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School and Academy design

A guide to the design and protection of School and Academy buildings

Foreword

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Education is understandably one of the Government's principal priorities. Fundamental to the ability to provide a high quality education system, is a suitable environment in which we teach our young people and students. It is therefore essential that the design and protection measures for our schools and academy buildings be fully integrated to ensure sustainability and longevity of use.

Each year more than 1300 schools in England and Wales alone suffer the ravages of fire. The adverse effect on the education of the students from those schools is immense. As we all know the financial cost of fire in these types of premises each year runs into the tens of millions of pounds, but the true cost goes beyond the huge financial losses. Lost classroom time, lost or damaged course work, exam work and essential resources, the long term effect on students from having to study in temporary accommodation are but a few of the considerations to be overcome.

By far the majority of educational buildings are now being utilised on an almost 24/7 basis and more than ever before are being seen as a major community asset. The loss of this asset through fire has a considerable negative impact on the entire community and its quality of life.

This School and Academy Design Guide is a welcome and considerable step in the right direction to reduce the number of incidents of fire in educational premises, and eradicate the negative affects of fire as described above. Zurich are to be commended for the huge amount of work and effort that has gone into producing a design guide that is both technically robust and easy to understand. The advice and guidance contained within this document is to be applauded, as is the considerable initiative behind its production.

I would like to take the opportunity within this foreword to focus on a couple of areas contained within the guide that are close to my heart.

Firstly the provision of sprinklers within educational premises and the massive benefits to be had by doing this. It is my confirmed belief that if we consider sprinklers at the design stage of a project they can be a major factor in enabling designers and architects to create buildings which will be safe, functional and inspire learning and teaching.

Secondly, teachers and educationalists in general want an environment that allows them to teach in the most effective way possible. To this end they wish to design and develop learning spaces to suit their own methods. To achieve this, maximum flexibility of spatial planning is the key, not over restrictive compartmentation. As well as protecting the occupants and building it is contained in; an active sprinkler system can allow the realisation of many design freedoms and flexibility's resulting in a modern, effective teaching and learning environment.

The recently introduced (March 2007) Sprinkler Risk Assessment Tool issued by the Department for Children, Schools and Families (England and Wales) requires all new school and academy projects to consider a fire sprinkler system within the earliest possible stages of the design process. The introduction of this risk assessment tool is a very welcome and long overdue addition to the armoury for those with the safety of our schools and those who occupy them at heart. Such a tool used in conjunction with Zurich's School and Academy Design Guide can only help to considerably reduce the adverse affects of fire as described at the commencement of this foreword.

In conclusion I would urge all those involved in the designing and planning of schools and academies to give careful consideration to the content of this document. By considering and developing the fresh approach to the issues described within, the end result will be safer schools, fewer fires within schools and an perceptive and exciting approach to design and safety within schools and academies.

Contents

1.0 Introduction

This document has been prepared to aid and assist with the design of new School and Academy buildings including new constructions and redevelopment of existing sites.

Developments in all education sectors are resulting in increasingly complex and often more challenging building design. Such developments also introduce differing and contemporary risks, which in terms of service provision and overall management require careful understanding and control. Much of the education sector generally suffers from a prevalent problem of arson and wilful fire raising, this being predominantly in the school type environment.

As a market leader for the insurance industry within the education property sector, Zurich have intimate knowledge of how fires and malicious damage creates a waste of resources and interruption to the educational process. We are therefore in an unrivalled position to be able to provide constructive comment and advise on ways forward to tackle the problems posed by incidents and subsequent losses within such premises.

The substantial targeted funding directed at the improvement of education provision is seeing unprecedented investment in the built environment within the education arena. The Governments' Building Schools for the Future (BSF) and the Scottish Executives' Building Our Future agendas are to ensure best use of available funding resulting in high quality, well designed and constructed buildings in which to educate for many years to come.

As with any educational building, Risk Management forms an integral part of the day to day management of such a premise and does not stop after the construction is completed. The design and construction phase is however a key point within the life of the project to avoid undesirable and threatening risks, and to mould the future Risk Profile in terms of the structure and much of its day to day operation.

Whilst much of the success in the early stages of a new School is a result of the teaching, support staff and the design team, success is also down to the wider stakeholder group, which throughout the life of the School will develop and react in line with operational and inspirational needs.

It is hoped that Insurers can play a key, though obviously limited part within the stakeholder group and offer support where necessary. Involvement at design stage is an area we feel there is much to offer and through the use of this document, backed up by individual support on a case by case basis, we can provide that support at critical stages within the project.

In a document such as this we cannot hope to cover all aspects and whilst the contents should be used as a good starting point it is advised that contact is made with our Risk Management staff at the earliest possible opportunity. Consultation is available, through our Risk Management staff who are able to work alongside design teams to ensure effective and bespoke solutions are incorporated appropriate to the risk.

The guidance contained within the document is directed towards all School Facilitators, Local Authorities, Academy Service Providers, Design Teams and End Users. Whilst comprehensive guidance is offered, this is predominantly of a generic nature and Zurich are keen to work along side customers in order to assess individual circumstances.

Early consultation with Zurich Risk Management is essential to ensure designs meet the Underwriters' requirements.

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2.0 What can we learn from the past?

The design of schools has been significantly improved over the years and we are now presented with an essential opportunity to mould the risk profile of the new school and academy buildings. We are confident that through careful design, these high profile, inspiring facilities can offer much improved risks, with the incorporation of appropriate Risk Management measures.

In terms of common losses in school environments, arson, wilful fire-raising, general vandalism and theft have been the most prominent issues in terms of losses. These are largely crimes of opportunity, as opposed to planned events, although because of the attractiveness of the equipment likely to be found in school buildings, it is likely that we will continue to see examples of the latter.

We have identified six foremost reasons why criminal damage in schools has been a problem for so long:

- children and youths are attracted by the familiarity of the site initially. In many instances, simply to 'play'; unfortunately this often leads to some form of damage being caused within the site.
- the level of site and building intruder protection and detection is poor or has specific areas of weakness.
- many buildings have little resistance to fire spread and in some cases have combustible materials used within their construction.
- delayed detection and reporting of fire, leading to extensive damage.
- there has been limited investment in active fire protection.
- smoke damage and environmental issues, arising as a result of fire fighting operations, significantly increase the cost of any claim.

The familiarity aspect is inevitable and cannot be changed, but by giving attention to intruder protection, detection and access control, damage can be significantly reduced. 'Target hardening' of schools, ie. improved intruder and fire security has occurred throughout the country over the last 20 years, often with encouraging results. The type of measures implemented with successful outcomes, need to be incorporated into new designs.

Other relatively recent losses encountered involve both storm and flood damage to school premises. Changing climatic conditions are now presenting new challenges to many building occupancies with schools having suffered quite extensive damage and disruption in recent years. Flood and storm resistance was generally perceived to be much less of an issue in the design of schools 10 or 20 years ago, though the recent climatic changes really demonstrate the importance of addressing such issues for all new projects.

If we can focus attention on such issues when designing new buildings we will be confident that past mistakes are not being repeated and the risk profile will be greatly improved.

2.1 Poor design features

The following is a brief list of adverse features, which are frequently present on school sites. Future designs of both schools and academies must take these issues into consideration if we are to benefit from past mistakes:

- schools located in open spaces, which are not overlooked or are surrounded by large areas of playing fields;
- lack of boundary security – open access not just to the school grounds but to areas around the buildings;
- lack of investment in fire protection;

- poor quality doors, windows, frames and locking devices;
- easily accessible, often flat, roofs;
- recessed doorways and courtyards providing hidden and therefore vulnerable points;
- inadequate firebreaks in wall, ceiling and roof voids;
- lack of appropriate waste storage areas;
- inadequate and poorly performing intruder alarm installations, many of which have Police response withdrawn;
- lack of sufficient protection to areas containing I.T. equipment, increasing the potential for theft and subsequent arson to destroy evidence.
- lack of sufficient storage space resulting in inappropriate storage in plant rooms, electric switch rooms and cupboards;

In order to progress, it is vital to know exactly how we can replace a poor feature with something better, or how protective measures can best be applied.

3.0 Design strategies

It is essential that Property Risk Management issues are considered at the earliest possible stages within the design process. In many cases whilst consideration is given to the wider Risk Management issues, the design is already progressed to such a level that it is not possible to make changes without detriment to the budget and building program. The timeline of the design process must allow sufficient opportunity to consider Property Risk Management in addition to the more conventional statutory design aspects, ie. compliance with Building Regulations.

Issues such as the location of the proposed building in relation to recognized flood plains all require appropriate consideration. Using flood risk as an example, detailed consultation should take place in such cases where flood may present a degree of risk to the completed project.

Full stakeholder involvement must be encouraged throughout the design process to ensure the building solution delivered provides a robust long term provision, tailored to best possible use and appropriate to risk.

Wider stakeholder groups may consist of such parties as:

- Geotechnical Engineers,
- Structural Engineers
- Environmental Consultants
- Environment Agency
- Mechanical and Electrical Engineers
- Fire Authority
- Police Authority
- Insurers
- Facilities Management

These are of course in addition to the conventional participants, ie. Client, Architects, Cost Consultants, Project Managers etc.

In terms of losses commonly faced by existing schools, the threat posed by fire cannot be over emphasized. Throughout much of this document a significant focus is towards fire, the resistance of the building to it and appropriate measures to resist the affects of fire. Fire presents one of the most significant threats in terms of education provision, property damage, community impact, financial loss and business interruption. A single fire can have a devastating effect and leave long lasting damage in various ways. There is also the significant threat to life introduced to building occupants as a result of the worryingly high number of daytime school fires occurring during periods of occupation.

It is accepted that all fires start as small fires, yet without adequate protection measures within a building extensive damage can result as the fire spreads throughout a premise. Additionally, externally set fires introduce substantial ignition sources to a building which may not be able to adequately resist the effects of fire.

The design process cannot simply address statutory requirements in terms of provision, design and construction but must include additional elements to ensure the delivery of building fit for purpose and acceptable to all stakeholders.

4.0 Construction issues

The construction of a building can influence the extent of any property related loss to a dramatic degree. Within this document it is not possible to address all construction aspects or indeed to address all perceivable risks, however the content is directed towards assisting both designers and end users in considering risk management concerns in an appropriate manner.

