	INSURANCE	15
21.0	MAINTENANCE.....	15
22.0	LONDON FIRE BRIGADE.....	15
23.0	OVERALL INSTALLATION PROGRAMME	16
24.0	CONCLUSION.....	16



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1.00 INTRODUCTION

This report has been prepared in accordance with the Housing and Regeneration Department brief dated July 2017.

Following the serious fire at Grenfell House this report is to consider the retro fitting of either a sprinkler or mist system to flats owned by Wandsworth Council in blocks that are greater than ten storeys in height or above.

The proposal is to install either a sprinkler or mist system in both tenanted and leasehold properties that meet the criteria above.

Automatic sprinkler systems have a proven record of more than 150 years in protecting life and property. Sprinklers are widely recognised as the single most effective method for fighting the spread of fires in the early stages. Sprinklers reduce injuries by at least 80% and reduce damage to property by 90%. The installation of sprinkler systems is fully supported by the London Fire Brigade as a proven method of saving lives in the event of a fire.

2.00 LIMITATIONS OF THE SURVEY/INSPECTION

- All items inspected visually and limited by access prior to any works taking place.
- No test or samples were taken other than visual inspection.
- Conditions of elements pertain to the time of the survey.

3.00 PROPERTY TYPE

The blocks of flats identified for the retrofits of a sprinkler system are those ten storeys or higher of which it has been identified there are 100 blocks within the ownership of Wandsworth Council.

4.00 ELEMENTS TO BE CONSIDERED

- The fitting of a standard sprinkler to BS 9251 or a mist type system which is not British Standard approved at the time of preparing this report.
- Location of installation, flats & communal areas or just flats.



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- Provision of adequate water supply to enable the effective operation of a sprinkler system in the event of fire.
- The impact the installation will have within individual dwellings.
- The presence of asbestos or asbestos bearing materials.

5.00 SPRINKLER SYSTEMS

At present the requirement for a fully approved system only exists for installations to commercial buildings, factories etc. This has largely come about as a requirement of the insurance industry who before insuring a building insist that if a sprinkler system is to be fitted it should meet or exceed all British Standards & comply with all current Technical Bulletin's issued by the BRE.

Given the size of Wandsworth Council's installation programme all sprinkler systems should be fully compliant to standardise installations across the borough.

The sprinkler system specification should be designed and installed in accordance with BS9251:2014. The sprinkler installers should be 3rd party accredited to prevent where ever possible the employment of any incompetent installers.

The three main 3rd party accreditors are Warrington Fire (FIRAS), Loss Prevention Council (LPC) or International Fire Consultancy (IFC).

Designing the system in accordance with the British Standard, the proposed sprinkler system would come under the requirements of Category 2 or 3. It is noted that "where blocks of flats exceed heights of 18m, then a Cat 2 system must be implemented or Cat 3 if communal areas are covered"

(BS9251:2014). The main difference between a Cat 2 and a Cat 3 system is an increase in water demand, allowing for up to four sprinkler heads to operate at one time (should there be four within one area) for a minimum of 30 minutes.

There are two options for a sprinkler system full cover to the whole property (flats and all communal areas) or just the flats. The Housing & Regeneration Departments preferred option is to cover the flats only. This may require input by the fire brigade and Building Control to assess that the communal areas are sufficiently sterile and only sprinkler protection to the flats is adequate in the event of a fire. The decision to cover the flats only would require a 3rd parties' approval such as the Fire Brigade or Building Control which



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would be determined as part of a full plans application for each installation. This would then support the accredited installer's completion certificate.

6.00 SPRINKLER DESIGN FLATS

Pipework would enter the property at high level either above or alongside the flat entrance door. The supply pipes would then be run at high level around the hallway with a sprinkler head run to each room.

All pipework within the flats would be plastic CPVC (a special fire-retardant pipe manufactured for sprinklers). Preferably the sprinkler heads should be wall mounted with the service pipework boxed in.

Supply pipework from the tank would be galvanised pipe run internally via either existing service Riser ducts or where these do not exist pipework would be surface mounted internally or in the worst case run surface mount externally up the face of the building

On completion where ever possible the pipework would be boxed in and decorated. Any damage as a consequence of the works to be made good.

The description above will apply in the majority of cases but inevitably some variations will occur given the layout of individual flats.

It should be noted that sprinklers are likely to cause more water damage than mist systems.

7.00 SPRINKLER DESIGN COMMUNAL AREAS

It is not a Housing & Regeneration Department requirement to fit sprinklers to communal areas. Reference to communal areas has been included for background information only.

If a communal area system is fitted the communal pipework in most cases would consist of galvanised pressed steel pipe connected to exposed sprinkler heads protected by a metal cage.

