DIRECTORATE OF ESTATES AND FACILITIES

PROCEDURE AND INFORMATION MANUAL

EPM HS38 – Sprinklers and other Water Suppression Systems

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Sprinklers and other water suppression systems

1. Executive Summary

The University of Manchester policy approach is for sprinkler systems to be included in all new buildings and to be seriously considered within major refurbishments or significant extensions. The University does not consider it acceptable to reject such systems solely on the grounds of cost saving.

Having this approach in place and over time, an increasing portfolio of sprinklered buildings will reduce the risk of the University suffering a significant loss and thereby an improved organisational resilience.

This approach fully supports the University's Core Goal of social responsibility by:

- *Managing financial resources to ensure the University's long-term sustainability; and*
- *Ensuring that our estate provides an environment which promotes world-class research and education whilst minimising our environmental impact, conserving our historic built environment and improving our space utilisation.*

2. Introduction and Purpose

2.1 Fire safety has always been considered in relation to new buildings but the emphasis historically, has only been towards the statutory requirement for life safety. Property protection, conservation, environmental protection and business continuity have hitherto not been seen as priorities.

2.2 This position has now changed and therefore and as part of a wider risk management strategy, the University has developed a sprinkler policy requiring all new buildings to be fully sprinkler protected. Justification of this position was based on a number of facts including the following:

- An automatic sprinkler system is designed to control or extinguish the fire in its early stages. By doing that, the system makes the building safer for occupants and for fire fighters, and reduces the likelihood of major fire damage to the property. Also reducing major disruption to the business.

- Flexibility in terms of building design. The provision of sprinklers enables a departure from a traditional code based approach enabling more innovative architecture.

- Positive environmental impact as any fire is likely to be contained without the need for large volumes of water and the subsequent polluted run-off, and a minimisation of smoke and atmospheric pollution.

- Reputational benefits - the damage that a major fire could do to the University's reputation is significant, with the loss of a facility could come loss of high calibre academic staff and students as well as research funding. In

addition it is important to reassure insurers that we are serious in protecting property,

- Loss of research - the loss of the ability to carry out research is of great concern and the loss of a building, or access to a building, or the loss of specialist equipment could seriously impact on our ability to carry out world leading research.

- Accumulation of risk - with sprinklers fitted, this risk is vastly reduced. In addition, by protecting new builds and limiting external fire spread we are protecting nearby older buildings, which might be more vulnerable and more precious and are less likely to be fitted for fire suppression.

- Any fire will cause some damage. The fire and smoke damage sustained is directly related to how quickly the fire is tackled. Furthermore, the amount of damage determines how quickly a building can be brought back into use and therefore the size of the business interruption cost of a fire is also dependant on how quickly the fire is tackled. Sprinkler systems control or put out fires 99% of the time.

- University's strategic plan – this policy supports the University's strategic commitments.

3. Guidance for Project Managers:

3.1 The Selection of Sprinkler or Misting Fire Suppression Systems

This guidance sets out the case for wider adoption of fire suppression systems in all new buildings. The default position should be to install sprinklers. Although it is possible to construct a building that is fully compliant with Building Regulations without a fire suppression system, the University does not consider it acceptable to reject such systems solely on the grounds of cost.

3.2 This guidance provides some basic information to help make informed decision on the benefits of fire suppression systems. Consideration of this information should be part of the overall risk management process for <u>all</u> capital projects.

3.3 It is not expected that project managers will be experts in the design of sprinkler systems or other types of water suppression. It is therefore necessary to always engage an appropriate fire engineering expert at the earliest possible stage of the project.

3.4 The guidance is in three sections:

1. Specific issues for consideration before deciding whether a sprinkler system should or should not be installed.
2. Requirement for consultation.
3. Other factors to consider regarding sprinkler systems.