From inception to completion and beyond the choices made in terms of construction can have a significant impact on the success of a project. Robust and tested technologies present fewer and more measurable risks in general terms. It is however recognised that in many cases however it is both necessary and pleasing to see new and innovative products and methodologies being adopted.

Pressures in terms of project delivery deadlines can often limit the choice of both design and materials as can the resultant costs. Increased awareness at the earliest possible stage within a project can assist in reducing these pressures and help steer a project through to a successful completion and robust future.

The construction of new schools and academies needs to encompass and successfully present a building capable of resisting: fire, flood, storm, vandalism, impact, subsidence and collapse. In most of these areas, statutory requirements and associated guidance offer designers the solutions to deliver such a project. However, statutory requirements in the form of Building Regulations for example, are based purely around life safety aspects and the health and safety of the users. They offer minimum requirements or standards and not necessarily the optimum in terms of protection, as is sometimes perceived. A school building designed in accordance with contemporary building regulations, whilst offering perfectly acceptable safety to the occupants, could suffer a total loss in a fire scenario. In terms of life safety this would be acceptable; in terms of risk management, how acceptable is this really going to be to pupils, staff, parents, and the wider community?

This concept ultimately applies across the spectrum of property risk management issues and it is therefore necessary for all stakeholders to embrace the understanding that from a property protection aspect, we must look beyond the minimum statutory requirements.

4.1 Choice of site

It is appreciated that from a design perspective, designers are not commonly presented with a choice of sites for a new building to be constructed upon. However, in those situations where a choice is offered it is necessary to consider, again at the earliest possible stage, the wider issues in design terms. The vulnerability of the site to flood risk may be an issue where land is low lying and in close proximity to a water course. Furthermore, dependant on the topography of the site and the land within the adjoining area, the premises could be placed at undue risk of flooding when surface water drainage in the locality is overcome by storm conditions.

The design of foundations is again an issue that requires early consideration and ground investigations will be necessary to reveal the extent of the likely sub-structure works necessary for the project. Issues such as ground treatment on contaminated or brownfield sites, ground stabilisation works on reclaimed or unstable land often pose designers with costly challenges. In the case of contaminated land, will it be necessary to introduce remedial measures to the entire site or purely in the locality of the building footprint? Substantial unforeseen costs can result presenting budgetary and programme problems.

Fire Service access can in some cases be limited where sites are located in a either a remote location, or indeed in dense built up areas. Appropriate provision has to be provided in accordance with Building Regulation guidance, though consideration must be given to any possible future development and the effect this may have on access. The topography of the site, together with the hard and soft landscaping proposals will all impact on the suitable access provision.

Early discussions should be undertaken with the relevant fire authority in this regard.

The location of buildings on a site can again lead to differing problems. Buildings located towards the perimeter of a site are likely to be prone to increased vandalism at some point during their life. The location of glazed features, large elements of glazing or proprietary cladding systems all require careful consideration and collectively such issues may influence the location of the building/s on the site.

Boundary treatments to school sites should be given due consideration at an early stage within a project, as in some cases planning issues prevent the provision of a secure boundary treatment being provided. Whilst this cannot be viewed in isolation, such issues can present compromised security to both the site and buildings.

4.2 Flood risk

Recent events during 2007 have resulted in major losses in terms of flood damage, not only resulting in unparalleled losses in financial terms, but also seeing long term impact to the users of flood damaged buildings. The resilience of building components and materials to the effects of water, be it flood related or failure of internal services must be considered carefully. End users of the buildings should be aware of the likely impact of any flood related incidents on the fabric of the building. Common misconceptions are that a building can be simply dried out and cleaned prior to re-use. In the vast majority of cases remedial works consist of much more invasive measures leading to extended financial loss and service provision.

There are a number of reasons why floods occur:

- sudden heavy rainfall
- prolonged rainfall
- rapidly melting snow and ice
- storm surges.

There are also a number of sources from which floodwaters might come including:

- coastal, including estuaries
- rivers or other watercourses
- blocked, poorly maintained or overloaded drains, sewers and drainage ditches
- run off from heavy localised rainfall
- rising groundwater leading to flooding of property

From a Risk Analysis perspective it may not always be reasonable to suggest that because a particular area or property has never flooded in the past, there is no increased flood risk. It may not be the case that an appropriate assessment is based upon past experiences or site history. Consideration should be given to such issues as:

- an increase in the potential frequency and intensity of rainfall (climate change).
- condition of drainage systems and maintenance/upgrading regimes by water companies, statutory authorities or building owners or occupiers.
- flood defence improvements of a river upstream, pushing the flood vulnerability further down stream.
- changes in the characteristics and use of agricultural land. There is an increasing requirement for very large fields, unbroken by hedges, gullies and drainage channels. Also, topsoil can become compacted as a result of intensive farming and therefore less able to absorb sudden and heavy rainfall.
- increased building development (including very large roof areas) and paving (including roads, car parks and walkways), that cause rainwater to 'run of' quickly, creating large accumulations of flowing water that would have otherwise soaked into the ground. Some development proposals may be located in areas that previously collected and temporarily stored excess water. This may include land that would have previously been left undeveloped because it forms part of a natural flood plain.

- modern building techniques and the use of materials that are relatively new to the construction industry. Many modern buildings are less resilient to water damage than buildings constructed of more traditional materials. For example, requirements to improve the energy efficiency of new buildings means that there is increased use of varying insulation materials, many of which may not be sufficiently resilient to water damage.

In terms of flood resistance of the building, consideration must be given to such issues as:

- non-return valves on sewers and private drainage
- wet-proofing of the structure
- floor construction
- basement/sub-floor void protection
- external wall construction – is it designed to resist flood waters?
- internal walls/partitions – avoid the use of plasterboard and other panel systems that will be prone to damage from contact with water
- location of electrical services, ie. raised from floor/ground level
- location of plant equipment, boilers, heaters etc.
- siting of IT equipment, server provision etc.

Buildings must be protected to provide at least a 1 in 100 year flood rating though a 1 in 200 year rating or above is strongly recommended for any new development. Any flood assessment must also take into account potential storm water entering the site from neighbouring premises and areas.

Significant losses can occur as a result of storm drainage being unable to cope with flash flood situations, therefore assessments of likely effects should be made. Ground floor levels may need to be raised in order to resist such effects and consideration given to the natural topography of the site and that of the finished/landscaped site.

Such measures as the building (walls, partitions, floors) being constructed using flood-resistant materials must be considered at an early stage within the design, so at to be incorporated within the budgetary planning.

Details of the flood assessment, foundation, drainage, sub-structure design and defence mechanisms are likely to be required by the insurer. Zurich Risk Management should be contacted at the earliest opportunity to discuss such issues.

4.3 Storm risk

As with the changing risk posed by flooding, as a result of climatic change we are continuing to see changes in terms of Storm risks faced by buildings. In recent years buildings in many parts of the UK have been the subject of aggressive storm damage. The result has again been costly claims and substantial disruption caused to building users and largely the wider communities too.

The materials used within the construction of all buildings must be appropriate to the risk. It is therefore essential that consideration is given to potential changes in the storm patterns throughout the UK. This key issue must be addressed at design stage; there will be no second chance within the life of a building to address this, other than after and storm incident or loss.

The exposure of the site in general should be considered initially and an assessment made as to the current perceived exposure. Issues such as windspeeds and likely behaviours need to be accounted for when selecting the orientation of the building, elevational details, external profile, materials and methods of construction. The situation of the building within a site can also have a significant impact on the potential exposure to storm. Within a built up area for example, wind is likely to be diffused and filtered by nearby buildings, though conversely the geometry of the nearby buildings may channel wind towards the proposed building.

As with most property related risks, the more robust construction, generally the better resilience to storm related damage. Heavy masonry type structures are generally perceived to offer much greater resistance than say lightweight panel construction.

Within the education building sector there have been relatively recent incidents where entire roof structures have been peeled from the main structure during heavy winds, some occurring during hours of occupation. Architectural details such as overhanging eaves, mono-pitch or irregular shaped roofs and lightweight construction, for example, may pose increased risks in this regard. The appropriate selection of materials, fixing details and on-site quality control can significantly improve such risks.

The correct selection of roofing and cladding systems can again reduce the storm risk presented with a completed building. A relatively recent storm related loss saw the peeling of a lightweight render system from a multi-storey building. The extent of the loss was significant in terms of property protection and in terms of potential danger to the public. Where such localised losses do occur, they automatically pose the question from a risk management perspective as to the adequacy of the remaining cladding system and its vulnerability to future losses.

Where lightweight cladding systems are utilised, their vulnerability to mechanical and malicious damage can also impact on the storm aspect. Where areas of weakness are present, for example, where malicious damage has resulted in the 'external skin' being broken, the entire system becomes less resilient to the effects of both wind and rain. This can in turn lead to the rapid degradation of the construction materials.

Key aspects to consider include:

- Is the building in an exposed location or position within the site?
- Height above sea level, contour of site and adjoining land.
- Location of and effect caused by neighbouring buildings.
- History of wind/storms in the area/exposure of site.
- Orientation of building(s) within the site.
- Height of building(s).
- External profile, design features – overhanging eaves, recesses, canopies etc.
- Nature of construction – heavy traditional, lightweight modular, cladding systems etc.

5.0 Building structure

5.1 Sub-structure considerations

Foundation design is an issue commonly referred to Structural or Geotechnical Engineers at a relatively early stage within the design process. From an insurance perspective we may request details of structural design where construction is anything other than standard construction practice. Engineered foundation design is likely to be necessary on the majority of projects and certainly on the more complex schemes or where ground conditions dictate engineered solutions.

Issues where early attention may be required include:

- Brownfield/reclaimed sites
- Areas where mining has been/may be present
- Water courses run through or near to the site
- Underground culverts, wells or watercourses
- High water table within or near to site
- Unstable ground, ie. where ground improvement may be required
- Sloping sites
- Landfill within or close to the site/building
- Varying ground bearing pressures (where sub-strata is inconsistent)
- Shrinkable clays, non-cohesive soils etc.

Wherever the ground conditions may affect the stability of the structure or dictate specialist foundation design, it is likely that Zurich may request formal details to be provided.

5.2 Super-structure – building fabric

The construction industry as a whole is seeing a rapid change in the type of products being utilised in creation of new educational buildings. Being aware of the insurance risks and concerns surrounding particular constructional issues, materials and methods of construction is vital to the success of a robust built school environment.

