

Scrutiny Report



Sprinklers in Schools and Other Council Buildings.

**Report of the Resources Scrutiny Panel
April 2004**

Resources Scrutiny Panel Membership

Mr F Baillie (Chairman)
Mr R A A Bullock
Mr J M Cairns
Mr A Fry
Mr W P Gretton
Mr P A Mould
Mr M J Shellie
Mr B A Taylor
Mr C T Wareing
Mr J R Webb (Vice Chairman)
Mr P D Wickstead

Sprinklers Task-Group Membership

Mr B A Taylor (lead member)
Mr P A Mould
Mr A Fry
Mr F Baillie
Mr J R Webb

Scrutiny Support Team

Suzanne O'Leary (Overview and Scrutiny Manager)
Stella Wood (Overview and Scrutiny Officer)

Scrutiny Liaison Officers

Martin Finch, (Head of Financial Practice and Standards)
Trevor Norton, (Director of Corporate Services)

Contributions of Evidence

The Panel would like to thank Stuart Blackie of Education Leeds and Keith Thompson of Warwickshire County Council for their willing contributions and various personnel at other local authorities.

The Panel would also like to thank the Secretary General of the British Automatic Sprinkler Association (BASA).

Thanks also to the Deputy Chief Fire Officer Brian Tregunna, Assistant Divisional Officer Chris Blake and Station Officer Adrian Moore (legislative fire policy) for their hospitality, presentation, video and statistics.

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EXECUTIVE SUMMARY

The Scope of the Scrutiny

The Scrutiny Panel assessed the value of installing sprinklers, principally in schools but also residential homes. It carefully considered whether:

- sprinklers provided sufficient extra protection in new-build structures to be good value for money;
- the public reassurance factor made the extra cost worthwhile; and
- retro-fitting of sprinklers in existing schools which were particularly vulnerable was worthwhile.

Key Findings

The Scrutiny Panel found that:

- Sprinklers had the outstanding advantage of attacking, rather than containing a fire, and did so quickly, locally and effectively.
- The costs of installing sprinklers (average cost of £83,500 per school) and maintaining sprinklers (average cost £1,000 per annum) is a key factor. Costs were hard to quantify and depended on local circumstances, but were certainly substantial.
- Retro-fitting sprinklers to all schools (estimated to be an average of £83,500 per school) was too costly for realistic consideration.
- Sprinklers' should be seen in context. Other fire protection measures, many of them mandatory, minimise fires and fire-damage. The Panel were concerned to ensure that those responsible for fire precautions in council owned buildings are properly trained.
- Worcestershire had comparatively low incidences of school fires. Reasons for this were not clear. There were variations in the number of fires in the districts across the county.
- If sprinklers were fitted into a few council owned buildings, the Council's block insurance policy made reduced premiums unlikely. However, insurance savings of about 65% may be possible on individual PFI new build schools.
- The latest research into the cost effectiveness of sprinklers found mainly that cost effectiveness could only be achieved if installation costs were minimal and/or if there was evidence of a high risk of fire.
- It is difficult to quantify the apparent savings that can be made on the design of a new building if sprinklers are installed. There may be a number of trade-offs, for example, the thickness of firewalls can be reduced, fire compartments made larger and the number of fire doors reduced. Designs can be simplified to easily accommodate a network of pipes above the ceiling.
- PFI contractors will build to an output specification and will make commercial judgements concerning the inclusion of measures of fire protection. The aim of the contractor will be to provide a building fit for purpose at the optimal cost. The

inclusion of specific measures would normally be left to the contractor, unless the Council had particular requirements.

- The installation of sprinklers needs to be set against a number of factors affecting individual schools: potential pupil distress and disruption, existing fire precautions and level of risk.

Conclusion

Sprinklers are an important safeguard. Installing sprinklers is therefore worthwhile, providing that the costs are contained and measured against risk. Further consideration needs to be given to existing measures and levels of training to relevant staff.

Recommendations

1. We recommend a formalised system of training in the management of Fire Precautions, for appropriate staff, is set up and maintained (estimated cost year 1 £50,000 and £10,000 per annum thereafter). Property Services should maintain a dialogue with the Fire Brigade to ensure that appropriate literature on necessary fire precautions is circulated to schools (see paragraph no. 8.7).
2. We recommend the following other measures to improve fire protection:
 - a) depending on the results of surveys currently being carried out on 'SCOLA' buildings (built during the 60's and 70's), upgrades where necessary, should be undertaken by specialist approved contractors (estimated capital cost £1 million) (see paragraph no. 9.7).
 - b) automatic detection and signalling and emergency lighting should be part of ongoing investment and their installation should be prioritised in buildings which are in areas deemed to have a higher fire risk, based on the Fire Risk Assessment (see paragraph no. 9.7).
3. We recommend that when Fire Risk Assessments are undertaken on schools in areas of possible higher risk, consideration should be given to whether retro fitting of sprinklers may be worthwhile (average cost £83,500 per school) (see paragraph no. 9.8).
4. We recommend that the Fire Risk Assessments should form an integral part of the budget setting and prioritisation process (see paragraph no. 9.9).