Where possible pipes would be run either surface or within existing or redundant riser ducts across ceilings or above false ceilings where these voids already exist. If this is not possible riser pipework will be run externally. Where pipes run between concrete floors these will



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need to be core drilled and the holes fire stopped on completion. Any other holes formed during the installation will also need to be fire stopped.

It is inevitable that some decorations will be damaged during the installation & these will need to be made good on completion of the works. Consideration may also be given to boxing in supply pipework to improve appearance.

The description above will apply in the majority of case but inevitably some variations will occur given the construction and layout of individual blocks.

8.00 WATER SUPPLY

Sprinklers installed to meet the latest standards are designed to operate using a water supply that offers a good flow rate. It is not necessary for the supply to have a high pressure.

Given the clients preference not to fit sprinklers to the communal areas the sprinkler water demand will be approximately 98lpm (litres per minute) @ 8bar. Should this be fed from a tank, it would need to hold 3200ltrs minimum or reduced to a maximum of 60% depending on the infill rate from the town main, of which we can use 80% of the available volume.

If the communal areas were covered the sprinkler system would require approximately 120lpm @ 10bar. This would be using 30lpm sprinkler heads in the communal areas creating the maximum demand of 120lpm with four sprinklers operating. If this was fed from a tanked supply the tank would need to be a minimum of 3800ltrs or reduced using the methods stated previously.

Alternatives to be considered for each block are:-

1. Increase the size of the current domestic water tank and have a separate outlet to a dedicated sprinkler pump. This would involve the need for float switches within the tank to reserve a certain amount of water for the sprinkler system. As well as a priority demand valve on the domestic water outlet to ensure all water is diverted to the sprinkler in the event of sprinkler activation.
2. Provision of a new standalone supply. As a minimum this will involve the conversion of an existing disused area within a block or alternatively a new building will need to be constructed to house a dedicated sprinkler supply tank.

Given the water supply issues due to lack of pressure by Thames Water where ever possible a standalone boosted tank is the preferred option. Where it is not possible to locate a



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dedicated tank, providing the existing cold water storage tank has sufficient capacity a diverter valve can be fitted which switches off the block supply in the event of a fire.



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9.00 SPRINKLER BUDGET COST SUDBURY HOUSE

The following budget cost is based on the installation of a sprinkler system to the flats only not the communal areas to Sudbury House. These costs when pro-ratad could equally apply to any of the 100 blocks where it is proposed to fit a sprinkler system.

On average the installation would require 7 sprinkler heads per flat (924 total) with 16m of boxing (2112m total)

Supply & install a Sprinkler System (flats only)		£197,000.00
Boxing to pipework (flats only)		£116,000.00
Core Drilling		£10,000.00
Fire stopping works		£10,000.00
Pump Set		£6,000.00
Tank (7,500 litres)		£8,500.00
Manifold to each floor for monitoring		£3,500.00
Monitoring Installation (Linked back to a central control)		£25,000.00
Provisional Sum for asbestos testing & limited removal		£23,400.00
Allowance for adapting existing space to provide a tankroom or constructing a new tankroom		<u>£25,000.00</u>
		£424,400.00
Preliminaries	15%	£63,660.00
Contingencies	10%	<u>£42,440.00</u>
		£530,500.00
Professional Fees	10%	£53,050.00
Client Costs	5%	£26,525.00
Total Budget Requirement for Sudbury House (at 3rd Q 2017 prices)		£610,075.00
Typical Average Cost per flat (at 3rd Q 2017 prices)		£4,622.00

Please be aware that given the current & future demand for sprinkler systems these costs are likely to increase significantly.

10.0 OVERALL BUDGET COST FOR SPRINKLERS TO 100 BLOCKS

It has been identified there 6,401 flats where sprinklers will be required at average installation cost £4,622.00 per flat giving an overall budget for all flats of £29,585,422.



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11.0 THAMES WATER

As part of the preparation of this report our proposals were submitted to Thames Water for consideration. At the time of preparing this report they had no adverse comments regarding our proposals. Their only comments were that all works are to comply with the current water regulations at the time of installation.

12.0 ASBESTOS

Given the age and original construction methods of the 100 blocks identified where sprinklers are to be installed it must be assumed that asbestos will be present during many of the sprinkler installations. Prior to commencing works a thorough asbestos survey should be commissioned to each of the blocks in the areas where works will be taking place. It should be noted that cost of removing any asbestos could add significant cost to the project.

13.0 INSTALLATION TIME SPRINKLERS & MIST PER FLAT

Excluding any asbestos removal works it is anticipated that each flat will take two days to install. This includes installation of the sprinkler/mist system & boxing around pipework.

This installation time is dependent on residents giving reliable access to carry out the works.

Installation of the riser mains & storage tanks should only have limited impact on residents.