As mentioned earlier within this document and relating to much of the following guidance, fire presents one of the largest challenges in terms of the super-structure.

Given the type of risk that schools present and the recent history in relation to the significant problem of school fires, due consideration is required even prior to planning application stage. External cladding materials often present significant risks in terms of malicious vandalism and external fire setting. In terms of aesthetic detailing, whilst from an architectural aspect features maybe both desirable and acceptable, often in the longer term from an operational angle they are not appropriate. Examples include the provision of low level timber cladding systems, lightweight externally rendered insulation systems etc.

Whilst, as insurers, we consider fire to present the most significant risk to schools in property terms, other key aspects to consider are the resilience to both storm and flood damage. Environmentally, we are beginning to see significant global change in terms of weather systems. Design teams perhaps need to question initial design proposals in this area to a much greater extent than ever before.

Storm damage can lead to large losses in terms of damage to a building, service provision and potentially in terms of life. There have been examples where roofs to school buildings have been unable to resist wind forces and have been peeled off during the school day when pupils and staff were present in the buildings. The potential threat to life in such instances is immeasurable. Careful selection of appropriate external envelope materials and systems is essential.

The buildings must be designed to comply with the requirements of current Building Regulations and associated standards in terms of such issues as Structural design, resilience to fire, resistance to moisture and weather etc. These requirements generally relate to life safety and the health and safety of the users of those buildings. It is however necessary to think beyond these requirements in terms of property protection and continuity of service provision. Whilst people's lives may not be placed at danger, the continued provision of the service offered, the damage to the building may be overlooked.

Generally from a structural viewpoint, robust and commonly heavier construction is favoured in terms of such threats as fire, storm and flood risk. Heavy masonry construction for example is likely to behave in a much more stable manner than a lightweight system built construction in the event of such losses.

Adequate fire protection must be provided to the structure to prevent intangible losses on the scale of those presented with many Consortia built schools of the past.

From an insurer's perspective it is required that new premises should be constructed of non-combustible construction conforming to Euroclasses A and B of BS EN 13501 or Class O of BS 476 Part 6 and 7 (now Euroclass B) in respect of fire. In terms of approval of materials used within the construction, any product that has Loss Prevention Certification Board (LPCB) approval for the appropriate fire test will be acceptable to insurers, provided it is used in the application for which the approval was given.

Please note: where Modern Methods of Construction (MMC) or Fire Engineered Solutions are being utilized, early consultation should take place with Zurich Risk Management.

The following guidance is a representative view of the many different aspects of construction though may not address all aspects. Please contact your insurers for further advice before construction details are finalised.

5.2.1 Combustible materials

Generally up to 10% is permissible, however care will need to be taken in the location of these materials eg. on external cladding or linings on escape routes. Other areas are specifically mentioned.

5.2.2 Modular type buildings

Factory built building units may be considered by designers for ease, speed and quality of construction. These can consist of small 'pod' type units used within areas of a more conventional build, or can in some cases form the entire building. The following aspects require careful consideration:

1. Construction materials used in the units, including combustible elements and insulation products used. How resilient to fire, flood and storm are these products?
2. Fire compartmentation between each unit/pod.
3. The effect of a fire in a unit/pod – how will this effect the structural framework and reparability of partial losses.
4. Potential damage to services and how these would be reinstated after a fire.

5.2.3 Use of timber in construction

As a result of increasing initiatives on the use of 'sustainable' building materials, there are likely to be increased proposals to incorporate timber within the design. Zurich have concerns regarding the use of timber both as a structural element and as an external cladding material within school type premises. With respect to the latter, in view of the fact that many malicious fires are started externally, there is significant concern over the use of timber cladding on School and Academy type buildings. The use of fire retardant treatments are considered to have a limited affect on the combustibility of the timber and structure as a whole and it is likely that a major fire could develop which could overcome internal fire protection offered.

No matter what fire protection systems are incorporated within the building, they will not generally restrict a fire starting or spreading on the outside of the building.

Whilst it is not possible to address all design proposals in respect of the use of timber, the following should be observed:

1. Timber cladding should be at high level only with the lowest point being no less than 3m from ground level;
2. There should be no overhanging eaves adjacent to the timber cladding into which a fire can spread. Where eaves exist above the cladding area, they must be appropriately fire stopped;
3. Where the external timber clad walls are raised above the roofline, as an alternative to overhanging eaves, this is likely to be acceptable;
4. There must be no storage of waste eg. skips, bins, etc. in the vicinity of the cladding;
5. The cladding to be treated to Class O/ Euro Class A or B and be re-treated in accordance with the manufacturer's recommendations for maintenance throughout the life of the building;
6. The cladding to be on a non-combustible backing eg. concrete blocks;
7. Continuous stretches of cladding should be 'broken up' by non-combustible materials to limit potential fire spread.

Where combustible/timber cladding is to be used, details must be forwarded to and agreed with Zurich Risk Management prior to installation.

As a guide to the allowable areas of timber cladding, the following would normally be acceptable, though observing the points outlined above. The figures represent the percentage of the timber cladding allowed in relation to the total wall area of all the communicating buildings within one communicating range of buildings, and not all of the buildings on the site:

- **Up to 10%**
  No additional underwriting terms would apply.
- **11 – 25%**
  Acceptable but underwriting terms may apply.
- **26% and over**
  Acceptability will be unlikely but this will depend on several factors. The views of Zurich Risk Management regarding the individual proposals must be obtained at the earliest opportunity.

Again, due to extent of fires in schools, the concept of using significant elements of structural timber within the construction of Schools and Academies is considered undesirable. Furthermore, the resilience of timber to flood risk is likely to be extremely limited. Where the building has the potential to suffer some effects of water ingress or flooding, the use of structural timber must be avoided, owing largely to its likely behaviour resulting from saturation, then associated drying out and shrinkage.

5.2.4 Sandwich panels

The use of sandwich panels are increasing in many areas of construction and are acceptable if they are LPCB approved to LPS 1181.

LPS 1181 Part 1. Requirements and Tests for Built-up Cladding and Sandwich Panel Systems for Use as the External Envelope of Buildings provides for 2 main grades of products:

- Grade EXT-A. A product that satisfies the requirement for both 'fire resistance' (ie. LPS 1208) and 'reaction to fire' test (ie. LPS 1181 Part 1).
- Grade EXT-B. A product that satisfies the 'reaction to fire' requirement (ie. LPS 1181 Part 1) only.

Because the high incidence of external fires in schools environments, only wall panels complying to Grade EXT-A will be acceptable for walls and these must have a minimum integrity and insulation of 30 minutes.

It should be noted that Grade EXT-A or B panels will be acceptable for roofs.

5.2.5 Rain screen systems

Generally, these are a lightweight wall construction on a steel frame with insulation and internal plasterboard or similar linings. Given the environment these will be subject to, the robustness of the construction must be considered with extreme care and with full stakeholder involvement. Lightweight constructions such as these are likely to offer minimal resistance to malicious vandalism and result in significant continual maintenance costs. Internal insulation products and cavities can become exposed as a result of attack to the internal lining, or indeed malicious activity externally. For appropriate insulation materials please refer to the text on insulation later in this document. Appropriate fire barriers will be required within the cavities, usually, falling in line with fire compartmentation as a minimum requirement.

The construction of the external wall needs to be considered in relation to how easy it will be to repair or replace and how quickly (and easily) fire will spread up the outer face of the building. In the latter case internal spandrels, or other fire restriction features, are likely to be required.

5.2.6 Sprayed on polyurethane or similar materials

External cladding systems utilising 'Sprayed on Polyurethane or similar materials', are not likely to be considered acceptable in the construction of School and Academy buildings.

5.2.7 External insulated finish systems

This type of construction must not be used at low level because of the potential damage that educational buildings of this type may be subject to. The resistance of these systems to mechanical malicious damage or even normal wear and tear in terms of a school building is considered extremely limited. Additionally, from a storm aspect, the provision of such systems must be questioned in the case of exposed sites or buildings.

The insulation used must be of non-combustible construction eg. Rock mineral fibre type, stonewool or mineral wool. Such systems should conform to the LPCB test (LPS 1181 Part 4).

5.2.8 Ethylene Tetra Flouro Ethylene (ETFE) Structures

Where this material is used either to provide entire roof coverings, or on a partial basis, Zurich will consider each case on its particular merits and therefore early consultation is advised. General guidance as to acceptability are:

1. The fire load in the area covered by ETFE should be low. For guidance in this respect please contact Zurich Municipal.
2. As a guide, if the ETFE roof is more than 15% of the total building*, the building should be protected by a fire sprinkler system.

   *'Building' refers to any separate fire risk ie. series of communicating buildings where the ETFE roof is located and not the whole site.
3. The location and orientation of the roof must not aid the spread of fire, or the products of combustion, to adjacent buildings.
4. ETFE roofs should not generally be erected at a low level, be easily accessible or used in situations where it is likely to be subject to malicious damage.
5. If the building is protected by a fire sprinkler system, generally the ETFE roofed area must also be protected. However, the requirement for this will depend upon the particular circumstances, i.e. extent of areas open to the air, height, use within covered space etc. If it is decided that the ETFE covered area will not be suitable for the protection by a fire sprinkler system then appropriate separation of this area from the sprinklered areas of accommodation must be provided and agreed by Zurich.

6 Where EFTE covers an area, which causes the compartmentation guidance under Building Regulation Approved Documents or Technical Standards to be breached, then further fire protection measures will need to be incorporated into the design. The most appropriate fire protection measure to overcome this will be the provision of a fire sprinkler system.

If a fire sprinkler system is incorporated into a non-heated ETFE covered area, the system will need to be of an alternate type.

8 If the ETFE covers small areas in non-sprinklered buildings an automatic fire detection system will need to be installed and the standard agreed with Zurich.

For any building containing the use of ETFE, in some cases there may be further underwriting considerations, eg. restriction of storm or malicious damage cover or the imposition of higher excesses. In view of this it is recommended that you contact Zurich Risk Management at the design stage for their views on the particular risks presented.

Before an extension or building is erected incorporating ETFE then your insurers should be consulted.

Please note: there are other flexible products that are being considered by designers for the covering of open areas. Each of these will need to be considered separately by Zurich Risk Management.