3.5 Issues for consideration

(a) Firefighting

i. When called to a fire and before firefighting commences the Fire and Rescue Service (FRS) will make a dynamic risk assessment of the situation. Firefighters will be prepared to take risks to rescue persons who are reported missing, but will not normally put their lives at risk by entering a building solely to prevent property damage. The FRS will most likely employ defensive fire-fighting instead, i.e. they will tackle the fire from outside the building, and this is likely to result in significant damage to, or even total loss of, the building.

ii. If firefighters know the building is provided with a sprinkler system they will be more likely to enter it, because sprinklers will have contained (or often extinguished) the fire, leaving the remainder of the building undamaged.

iii. Fires in areas below ground are particularly dangerous and the FRS will not usually commit personnel to enter such areas. These fires can result in structural collapse and total loss of the building.

iv. Where basement floors are covered by sprinkler systems fires are likely to have been contained, providing a much safer environment for closer investigation and for firefighting personnel.

v. The activation of the fire alarm in any University building initiates an first response from Security. They endeavour to attend within 5 minutes. On arrival they will investigate the cause of the activation which takes more time and they will only call for FRS assistance if absolutely necessary. It may therefore be up to 10 minutes after ignition that the FRS is called. The FRS will likely take a further 7 – 8 minutes to arrive. A fire could therefore develop and spread for 18-20 minutes before any meaningful firefighting takes place. A lot of damage can occur in that time. A sprinkler system will suppress the fire and therefore both buy valuable time and minimise damage.

(b) Risk to adjacent buildings

i. A fire within an existing building can potentially be a significant threat to other buildings in close proximity. Notional boundaries, i.e. the prescribed minimum distances between buildings determined by current Building Regulations, can be (and often are) reduced if all the buildings on the site are under the same ownership.

ii. By fully sprinklering a new building, the effects of any fire passing across the space to an adjacent building will be minimised.

iii. Similarly there are occasions where a new building, or an existing building scheduled to undergo extensive refurbishment, is closely flanked by properties not owned by the University. Damage to the University building in a fire will probably cause significant damage to adjacent premises, resulting in substantial insurance claims against the University.

iv. Sprinkler systems installed in University buildings will minimise the risk of damage to third party properties.

(c) Loss control

i. Fire suppression systems must be installed in buildings that house priceless and irreplaceable artefacts, collections, books or documents. Consideration should also be given to their installation in buildings where valuable specialist equipment is in place, or where the building itself is of high value. Where externally funded research is interrupted through loss of equipment and/or data by fire and work cannot be quickly re-established elsewhere, then this may result in the termination of that research and loss of funding, together with the possibility of reputational damage to the University.

(d) Design freedoms

i. If a sprinkler system is installed, fire intensity and growth rates will be lessened and risk profiles for buildings can be reduced. Consequently trade-offs can be made against current Building Regulation requirements, which may help architects obtain greater design flexibility. These include:

ii. Extending travel distances for means of escape, a reduction in the number of escape stairways required and the escape widths of stairways, reduced fire resistance for structural elements, use of mechanical smoke extraction instead of breakable pavement lights, increase in compartment sizes and flexibility in the use of internal finishes, reduced boundary distances, and a reduction in the number of firefighting mains required within stairways.

3.6. Advice and consultation

i. In making its decision, the Project manager must consult with the University Principal Fire Officer, the University's Insurance manager, and the fire strategy engineering consultant if one is employed by the project.

3.7 Other factors to consider

(a) Sprinkler activation

Sprinkler system pipework can be either pre-charged with water, or remain dry until two or more fire alarm detection devices have been triggered. There is a popular misconception (fueled by Hollywood) that sprinkler systems will cause significant water damage because all sprinkler heads will operate in the event of a fire. The sprinkler heads immediately above the location of a fire will operate when the temperature of the heads reaches 50ºC to 60ºC. Other heads will not discharge until they are exposed to

this temperature.

(b) Costs

The capital cost of installing a sprinkler system varies depending upon the building layout, but is typically in the order of 1% of the total development cost.

There are recurrent costs associated with sprinkler and misting systems, as they require regular testing and maintenance regimes. At present Estates is responsible for carrying out certain routine tests on a weekly basis (this can be done at the same time as weekly fire alarm tests). FMC is responsible for annual system maintenance, which is normally subcontracted to an external specialist.