14.0 PROCUREMENT

All works should be undertaken by a company that is an approved member of either the FIRAS, British Automatic Fire Sprinkler Association or the Loss Prevention Certification Board.

Given the very specialist nature of these works it is recommended the works are procured using only contractors who are full members of the above organisations. This could be achieved using either a framework agreement or using a JCT Design & Build Contract.

From our investigations the majority of sprinklers installers operating in this market are fairly small. The larger companies at present focus on the commercial/industrial market. This may well change as more local authorities start commissioning new installations.

During the preparation of this report we have identified a couple of possible framework



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agreements for the procurement of sprinkler installations. These require further investigation to establish their suitability before proceeding further.

15.0 BUILDING CONTROL

In the preparation of this report the SSA Building Control were approached to give their position regarding the retro fitting of either a sprinkler or mist system. Their comments are as follows:-.

In general sprinklers are a more permanent installation than a mist system but they require a greater water supply to operate. Sprinklers are also less susceptible to tampering by occupants.

On the other hand misting systems would be easier to fit but are less robust, more susceptible to interference & potentially have a greater future maintenance cost given they require both water & an electrical supply to operate.

Regarding provision of a sprinkler or misting system to common areas, Building Control suggest there should be no need to do this unless there is a failure of the fire strategy associated with the principle means of escape. This is on the basis that internal common areas are considered to be satisfactory with suitable passive fire precaution features and a robust maintenance process and programme as required under the Regulatory Reform Fire Safety legislation.

Building Control were unable to comment further until they are in receipt of a full plans application to install either a sprinkler or mist system into a block.

16.0 MIST SYSTEMS

Unlike sprinkler systems, water mist systems are “project specific” and each particular hazard or occupancy requires its own very specific design. It is therefore not possible to design a mist system simply by reference to one of the various standards available. In the case of sprinkler systems where reference to BS EN12845 or BS 9251 enables a full design to be produced and a fully compliant system to be installed, this is not possible for mist systems.



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Mist fire suppressions systems are a fairly new addition to the domestic market with the technology constantly evolving. At present there is no British Standard covering these systems in entirety only in part. Therefore any mist system installed at present would not be fully compliant making it difficult to ascertain which systems are the most effective. The mist system manufacturer we have considered in the preparation of this report has BS approval for the nozzle but not the complete system.

Mist systems have largely come about as a result of the maritime industry. Ships by their very nature are usually divided into many separate compartments. Given this fact, it allows a mist system to operate far more effectively than in an open domestic or commercial environment. Also, in the event of a fire on ship you do not want to fill the ship with large volumes of water.

Mist systems do not operate effectively in well ventilated areas such as older flats which make up most of our current housing stock. We have no control over the opening of windows etc. which, if a mist system was triggered any wind entering the flat via an open window could quite easily blow the mist away from the seat of the fire. This is especially relevant in tower blocks

Mist systems are more suited to new build properties which due to energy saving requirements and current construction techniques are more likely to have mechanical background ventilation allowing windows to remain closed. If the mist is triggered where these systems are in place the mechanical ventilation will automatically switch off giving a stable environment for the mist system to operate.

When designing mist systems, room layouts become far more critical than for a conventional sprinkler system. During research for this report of the mist companies we have spoken to at present their main source of work is fitting systems in new build elderly care homes & hotels which in both cases room layouts, furniture etc remain largely the same.

Currently there is no published British Standard for the installation of water mist systems. In the case of Dualmist mentioned later in this report, the mist nozzle has been tested by the BRE, but not the complete system.

Existing water mist standards such as the National Fire Protection Association (NFPA) 750 Standard on Water Mist Fire Protection Systems or International Maritime Organisation (IMO) Standards are not directly applicable to UK land-based applications. A European water mist technical specification (CEN TS 14972) has been published but has not been adopted in the United Kingdom.

However, two new Drafts for Development have been issued:



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- DD 8489: Fixed fire protection systems – Industrial and commercial water mist systems
- DD 8458: Fixed fire protection systems – Residential and domestic water mist systems

These have not been published as full British Standards as there is currently insufficient technical data to support them. These documents try to define the testing protocols for water mist systems in various different applications, but as yet they don't cover all water mist scenarios. Tests for further applications should be developed going forward and published in additional sections.

Water mist systems should be considered on a case-by-case basis to determine whether a proposed system will meet the fire protection objectives, which need to be clearly stated by the supplier.

The London Fire Brigade have also looked at the issue of “hoarders” living in high rise blocks of flats. Whilst this situation might not be particularly common London Fire Brigade commissioned a test by the Building Research Establishment (BRE) of both mist & sprinkler systems effectiveness in this situation in the event of fire.