5.2.9 Green roofs

The construction industry is seeing continued growth in the use of 'green roofs' on a whole host of buildings, the predominant building category in many areas being schools.

The issue of 'green roofs', or more commonly 'sedum roofs' is one which requires careful consideration in order to make a confident and realistic assessment of the risks.

From an insurance risk perspective, if the design is such that the planted surface would be able to readily burn without penetrating the building via the planting mixture/substrate or via adjoining surfaces and penetrations and it is located at a high level, it is likely to be acceptable. However, in such situations as single storey schools where access to the roof can be gained relatively easily then it is viewed that such a finish should be avoided.

During summer months it is likely that the vegetation forming the roof covering will dry out significantly, without an effective irrigation system. Whilst the plants used in the roof design are generally succulents, the issue of limited maintenance may result in other vegetation of a less succulent nature growing on the roofs. In periods of sustained dry weather these may offer potential for easy fire starting, if readily available roof access exists. This unfortunately correlates quite closely with common losses suffered in school premises over the long summer holidays when both security and activity around the building may be reduced.

Zurich Risk Management must be consulted at an early stage where such roof coverings are being considered.

5.2.10 Overhanging roof eaves

These are a feature introduced into many modern single storey buildings often to make roof access by vandals more difficult. It is important however, to ensure that the overhang is not so prominent that it provides a sheltered area for youths to congregate, particularly outside hours of occupation. It is also important to ensure that adequate fire barriers and stopping are provided to the eaves element, to ensure that an externally set fire cannot enter the roof-space via the eaves. The barrier/s can be in the roof where this abuts the wall and preferably, the fabric of the overhang should be constructed of non-combustible materials.

Where extensive overhangs are provided and require structural support in the form of columns, the design of these should also resist climbing or scaling to prevent roof access.

5.2.11 Covered walkways/Canopies

Often these are proposed to be constructed in a variety of materials such as flexible plastics, PVC, ETFE or rigid materials. Some of the designs are open sided. The important issues are that:

1. Materials of construction should be non-combustible and will not assist in the spread of fire between the buildings.
2. The design should not encourage or allow access onto the building roof.
3. Consideration must be given to the location of such features so that it will not be subject to vandalism.
4. If the premises are to be sprinkler protected it may not be feasible to install sprinklers in these areas. The design of the sprinkler system should incorporate adequate coverage of the separation between the walkways and the protected area to prevent any fire spreading into the sprinklered area.
5. Combustible materials, litter bins etc. within or beneath the canopy area must be avoided.

The use of recessed doorways and alcoves should also be avoided, as these commonly present areas where fires are started, or where unauthorised access may be readily gained.

For such constructions, cases will need to be discussed on their merits and early discussions with Zurich Risk Management are recommended.

5.2.12 Insulation

There are many types and methods of insulation ranging from insulation between masonry cavity walls, to exposed external insulation. Each type of insulation, and its location within the construction, will need to be considered and it is possible that an insulation method could be accepted in some circumstances but not in another.

As a guide, non-combustible insulation should be used eg. rock mineral fibre type, stonewool, slagwool or man made mineral wool/fibre. In respect of these materials rock mineral fibre and glass wool are inherently non-combustible. They do not contribute to fire growth and will be acceptable for many applications. However glass wool has a lower melting point, which may affect its use in fire-stopping applications. The density of rock mineral fibre products will need to be selected by proven fire performance for the particular application.

Usually, the more robust/substantial construction the wall is, there will be more flexibility as to the acceptable types of insulation that will be considered, however this will also depend on how the cavities are closed eg. around doors and windows. Where there is a lightweight wall construction then non-combustible insulation will generally be required. Also for this type of construction additional cavity fire barriers will be needed.

Examples are given below. Please note that this list is not exhaustive:

1. Rock mineral fibre, stonewool, glasswool or man made mineral wool/fibre are acceptable in all areas.
2. Floor insulation below either a concrete slab or a concrete screed – all types of insulation are acceptable.
3. Cavity wall insulation within a traditional ‘brick and block’ construction or within a ‘brick and metal stud’ construction – thermosetting PIR and Phenolic insulation board is acceptable.
4. Pitched roof insulation, behind plasterboard, within or on top of a timber truss – thermosetting PIR and Phenolic insulation board is acceptable.
5. Concrete deck roofs – all types of insulation are acceptable but preference should be given to non-combustible insulation or thermosetting PIR and Phenolic insulation board. Acceptance of combustible insulation is subject to the ends being sealed with non combustible materials and having a non combustible external surface.

6 Insulation on ceilings/under suspended floors – non-combustible materials should be used.

7 Built up metal deck roof constructions utilising thermosetting PIR and Phenolic insulation boards are acceptable provided they are LPCB approved to LPS 1181.

8 Where insulation is to be used in pitched roofs then this should comply with Euroclass A or B of BS EN 13501, or Class O of BS 476 Part 6&7.

There are increasing proposals to use environmentally friendly and high performance natural insulation materials so as to improve the efficiency of new school buildings. In many cases such products have not undergone the relevant fire tests, therefore, where such insulation products are being considered, early consultation with Zurich is essential.

5.2.13 Atrium construction

The use of large open Atria type spaces is becoming increasingly popular within educational premises, in order to afford inspirational, flexible and inviting spaces. Whilst this concept is welcomed due consideration must be given to the following:

1 The realistic and potential fire load in the atrium, taking into account possible changes in the future, community/third party type use of such spaces etc.

2 The fire resistance of the buildings/parts which face into the atrium – is compartmentation provided on such lines?

3 Means of escape criteria if the atrium forms part of the escape route(s). Has a fire engineered solution been adopted/is it required to address means of escape issues?

4 Smoke and heat extraction/ventilation.

5 The type of fire detection system that is to be installed within the atrium.

6 The effectiveness of fire sprinklers within the atrium space – also consider obstructions.

For guidance in respect of Atria design please contact Zurich Risk Management at the earliest opportunity.

6.0 Building structure – internal

6.1 Compartmentation

The main objective of compartmentation is to reduce the potential for fire to develop and spread from the room of its origin. The Building Regulation Approved Documents and Technical Standards set out requirements on this important aspect but the guidance is for minimum standards relating mainly to the protection of life. It may be desirable to produce smaller or more fire resistant compartments in order to confine any fire outbreak to its area of origin. The impact of Approved Document E and Building Bulletin 93 (Section 5 Building (Scotland) Regulations) may be beneficial in this regard provided that attention is paid to not introducing additional combustible materials into the design.

Other aspects that need to be considered are:

- Where ductwork breaches compartment walls, fire shutters, linked to the fire detection system, will have to be installed. It is important that these shutters are located in the wall or immediately adjacent to it.
- Fire doors in schools tend to be damaged by constant use and abuse. In this respect the resilience of the doors needs careful consideration. The use of fail safe, electromagnetic contacts, linked to the fire alarm/detection system is strongly recommended.
- Compartment walls are to be marked on plans so that, if any work is undertaken in the premises in the future, a check can be made to ensure that any holes or voids created are suitably fire stopped.
- Once compartmentation is provided, it is vital that this is maintained throughout the life of the building.

Fire stopping is often breached by contractors installing services, therefore final snagging checks of a project should always pay particular attention to the integrity of firebreaks within ceiling and roof voids.

There are a significant number of daytime fires set within cloakrooms where the contents present a significant fire load. Bearing in mind the combustibility of children's modern outdoor clothing, cloakrooms should be segregated by construction having at least 60 minutes fire resistance and cloakrooms on escape routes should be avoided.

6.2 Natural ventilation systems/ night cooling

With the requirement for greater insulation and heat conservation in building design, buildings are being designed to retain heat during the day and release this back into the building at night-time. Whilst this may not present additional unacceptable risk features in winter, this may do so in summer. In summer heat commonly needs to be dissipated and this is, generally, by leaving windows or roof lights open at night-time. As a result this presents an increased security risk. Zurich will need additional security for any such windows. As a minimum, external security grilles are likely to be needed though the following also require due consideration to overcome the resultant reduction in security:

- Is the site provided with security fencing?
- Is external CCTV (monitored) provided?
- Are openings limited in size and provided at high level?
- Security Grilles to the openings – mesh etc.
- Permanent fixed openings.
- Will the intruder alarm be prone to false alarms as a result of air movement?
- Are sprinklers provided within the building?

In situations where heat is being drawn from under the ground and this involves tunnels/ducts under the school grounds, safeguards must be put in place for the prevention of rubbish accumulating in these areas and unauthorised access must be prohibited.

Internal ventilation requirements may also compromise fire compartmentation, by introducing additional routes for the passage of both fire and smoke. Appropriate measures to maintain the necessary compartmentation will be required where such systems are being utilised.

6.3 Internal linings

Incorrect use of lining materials can greatly contribute to the spread of fire. Linings should comply with the following:

- Euroclasses A and B of BS EN 13501 or Class O of BS 476 Part 6 & 7 test criteria
- LPS 1181 Part 2 Requirements and Tests for Wall and Ceiling Lining Systems as Internal Constructions of Buildings. This is standard provides for 3 main grades of products:
  - **INT-1** 60 min integrity and insulation
  - **INT-2** 30 min integrity and insulation
  - **INT-3** No time specified

Only linings complying with Grade INT-1 and 2 will be acceptable.

6.4 Acoustic issues

Approved Document E of the Building Regulations and the DCFS Building Bulletin 93 (Section 5 Building (Scotland) Regulations) applies to acoustic requirements in school premises.

Acoustics can be improved by the use of ceilings, acoustic barriers and acoustic panels either on walls or hung at high level, etc. In order to resist fire spread, materials complying with Euroclasses A and B of BS EN 13501 should be used as a guide when selecting acoustic materials.

6.5 Kitchens

By their very nature kitchens contain high fire risks and should have fire separation from the remainder of the premise, generally to a standard of 60 minutes fire resistance. If there is a kitchen, which uses gas, the supply should be fitted with an emergency shut-off valve near the fire exit door from the kitchen.

Extraction ductwork above cooking ranges should be non-combustible and vent directly to external air. If the ductwork passes through another area then the ductwork should be enclosed in 1-hour fire resistant material outside the kitchen area. Automatic fire dampers should be provided where ductwork passes through the fire separating walls and ceilings.

Ductwork should be designed to facilitate easy cleaning, in particular when deep cleaning is needed. The ductwork should terminate in a safe area, i.e. not where any fire could spread to roofs, overhanging eaves, combustible cladding or nearby buildings. A robust cleaning and maintenance programme should be introduced for such systems and appropriate access points incorporated within the design.

The use of a fire extinguishing system in the cooker hood area is strongly recommended. This would be a requirement where the ductwork terminates in a potentially unsuitable area, or the ductwork passes through important areas eg. plant rooms. Specific advice on this point can be obtained from Zurich Risk Management.

7.0 Fire protection

All services within a building require consideration at an early stage within the design process, so as to minimise the impact of these services on the construction process and in the operation of the completed building.

Included within this section is guidance on the provision of fire alarm systems and fire sprinkler systems, in addition to other service related issues.

7.1 Fire sprinkler systems

A fire sprinkler system must be considered for all new School and Academy projects. The recently introduced Sprinkler Risk Assessment tool issued by the Department for Children, Schools and Families (issued for England and Wales) must be utilised within the earliest possible stages of the design process. Zurich strongly advise that all new projects include fire sprinklers for the protection of the property and indeed in terms of business and education continuity.

The provision of sprinklers in educational buildings should however not only to be considered beneficial in terms of property protection but can allow unparalleled design freedom. Conventionally building design must meet the prescriptive requirements of the current Building Regulations together with their Approved Documents/Technical Standards and in the future BB100 (where applicable). However, such requirements have often dictated to designers the way a facility can be built, and in many cases limit the internal layout. The provision of a sprinkler system has the potential to offer increased freedom in this area and can ultimately result in better building design.

A number of misconceptions still seem to exist regarding the operation of sprinkler systems. In general terms, sprinklers are operated by heat and only operate in the area of the fire, therefore not resulting in widespread water damage to the entire building.

The sprinkler system is designed to control and suppress a fire, though in most cases extinguishes the fire without fire service intervention. As insurers of a large number of sprinkler protected schools we remain totally confident that malicious and accidental actuation is not an issue.

7.1.1 Design standards

For any fire sprinkler installation to be recognised for insurance purposes, it must be in accordance with the current standard which is BSEN 12845.2003. The Technical Bulletin in respect of schools in this new standard is TB221:2004:1. This Standard and the relevant Technical Bulletins replace BS 5306 Pt2 1990 for all new sprinkler designs.

It is generally required that all parts of a building are to be sprinklered, though in certain cases consideration can be given to the inclusion of limited non-sprinklered areas subject to appropriate internal fire separation. For specific guidance in this regard, please contact Zurich Risk Management.

The design and installation should be performed/supervised by a LPS 1048 certified contractor meeting Loss Prevention Certification Board approval.

Zurich employs staff with specialist knowledge of sprinkler systems, who are able to assist during the design process where necessary.

7.1.2 Design freedoms

The provision of sprinklers in educational buildings should not only to be considered beneficial in terms of property protection but can allow unparalleled design freedom. Conventionally building design must meet the prescriptive requirements of the current Building Regulations together with their Approved Documents/Technical Standards and in the future BB100 (where applicable).

However, such requirements have often dictated to designers the way a facility can be built, and in many cases limit the internal layout. The provision of a sprinkler system has the potential to offer increased freedom in this area and can ultimately result in better building design.

The following are examples of areas of freedoms that could be considered, subject to appropriate sprinkler system design:

- **Increased compartment size.**

  Increased compartment sizes (away from the conventional 800m2 in non-sprinklered buildings).

  Compartment sizes often limit aspects of the design of an education facility, particularly in relation to large open multi-function spaces, ie. atria spaces.

  Such freedom may also reduce the need for expensive service implications, ie. fire resisting ductwork or fire dampers on compartment lines, in many cases.

- **Flexibility in fire alarm standard**

  The normal requirement for fire alarm installations in such buildings is to a 'P1' standard in accordance with BS5839. However, where sprinklers are provided it is normally acceptable to relax the fire alarm standard as far as an L5/M system (manual call points, plus detection to cover any means of escape/life safety issues). This can introduce a significant saving over a P1 system, thus off-setting part of the sprinkler system cost.

  Where other 'trade-offs' or 'design freedoms' are utilised in addition to a reduction in the fire alarm provision, for example, travel distances increased to a significant extent, and compartmentation standards dramatically reduced, then an 'L3' level of coverage (monitored) on the fire alarm may be considered appropriate.

  If the building is to be sprinklered, ultimately we can accept L5/M subject to the agreement of the Building Control provider and Fire Officer Approval.

- **Reduced fire resistance to elements of Structure**

  Reduced Fire Resistance to elements of structure is a commonly accepted trade-off. This commonly means providing only 30 minutes fire resistance to the structure of the building as opposed to 60 minutes in many two storey premises. Dependant on the materials used, this can offer capital savings by providing a greater choice in the materials used, or standard of protection provided etc.

- **Flexibility in travel distances**

  Increased Travel Distances can allow much improved internal layouts and stair/exit location.

  Given the control and common extinguishment of a fire in a sprinklered premise, consideration should be given to the basic principle of affording sufficient time to escape from the reduced risk. Caution should however be exercised when considering increasing such distances in dead-end or single direction of escape situations.

- **Reduced fire door provision**

  Fire Door provision can commonly be reduced and compounded with the increase in compartment size. Such reductions are dependant on specific layouts, but designers should attempt to maximise this aspect due to the considerable problem fire doors pose in schools, particularly across corridors. Even when linked to automatic hold-open devices they pose on going maintenance and management difficulties and ongoing costs throughout the life of the building.

- **Improved disabled access/egress**

  Disabled Access and Egress arrangements can benefit significantly as a result of reduced numbers of self-closing doors (outlined above). By allowing more flexible and less constrained spaces, access has the potential to be much improved. The provision of sprinkler systems within a building can allow freedoms around the need for full evacuation of a premise and potentially may allow phased evacuation polices to be incorporated in larger premises.

- **Flexibility in stair sizing**

  Numbers of and sizing of escape stairs is a further area of consideration. It may be the more flexible layout offered as a result of sprinkler provision to reduce the number of escape stairs required, reduce the width as a result of phased evacuations etc. or potentially consider accommodation stairs (those not conventionally designed for escape purposes) in a more pragmatic manner for evacuation purposes.
  This may allow staircases to be maximised in terms of function and avoid costly staircases that are required purely for means of escape provision.

- **Surface finishes (internal)**

  Appropriate surface finishes and displays can be considered in a more risk based and less prescriptive manner within a sprinkler protected environment. This may be of particular interest and benefit in a school type environment given the desire for inspirational spaces with the ability to display pupils work. Educational bodies together with teaching staff welcome and actively encourage greater use of displays, though these are often limited due to the issues surrounding fire safety. Sprinkler provision can offer substantial flexibility on this very issue since a fire involving the displays can be suppressed at an early stage in its development.

- **Reduced fire service access requirements**

  Fire Service access requirements are less likely to pose such problems as commonly experienced on some sites. Clients should be encouraged to discuss these matters with their local Fire and Rescue Service at the earliest possible opportunity to take advantage of permissible freedoms. This again, may result in savings on external landscaping with respect to hard standings, access around the perimeter and turning points for fire appliances.

7.1.3 Sprinklers – other issues of relevance

Community Use of a facility can be allowed on an increased basis, given the improved resilience of the building to sustain a fire. Increasingly, schools are occupied by 'others' who may not share the same interest in the sustainability of the school provision. The level of fire safety management in such situations (or at such times) may be reduced and limitations may need to be placed upon how the premise is used by the wider community. Sprinkler provision should in many cases be able to contribute to allowing greater flexibility in this area.

Community impact

Impact on the community costs are much reduced as it is likely that the accommodation can be simply cleaned and dried out and in many cases be put back into use in a matter of days. The costs to the taxpayers and implications for the school community are therefore controlled and significantly reduced.

Education provision

The provision of education can be maintained without the need to find alternative accommodation, temporary classroom units, or even entire temporary schools. This affords real benefits in terms of business continuity, which is paramount to the provision of education.

Protection of the investment

With such massive investment in the facility, it is essential to maintain and protect that investment. Whilst a recently constructed School or Academy can be rebuilt following a fire, the wasted resources, reduced education provision and community impact are immeasurable.

Sustainable design

Great efforts are being made towards creating inspirational sustainable buildings and educational environments, yet these efforts can be totally destroyed by one simple arson attack or accident. A building destroyed by fire offers little in terms of sustainability, yet with sprinkler protection the potential sustainability benefits are significantly increased.

Insurance costs

These are commonly reduced by a significant extent with the provision of a sprinkler system. It is recommended that Zurich is contacted with regard to likely premium savings applicable.

7.2 Fire alarm systems

One of the major factors in the extent and costs of school fires is their late detection, often made by a neighbour, passer-by or even by activation of the intruder alarm caused by elements of the system being affected by the fire.

In order to have early detection of any fire occurring when the school is unoccupied, it is necessary to have an automatic fire detection system. Such a system should comply with BS 5839-1:2002 and conform to design of Class P1(M) (*see note overleaf). This class of system would provide detection throughout the building in addition to manual call points. A monitored remote connection to a central alarm-receiving centre must be provided to enable swift attendance by the Fire Service outside normal working hours.

It should be noted that although any sprinkler system would raise an audible alarm but it is recommended that automatic remote signalling is installed on the fire alarm system that is capable of also transmitting a signal from the sprinkler system as well. This would ensure a quicker transmission of the fire signal to the alarm-receiving centre.

Designing automatic fire alarm systems in schools needs careful consideration to avoid false activation. False alarms are caused by pupils maliciously activating call points or the incorrect type of detector heads being installed.

To prevent unnecessary activation of call points then the following should be considered:

1. Installing alarmed covers to the manual call points.
2. If the fire service are agreeable, during the school hours only, a delay on the transmission of the alarm signal to the central alarm-receiving centre. This delay is usually 2.5 minutes (approx.), which gives enough time to establish if the alarm is genuine.

Some areas where there could be false activation of the smoke detectors are:

1. In areas where there could be smoke/steam generated in the normal course of events eg. science labs, technology workshops, other teaching areas using cooking implements, changing areas and kitchens, heat detectors should be considered.
2. Pupils activating smoke detectors in changing rooms with aerosol deodorants etc. Again, installing heat detectors would normally solve this problem.
3. Where heat detectors are installed in high temperature areas, the temperature rating needs to be appropriate to avoid false alarm activations.