The test involved recreating a typical hoarders flat & igniting the contents. The fire was then doused using a sprinkler system for ten minutes which totally extinguished the fire. The test was then carried out again this time using the mist system for ten minutes before suspending the test. This time the mist had not extinguished the fire and it reignited.

The benefit of a mist system is that if it is triggered less water damage is likely to occur.

17.0 MIST SYSTEM BUDGET COST SUDBURY HOUSE

Again, this cost is based on an installation to Sudbury House using a DualMIST low pressure mist system. This is not a fully compliant system only the mist head meets British Standard Approval.

Supply & install a mist System (flats only)	£183,000.00
Boxing to pipework (flats only)	£116,000.00
Core Drilling	£10,000.00
Fire stopping works	£10,000.00
Pump Set	£6,000.00
Tank (3,500 litres)	£4,500.00
Manifold to each floor for monitoring	£3,500.00
Monitoring Installation (Linked back to a central control)	£25,000.00



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Provisional Sum for asbestos testing & limited removal		£23,400.00
Allowance for adapting existing space to provide a tankroom or constructing a new tankroom		<u>£25,000.00</u>
		£406,400.00
Preliminaries	15%	£60,960.00
Contingencies	10%	<u>£40,640.00</u>
		£508,000.00
Professional Fees	10%	£50,800.00
Client Costs	5%	£25,400.00
Total Budget Requirement for Sudbury House (at 3rd Q 2017 prices)		£584,200.00
Typical Average Cost per flat (at 3rd Q 2017 prices)		£4,426.00

In the case of Sudbury House there is a redundant area where the water storage tank could be located. In many of the other blocks included within the programme these areas no longer exist due to the construction of hidden homes etc. which means a new external tank room would need to be constructed adding potentially another £25,000 to the cost of each installation.

Please be aware that given the current & future demand for mist systems these costs are likely to increase significantly.

During the preparation of this report Premiermist Ltd who manufacture the DualMIST low pressure mist system made a one off offer to reduce the cost of installing a mist system to all the flats within Sudbury house from £183,000 to £149,000.

18.0 OVERALL BUDGET COST FOR MIST INSTALLATION TO 100 BLOCKS

It has been identified there are around 6401 flats where mist will be required at average installation cost £4,426 per flat giving an overall budget for all flats of £28,330,826.

19.0 MONITORING

Where ever possible London Fire Brigade would like as a minimum a zoned control panel giving a location as to which floor a sprinkler/mist has been activated. This allows them to identify where the fire is when they attend an incident and also allows them to isolate a sprinkler supply as quickly as possible reducing potential water damage.



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In discussions with London Fire Brigade they would like to see an isolation valve installed on each floor. It was considered to install isolation to each flat but it was felt that flats could be isolated in error when other works are being undertaken to the block rendering the system inoperative in the event of a fire.

For the purposes of this report a centrally monitored system has been allowed for.

20.0 INSURANCE

When undertaking a sprinkler/mist system installation the council should also consider responsibility of residents if a system is ever triggered in the event of a fire, accidentally or maliciously resulting in water damage to resident's personal effects. Are the council going to bare all the cost regardless of the reason the system is activated or will residents be informed that it is up to them to obtain insurance cover for all water damage resulting from activation.

21.0 MAINTENANCE

Following the installation of either a mist or sprinkler, the system will be subject to an annual inspection/maintenance regime. If leaseholders take up the offer of installation will they be offered the same maintenance as the tenanted properties and charged accordingly or will on-going maintenance become the leaseholder's responsibility.

Typical annual maintenance costs for Sudbury House are as follows:-

Inspection of water main and main manifolds	£250
Inspection of each flat (132no) £50	£6,600
Total Annual Cost for Sudbury House	£6,850

22.0 LONDON FIRE BRIGADE

As part of the preparation of this report representatives from London Fire Brigade at both a London wide & at local level visited the offices of the Housing Department to discuss our proposal to install sprinkler/mist systems across the borough.

Many issues were discussed which have been included within this report. The overriding outcome of this meeting was that London Fire Brigade welcomes the installation of either a



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mist or sprinkler system in the fight against fire in domestic properties. From their own experience they would always prefer to see a fully compliant sprinkler system which is known to perform effectively in extinguishing a fire before it gets time to take hold and spread.

23.0 OVERALL INSTALLATION PROGRAMME

Given the increase in demand for mist and sprinkler system installations across the country and the size and quantity of the current contractors currently working in the sector, installation to all 100 blocks within Wandsworth could take between 3 to 4 years to complete.

24.0 CONCLUSION

As we have found during the preparation of this report mist systems in the domestic market are still evolving and there is no fully compliant system available at present. Reliable, fully compliant sprinkler systems have existed for many years. From our discussion with London Fire Brigade their preference would be for a fully compliant sprinkler system installed within the 100 blocks identified within Wandsworth.



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