These problems need to be addressed at the design stage and we would suggest that the installer undertakes an analysis of the problems and they suggest solutions so that a 'suitable system', as per the British Standard, is specified for each area.

The installing contractor, designer and servicing contractor should be third party certificated by a certification body such as the Loss Prevention Councils LPS 1014 scheme or the BAFE SP 203 scheme.

*__Please note:__ where an Automatic Sprinkler Installation is to be incorporated into the design, the standard of fire alarm provision may be reduced. Where total sprinkler protection is provided, an L5/M fire alarm system (with off-site monitoring) is likely to be acceptable. Where trade-offs in terms of the means of escape provision are being considered, it is essential that the Building Control provider and Fire Prevention Officer are consulted at the earliest possible opportunity regarding the fire alarm system and extent of coverage.

7.3 Gas security

There have been instances of arsonists targeting those parts of a premises which use gas, such as science, food technology and design technology, craft and engineering facilities. In some cases the culprits have broken in, turned on gas appliances and started a fire, producing a rapidly spreading and serious blaze.

To address this problem, gas isolation valves for each area of the building/s should be situated within a securely locked area. If this is not possible, the valve handles should have a security bracket and padlock fitted to prevent unauthorised use, or a proprietary system can be installed. There are proprietary systems, which ensure the gas supply for each area is regulated through a key operated control panel utilising a solenoid valve.

7.4 Emergency lighting

The advices of the Building Control provider must be sought on this subject, but we would recommend that the system is installed to the relevant sections of BS5266. Consider also the need for appropriate external emergency lighting in order to facilitate safe evacuation to a place of safety away from the building/s.

8.0 Security

The security provisions to a new school or academy, or indeed re-developed existing sites, require early consideration in order to achieve a robust and effective solution. Common mistakes of the past have been the lack of consideration given to security within the design process, resulting in expensive, compromising and often less than desirable solutions.

The orientation of a building on a site, linked with the external profile of the structure can present significant benefits in terms of security. By simply avoiding the provision of recessed doorways, concealed areas and low roofs, the security to the building is already likely to be improved. Effective boundary treatment, with the use of security fencing to the site or around the buildings only will again assist in providing a secure environment both inside and outside hours of occupation.

With new Schools and Academies being much more community orientated than the Schools of old, it is necessary to consider the security risk this presents. Partial occupation, the interface with conventional school use and the hours of occupation all require consideration at an early stage. By designing the internal layout and external access in such a manner that the independent uses will not compromise the security of each other is essential.

The location of key facilities requires careful consideration so as to minimize the security risk. It is neither desirable or nowadays practical or safe to open up an entire building during a period of very limited occupation, ie. community events within a main hall for example.

Internal separation should be such that it is possible to secure areas of the building in a robust manner, without compromise to the use of the premise.

It is hoped that the following guidance will support designers in this regard.

8.1 Fencing

Security fencing is the most effective of all the measures commonly available to provide protection to a school against theft, malicious damage and any subsequent, deliberately set fire and should be incorporated as part of the design for all School and Academy sites.

The design and specification for appropriate fencing should be discussed with Zurich Risk Management at an early design stage so as to appropriate security is provided.

Fencing is available in a variety of different materials, heights and quality. Perimeter fencing should not prevent surveillance of the school site. Fences over 2 metres in height may require planning permission, particularly if adjacent to a highway.

For effective security, fencing should be of security weldmesh, palisade or railings. The fencing should be to a height of 2.4 metres and installed according to British Standard 1722 Part 12, 1990 Section 7 – the Erection of Palisade Fences or Part 10, 1990 Section 5 – the Erection of Welded Mesh Fences.

Chain Link fencing is not recommended since this is easily distorted or removed, and quickly becomes unsightly. It is therefore not an effective barrier to intruders.

Similarly, timber fencing is not recommended. The timber is often stolen and some timber fences can impede surveillance of the site from the outside. Timber can also have high maintenance costs.

If it is not feasible because of costs to fence the entire school site, including all playing fields then the fencing line should be brought in closer to the school buildings. Consideration should also be given to fencing across the school site in order to reduce means of escape for the criminals and to provide secure playing areas during the school day. Additionally, it is advisable to fence or gate any hidden courtyard or recessed areas that exist around the school building.

Gates within perimeter fences must be to the same quality and height as the fence. Gates should be securely locked outside of the normal school hours. Padlocks should be good quality, close-shackle types. (It is advisable, however, to check with both the local Fire Brigade and the local Police with regard to access to the site in the event of an emergency).

Every attempt must be made to ensure planning consent is given for appropriate security fencing to be included in schemes.

Should Planning Authorities refuse permission for such fencing, it may be necessary to include improved security to doors and windows to compensate for the lack of effective perimeter protection.

8.2 Building recesses and courtyards

Whether these are simply recessed doors, covered entrance areas or larger social type areas, there is a danger that they will produce a secluded and therefore vulnerable point, where some form of damage can occur. It is preferable that predominantly straight building lines are constructed wherever possible enabling increased vision and natural surveillance. Certainly, a building without recessed areas should be the objective, particularly if an external CCTV system is to be installed for both day to day management and in terms of security.

8.3 Roof access

Easy roof access, especially to flat roofed areas, has been an integral part of much school crime in the past therefore the following points should be included in the design.

When considering rainwater down-pipes these should ideally be plastic, be square or rectangular and be fitted immediately adjacent to the wall. If possible, consideration should be given to enclosing down pipes to prevent them being climbed. Without correct design of such elements, other, less desirable anti-climb measures may be required e.g. anti-scaling devices, anti-climb paint, etc. Neither of these solutions are likely to be desirable in a new School or Academy building.

It is important to reduce the risk of unauthorised access to roofs as much as possible. Roof access is not only a security risk but also poses a Health and Safety risk, should a pupil be injured on, or falls from a roof. Such an incidence is likely to have serious and far reaching consequences.

In recent years the flat roof has been largely abandoned but for reasons of maintenance rather than security. Care must be taken to ensure designs do not incorporate features that will assist with easy roof access, eg. adjoining lower level walls, gates, fences or other climbing aids.

Where low eaves are unavoidable consider carefully external door hardware, ventilation openings and window sill details, that may allow easy access on to the roof.

8.4 Doors and windows

In recent years the security standards of doors and windows in new school buildings have been much improved, though some additional security provision is sometimes required. Where possible, doors and windows should comply with LPS1175 Specification for testing and classifying the burglary resistance of building components, strong points and security enclosures.

Windows are by far the favourite route of entry for intruders. Ground floor opening windows large enough to permit entry should be fitted with opening limiters as well as key operated locks. All windows facing publicly accessible areas, must be fitted with laminated glass if less than 2.4m from ground level. It is generally recommended that all ground floor windows are fitted with laminated glass. The use of robust restrictor devices is also recommended to opening windows, limiting the openings to a maximum of 100mm.

Internally beaded aluminium, windows are preferable to uPVC frames from a security perspective, but, in both cases, it is important to ensure that frames are adequately secured to the building fabric and the opening areas are secured by multi-point locking.

In areas where levels of malicious damage and glass breakage are high, external motorised steel security shutters should be considered. Security shutters should comply with LPS1175 Specification for testing and classifying the burglary resistance of building components, strong points and security enclosures.

In respect of doors, more use is being made of double-glazing and as a safety feature laminated glass is being used. In general, exit doors must be secured by good quality locks ie. those which conform to BS 3621 incorporating the appropriate metal box striking plate. The locking mechanisms are to be a minimum of five levers.

Alternatively, locks should be at least 6 pin cylinder mechanisms, with anti-drill inserts and complying with Grades 4 or 5 of BS EN 1303 (Building Hardware – Cylinder Locks – Requirements and Test Methods).

It is important that all external doors and their frames are installed to a good standard. The frames should be securely fixed to the surrounding construction.

Where there is a letter box, a fireproof container should be fitted behind it, to reduce the risk of arson, or an external letter box could be used.

In general, reliance for fire exit doors is made on the panic bar and consideration must be given to the ease of activating the panic bars from the outside, particularly in areas where miscreants can work unobserved. All fire exit doors must have alarm contacts, or there must be a movement detector within the vicinity of the door, to detect intrusion at the earliest possible stage.

Where improved security is required then the door should be fitted with a high security fire exit multi-point locking device complying with BS EN 179 or BS EN 1125. The cylinder mechanism on the lock should have at least 5 pins and anti-drill inserts. It should be ensured that bolts fit properly into their boltholes and that there is no accumulation of dirt in the boltholes.

The local Fire Prevention Officer should be consulted concerning the placement and security of fire exit doors.

In some cases electro-magnetic locks are provided on doors. These are also a security feature but they must not be regarded as the sole security of the door, as they fail safe in the open position, if the electric supply fails.

8.5 Intruder alarms

Academy buildings must have the benefit of intruder alarm protection. The following points are relevant in respect of new installations:

Detection is not just aimed at those breaking in to steal, but at any intruder who wishes to cause damage. Detectors should be provided to cover all rooms accessible from the outside (ie. those on ground floor external elevations plus upper floors accessible from roofs), all ground floor circulation areas and external doors (by contacts). On upper floors circulations areas, high risk rooms and staircases should also be protected. The intruder alarm system should be linked to an approved off-site monitoring station, in order to initiate a police response and security/keyholder response.

Any remotely signalling alarm should utilise some form of monitored path to the alarm-receiving centre, via such systems as BT RedCARE, BTRedCARE GSM and CSL DualCom. The latter two provide dual-path signalling, allowing the Alarm Receiving Centre to still receive a second or further alarm signal if the primary path fails or is interfered with.

New systems require confirmation technology before being granted Level 1 Police response. Any systems, that lose Level 1 response, due to the number of false alarm activations experienced, will require the addition of confirmation technology before Level 1 response is reinstated. Verifiable or confirmed intruder alarm systems are those which include audio, visual or sequential verification. In practice, the method of confirmation usually found is that of sequential signalling.

All three verifiable systems are monitored at an alarm-receiving centre. The analysts at the centre are able to determine by either looking at pictures, listening in via microphones or by noting that more than one detector is being activated, that there is an intruder on the premises.

Any installer or service provider should be certified by a UKAS (United Kingdom Accreditation Service) accredited certification body.

Under BS EN 50131-1, the systems, equipment and signalling are graded into categories divided between Low, Medium, High, Very-High and Special Risk Trades.

For School and Academy type risks, Grade 3 is considered the minimum standard to which systems should be installed. However, the grade will only be officially decided upon following the formal risk assessment carried out by the alarm installer in conjunction with the client and insurers.

This is to ensure that the design of the system takes account of the trade, area, location and value of attractive stock and contents. In this way, the grade of system required would be based upon the likely skills, resources and determination that a thief will use, given the attractiveness of the stock and/or contents. System grades are categorised within the standard as:

- **Grade 1:** Low-Risk systems where intruders are expected to have little knowledge of intruder alarm systems and be restricted to a limited range of easily available tools.
- **Grade 2:** Low to Medium-Risk system where intruders are expected to have a limited knowledge of intruder alarm systems and the use of a general range of tools and portable instruments.
- **Grade 3:** Medium to High-Risk system where intruders are expected to be conversant with intruder alarm systems and have a comprehensive range of tools and equipment.
- **Grade 4:** High-Risk system where security takes precedence over all other factors. Intruders are expected to have the ability or recourse to plan an intrusion in detail and have a full range of equipment, including means of substitution of vital components in the intruder alarm system.

Individual components of alarm systems, eg. detectors, control panels, methods of alarm transmission, are also graded according to their performance, resistance to attack, etc. The grade of the system as a whole will be governed by the lowest graded component. Therefore, a system with a Grade 2 alarm-transmission system but having a Grade 3 control panel and detection will be treated as Grade 2 overall. As higher graded components will be more sophisticated, this could have a cost implication for the system as a whole and therefore care should be taken not to over-specify.

The grade will still not dictate the design of the system and reference should be made to the insurers to ensure the system meets with their requirements, particularly with regard to the alarm transmission system.

8.6 Closed Circuit Television (CCTV)

CCTV systems have had a mixed success rate at school sites – for a variety of reasons. These relate to the type of problems being experienced, the nature of the site and the nature and quality of the installation.

In many cases, site trespass problems have been successfully addressed by a relatively low cost system, with cameras in just certain key places and having a recording system with relatively low quality playback. In such a case, the mere presence of the cameras has proved sufficient deterrent to reduce or eliminate the problem issues. In other examples, this type of system has had little or no effect on the trespass or damage incidents and either the conclusion is reached that CCTV doesn't work, or possibly expensive upgrades have been required.

Prior to the installation of any system, careful consideration should be given to exactly what is expected of the installation eg. deterrent, identification, school management tool, safety of persons, recording, monitoring (on site/off site).

How the pictures are recorded is very important, and the use of recording onto a hard drive is preferred. The recorder must also be in a secure area, preferably in an area covered by the intruder alarm system.

The criteria for use should govern the type of installation and it is suggested that specialist and, if possible, non-commercial informed advice is sought.

Whatever the criteria it is essential, if the full deterrent value is to be gained, for lighting to be adequate in the area of the cameras and that high profile warning signs are erected drawing attention to use of the system.

CCTV will not attract premium discounts for insurance purposes but may, in some cases, reduce the risk category from high to medium. It should be noted that this is only possible where the system is comprehensive and has remote monitoring off site by an approved monitoring station. CCTV cannot be considered as a substitute for physical security measures or fire protection measures.

Any system incorporating the facility for the monitoring centre to interact with the protected site must be installed in accordance with BS8418 – The code of practice for the installation and remote monitoring of detector activated CCTV systems.

8.7 I.T. areas

Due to the rapid increase in the amount and cost of IT equipment, educational environments are becoming an increasing target for thieves. Computer equipment, including laptops, interactive whiteboards, data projectors and flat screen monitors besides conventional PCs and servers are desirable to thieves, both opportunists and organised groups.

A full security risk assessment is critical and needs to be undertaken at a relatively early stage within the design process, in order to incorporate appropriate security protections as an integral part of the design. It is neither desirable, nor economically viable to re-visit such aspects within months of a facility becoming operational, following a number of losses.

Where there are concentrations of values – purpose built computer suites for example, these should be located as high up the building as possible – simply making them less accessible. Where this is not an option, then ideally, location should be in an internal part of the building, without external walls, doors or windows.

The room or area should be protected with a secure envelope – with solid or reinforced walls and secure doors and windows, possibly protected with security grilles bars or shutters. Grilles or bars should be installed in accordance with the recommendations of BS8220 and shutters should comply with LPS1175 Specification for testing and classifying the burglary resistance of building components, strong points and security enclosures.

Often omitted is the protection to internal doors to such areas when other points of entry have been well secured. The room itself and internal areas outside the room should have the benefit of intruder alarm cover. Intruder alarm standards are outlined in section 8.5.

8.8 Attractive contents

There is a vast investment in schools, in particular in IT equipment, which is very attractive to thieves both from break in and walk in thefts. It is vital that security of these items is considered at the design stage.

Attractive contents are laptops, PC's, servers, data projectors, musical and scientific instruments, interactive white boards, flat screen monitors, etc.

The precautions that need to be taken have already been stated in 8.7 (IT Areas) above. Other aspects that need to be considered are:

1. Entrapment devices. Any device should conform to LPS 1214 Physical Protection Devices for Personal Computers.
2. Cable securing if entrapment devices cannot be installed.
3. Security mark all attractive items. Systems conforming to LPS 1225 Specifications for Testing and Classifying Asset Marking Systems should be used. Chemical etching or engraving is the preferred options.
4. Security of Data Projectors. Where data projectors are ceiling mounted, care must be taken to ensure the fixings are of adequate strength to prevent easy removal. It is recommended that for this type of equipment a security device incorporating a high decibel inertia sounder should be used.
5. The storage of laptop computers. It is common practice in schools to store these in a wheeled charging trolley at night. Thieves can break in and remove the trolley containing several laptops. In view of this, the trolleys must be locked in a in a secure area incorporating intruder alarm protection It may also be necessary to secure the trolley to the building structure using a chain and padlock.
6. The importance of prevention of daytime theft. Normal management security practices should apply. All doors should be secured during the school day, especially when the school is only partially occupied or being used in the evenings for cleaning, parent/staff meetings.

7 If doors in classrooms or demountable units are open for ventilation in summer periods, ensure that they are closed when the room has been vacated, during breaks etc.

8 Secure laptops in locked desks or cupboards when rooms are empty and portable items should not be left close to windows.

8.9 Lighting

Security lighting can often play a part in deterring criminal damage. However, each school location needs to be assessed on its own merits.

For example, good lighting is particularly effective in areas of the school site which are easily visible from nearby housing or roadways. To install lighting into areas of the school site which are not overlooked can sometimes have the detrimental effect of attracting wrongdoers to gather.

Security lighting is only effective if it is working properly and switched on at appropriate times. An automatic form of control is usually the best option. Automatic controls include:

- Time switches, that switch lights on/off at predetermined times.
- Time switches in conjunction with photo-electric cells to ensure optimum effectiveness.
- Passive infra-red movement detectors that switch on the light for a timed period when anyone enters the range of the detector.
- Connections to existing intruder alarm systems.

The route between the school building and the staff car park should always be well lit – for safety and security.

If a lighting system is to be used in conjunction with CCTV, additional factors have to be considered and it is recommended that a qualified engineer be consulted for advice.

8.10 Landscaping

Good surveillance potential can be enhanced or reduced by landscaping features such as ground contouring or the planting of vegetation. Careful attention therefore needs to be given to ensure these factors do not impact on the security of the site. Advice regarding the long term size, height and scale of any planting should be sought at design stage to obviate difficulties when planting reaches maturity. Such planting may adversely affect any natural surveillance offered and could impact on the effectiveness of any external CCTV provision.

Defensive planting may be desirable in key areas, for example where boundary or site security may be compromised as a result of neighbouring land levels, adjoining fence and wall lines etc. Such provision requires appropriate consideration, particularly in a school type environment, where there may be a balance between security risk and health and safety aspects.

9.0 Personal and pupil safety

The following guidance should be used in conjunction with the general security guidance to ensure suitable security provision is provided for the safe use of the building.

9.1 Site access

If the site has a secure perimeter, consideration should be given to restricting the access to the site during normal hours of operation. This could mean securing all gates apart from one after a set time in the morning. Where possible this should be controlled by a remotely monitored access control system. When planning fencing systems, ensure secure playing areas are created around the school site.

9.2 Main entrance

It is desirable that the main entrance provides a welcoming yet safe environment. In many cases, the best way to achieve this is with a secure lobby and reception area. This allows the external doors to be open throughout the day, so visitors can be dealt with at a reception point without the necessity for them to enter the main teaching environment. Obviously, the extent of a secure lobby area within a School building may vary largely and may actually incorporate other associated uses and public spaces.

9.3 Other external doors

In order to ensure effective access control is provided, external doors should be secured against unauthorised entry during normal hours of occupation. Particular attention should be given to appropriate access control if the building is to be used for partial occupation to a significant extent. All designated fire exit doors should, of course, be able to be operated in the usual way, allowing for safe exit but secured against intrusion.

9.4 Access control

This is very useful for doors that cannot be continuously monitored, and lead to restricted areas or fall outside the security envelope.

Access control systems are becoming increasingly popular in schools. These range from a simple system to a single door, to full systems where, even the pupils have swipe cards. Any form of access control is a good feature as this will enable securing of all or parts of the school in and outside school hours.

A good access control system will reduce the risk of 'opportunist' thefts, but it should be noted that relying solely on the electro-magnets locks of an access control system out of school hours is not recommended. Additional dead-lock devices should be incorporated to ensure adequate security outside hours of occupation.

9.5 Signage

This is an aspect of security that is often overlooked by those already familiar with the site. Effective directional signs from site access points and car parks to the main reception, give the visitor no excuse for wandering around the site and will therefore make it easier to identify trespassers.

10.0 Other considerations

10.1 Adequate storage areas

Invariably storage areas are insufficient and, subsequently in many premises boiler rooms and electric plant rooms are utilised for inappropriate storage. Due to the increased risk of fire, use of such areas is totally unacceptable therefore the inclusion of adequate storage areas in new school/refurbishment design is extremely important.

Cloakroom facilities require consideration at design stage, due to the increasing number of cloakroom fires that pose life safety risks to the occupants. Ideally, secure lockers should be utilised, being located so as not to hinder the means of escape, or cloakroom areas be enclosed by appropriate construction offering 60 minutes fire resistance.

Special stores should also be provided for gymnasium equipment and gym mats. The stores should be of sufficient dimensions to accommodate all the equipment and should be constructed so as to provide 60 minutes fire resistance.

10.2 Waste storage

Due to the high risk of deliberately set fires, the grounds of the school should be clear of combustible storage and waste bins and skips should be located away from buildings, so if they are set on fire, the fire will not spread into the school.

The following points should be specifically addressed:

- All waste bins should be secured a minimum of 10m from the school buildings. This can be achieved by chaining the bins to a fixed point, or providing a secure compound area.
- All waste skips should be located a minimum of 10m from buildings. If possible, skips should have lids that are kept locked when not in use.
- All external litter bins should be emptied at the end of each day.
- Litter bins should not be fixed to combustible wall claddings of school buildings or be located in covered or recessed areas.
- Any recycling receptacles (particularly those containing paper and textiles) should be located and secured a minimum of 10m from the school buildings.
- Loose combustible materials should not be stored against or close to the school buildings.

10.3 Artificial sports pitches

In recent years, such surfaces have become increasingly common as part of the outdoor sports facilities at schools and for community use.

These surfaces can be particularly vulnerable to damage following flooding. In some instances, total renewal of both the playing and the sub-surface have been necessary.

Damage occurs when the sports surface becomes covered with water for an extended period of time, resulting in the surface is lifting silt deposits getting underneath causing a rippling effect. In addition, deposits and debris will, when the water has receded, lie on top of the surface rendering it unusable.

Factors to take into consideration:

- Location on the site.
- Previous provision of such a facility on an area, and whether this will affect the bed of the playing surface.
- Knowledge of prior flooding incidents.

'Run off' water from adjacent steep banks, slopes and hillsides should be considered. Adequate drainage with interceptor chambers should also be installed to prevent water running directly onto the playing surface.

The porosity rate of the surface should conform to British Standard 7044 – Artificial Sports Pitches, which stipulates a minimum of 100mm per hour, however, the recommendation of the International Hockey Federation of 150mm per hour would be considered desirable.

In order to resist mass water inundation, the seams where the artificial surface rolls are joined should be able to withstand a minimum of 0.25 Newtons per mm as required under BS7044.

A final consideration regarding the protection of artificial sports surfaces should be given to the risk of vandalism and malicious damage. A number of incidents are recorded where stolen vehicles have been driven onto these areas and set on fire, in some cases leading to a requirement to renew the entire surface.

In view of this potential, vehicle access to the pitch must be considered. Adequate perimeter protection will be required and good quality welded mesh fencing should be considered.

10.4 Lightning protection

Guidance on this is provided in BS 6651:1999 (remaining current until August 2008) or in BS EN 62305 and the InFiRES Guide RC 35 Recommendations for the protection of buildings against lightning strikes.

10.5 Water supplies for fire fighting

The advice of the local Fire Prevention Officer should be sought on this matter. For small schools reliance on fire hydrants in the street maybe sufficient, for larger schools there may need to be clearly marked fire hydrants on site.

10.6 Water isolation/detection

Escape of water can cause serious losses especially if these occur when the premises are not occupied. Where this is a risk, consideration should be given to the installation of incoming main water flow monitoring and isolation devices. For complicated piping systems more than one of these devices maybe needed.

Care must also be taken where overflow pipes terminate, so the overflows do not create a further risk of damage to the building.

If there is critical equipment in the building, with long replacement times or serious disruption consequences, additional water detection equipment should be considered.

Activation of any of these devices should be interfaced to the Building Management System to ensure that an appropriate response in provided.

It should be noted that, if the premises are left unoccupied for a period of 30 days or more, insurance cover for escape of water is usually withdrawn. If this length of unoccupancy is to arise it is vitally important that you inform your insurance company.

10.7 Construction risks

During construction or refurbishment, there is likely to be a greatly increased fire and security risk. Insurers and the Construction Federation have produced the Joint Code of Practice on the Protection from Fires of Construction Sites and Buildings Undergoing Renovation and this must be followed.

Fires on-site during the construction process in many cases lead to both substantial financial losses and programme delays. It is recommended that contact is made with the Construction Risk Insurer at an early stage to discuss appropriate prevention measures.

11.0 Management procedures

The construction of a building is the first step to providing a school that will serve the community for years to come. To ensure that risks to the school are reduced to an acceptable level, good standards of management are required.

The notes below will help to reduce risks to an acceptable level. **More detailed guidance is also available in the 'School fire and security guide' available on the Zurich website.**

11.1 Fire safety legislation

The Regulatory Reform (Fire Safety) Order 2005 came into effect in October 2006 and is applicable to all School and Academy type occupancies (in England and Wales).

The Order requires that Responsible and Competent persons are appointed to manage Fire Safety within the premises on an ongoing basis and to ensure effective and appropriate Fire Risk Assessments are in place.

In Scotland, the equivalent legislation is Part 3 of the Fire (Scotland) Act 2005 and the Fire Safety (Scotland) Regulations 2006.

11.2 Control over contractors

Many serious fires occur whilst repairs, maintenance, refurbishment or alterations to buildings and plant are undertaken by contractors.

Fire hazards arising from these activities can be effectively controlled by the operation of a properly supervised Hot Work Permit scheme. Under the scheme, contractors cannot commence any hot work until they have obtained a permit from the Fire/Safety officer or other member of management responsible for fire safety.

Hot Work Permits can be provided by Zurich Risk Management.

11.3 Community relationships/ Informal surveillance

Fostering good relationships with the surrounding community is a vital task. Homes that view the school can help in deterring and detecting trespassers. Sometime a 'School Watch' policy' which is similar to 'Neighbourhood Watch' can pay dividends.

11.4 Out of hours/Community use

Use of the school out of hours can be advantageous, providing this is strictly controlled. There must always be a responsible person from the school on site, and the hirers must never be given keys to the premises or codes for the intruder alarm systems.

Only the parts of the school that are let out should be open and all other areas should be kept locked, subject to maintaining adequate means of escape in the event of a fire.

An inspection of the premises must be made by the school staff prior to securing the premises.

11.5 Outbuildings/ Temporary classrooms

It may be necessary to locate temporary buildings on site, owing to increased initial numbers on roll for example. Such buildings should be constructed of non-combustible materials and should be erected at least eight metres from the main building(s).

Any voids under these buildings these will need to be protected with non-combustible materials, such as welded mesh panels, to prevent rubbish accumulating under them.

11.6 Fire doors and fire escape routes

Internal fire doors and external fire exits will require regular inspections to ensure that they will function correctly. Also fire escape routes (inside and outside the building) will require regular inspection to ensure that they are kept clear of storage or obstruction.

11.7 Refuse control

Good standards of housekeeping must be maintained. Inspections must be made of boiler houses and electrical switch cupboards to ensure that these are not being used for storage.

11.8 Kitchen filters

The filters in extraction systems above cooking ranges must be cleaned weekly. The ductwork should be cleaned every 3 months and a deep clean undertaken annually, depending on the usage of the equipment.

11.9 Electrical testing

Fixed wiring will be required to be tested every 5 years to the current regulations of the Institute of Electrical Engineers/BS7671: Requirements for Electrical Installations.

Portable electrical appliances should be inspected in accordance with the Electricity at Work Regulations.

11.10 Temporary heating

The use of temporary heaters should be avoided. If absolutely necessary, electric convection heaters can be used, but portable gas, paraffin or electric radiant heaters must be prohibited.

11.11 Control of Flammable or Hazardous Materials and Liquids

All storage and use of highly flammable liquids must be in accordance with the COSHH Regulations 2002 and DSEAR Regulations 2002.

11.12 Fire alarm testing and maintenance

The manual, break glass system must be tested weekly at a different call point or zone on a rotational basis.

Maintenance of the fire alarm and detection system must be in accordance with the relevant part of BS 5839:2002 and should be completed a minimum of every 6 months.

All tests and maintenance must be recorded in a suitable Fire Log Book.

The contractor should be third party certificated by a certification body such as the Loss Prevention Councils LPS 1014 scheme or the BAFE SP 203 scheme.

11.13 Portable fire fighting appliances

These should be maintained in accordance with BS 5306:Part 8:2000 The Code of practice for the selection, installation and maintenance of portable fire extinguishers.

All extinguishers should be installed and maintained annually by a Fire Extinguishing Trades Association registered company or a Loss Prevention Certification Board approved company.

11.14 Security surveillance

Sometimes it is necessary to employ security guards on a full, intermittent or occasional basis or as a key-holder. There are 2 British Standards that you need to be aware of:

- **BS7499: 2002 Code of Practice for Static Guarding and Mobile Patrol Services**

  This provides guidelines for the satisfactory conduct of static guarding and mobile patrols. It gives recommendations for the organisation, staffing, operation and management of a company providing static and/or mobile manned guarding services on a contracted basis. It does not apply to cash in transit, secure parcel services, private investigators or body guarding, store detectives or door supervisors on licensed premises.

- **BS7984:2001 Code of Practice for Key-holding and Response Services.**

  This provides guidelines for key-holding and response services. Due to the withdrawal of police response, more and more customers are now employing the services of security companies. It is therefore important that the BS is followed.

12.0 Useful websites and reference points

www.teachernet.gov.uk

- Fire safety – Managing School facilities – Guide 6.
- Improving School security – Managing School facilities 4.

www.dcsf.gov.uk

- DCSF fire safety in Schools.
- Risk analysis and cost benefit analysis tools.

www.homeoffice.gov.uk

- Anti-social behaviour.

www.arsonpreventionbureau.org.uk

- How to combat arson in Schools.

www.bafsa.org.uk

www.redbooklive.com

- List of approved fire and security products and services from the Loss Prevention Council Certification Board.

www.zurich.co.uk

www.standards.dcsf.gov.uk

www.infoscotland.com

www.environment-agency.gov.uk

Further Technical advice can be obtained from:

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Early consultation with Zurich Risk Management is essential to ensure that designs meet the Underwriters' requirements.

Notes

Notes

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500495005 (06/09) RRD

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