New Build Schools/Residential Homes

5. We recommend that:
 - (a) Contractors are asked to provide two options for build: one including sprinklers and one without. Where the project is being delivered by a PFI contractor we would wish to have highlighted the costs of the sprinklers and other fire safety measures, savings on building design trade-offs, and the relevant insurance assumptions made within their financial model. The final decision on whether to install sprinklers would be made by the Cabinet, based on:
 - the results of the 2 tenders; and
 - the PFI project team's assessment of the cost effectiveness over the life of the project.

- b) The Council should consider writing in to the contract that any fire precautions should be discussed with appropriate representatives from the Fire Brigade, insurance company the Councils' Property Services and water authority representatives, before the design stage is reached. This will ensure that due consideration is taken of relevant legislation and recommended best practice. (see paragraph no. 9.15)

Resources Scrutiny Panel

SPRINKLERS IN SCHOOLS AND OTHER COUNCIL BUILDINGS

Final Report

1. Introduction

- 1.1. Fires in schools and other public buildings are an emotive issue. The damage and distress that can be caused by fires cannot be underestimated. For this reason, it is essential that the public have confidence in the measures put in place to prevent and deal with fire in public buildings.
- 1.2. One such preventive measure is sprinklers and the County Council's Resources Scrutiny Panel raised the question of whether it would be feasible or advisable for the County Council to install sprinklers in its buildings. There is only very limited use of sprinkler systems in Council buildings at present.
- 1.3. The Fire Service is currently urging local authorities to consider installation of sprinklers in schools as part of its wider strategy to develop a pro-active approach to fire prevention as set out in the White Paper *Our Fire and Rescue Service*. The Local Government Association has also published a series of booklets, *Automatic Fire Sprinklers – Toolkits for Local Authorities, Schools and Domestic Properties*, in February this year.
- 1.4. The Scrutiny Panel wanted to explore whether there were any practical and/or economic constraints on installing sprinklers in schools and examine the alternatives. It was hoped that this scrutiny could, in particular, inform the building of new schools in Bromsgrove under the Private Finance Initiative (PFI).
- 1.5. At their meeting on 17 October 2003 the Scrutiny Panel established a Task Group to examine this issue. The following terms of reference, supported by the Scrutiny Steering Group, were agreed.

To examine whether it would be advisable to install sprinklers in (a) new build schools; (b) existing Council buildings; and (c) residential homes for the elderly.

- 1.6. The main focus of the scrutiny has been on schools, although we make some comments about residential homes for the elderly. The key questions asked by the Task Group were:
 - What extra safety could be achieved by installing sprinklers?
 - Would fitting sprinklers be affordable and good value?

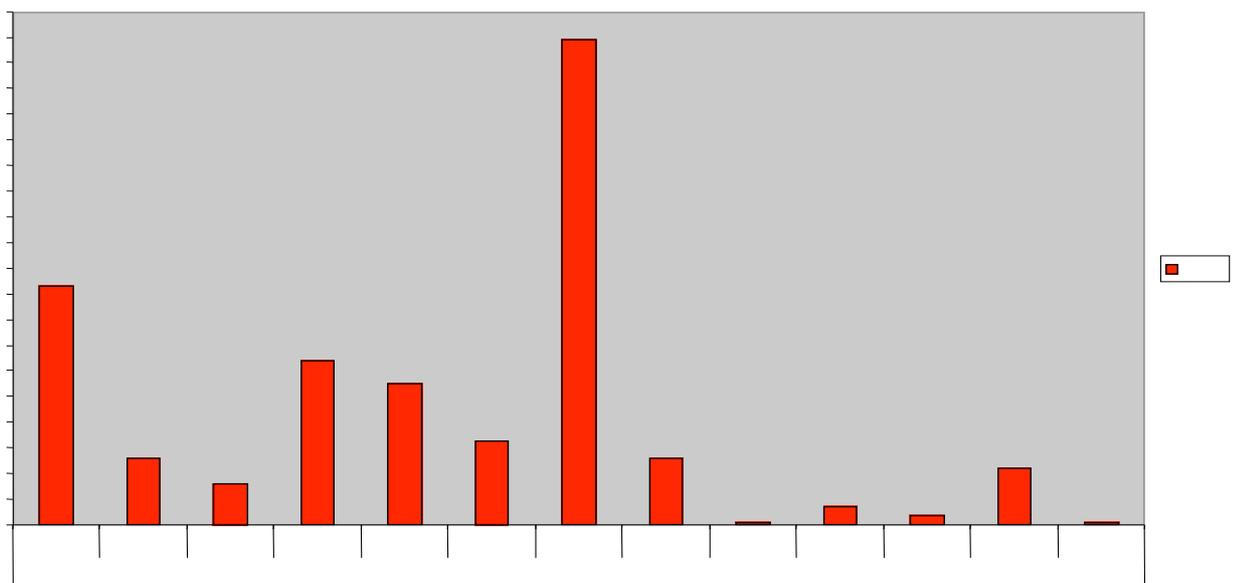
- 1.7. The Task Group agreed from the start that any recommendations should be evidence based as far as possible and therefore sought evidence from a range of stakeholders, encompassing all points of view.
- 1.8. The Task Group met with the County Council's Head of Property Services and visited the Fire Service Headquarters in Bromsgrove. It also heard from:
 - a number of other authorities (see Appendix), including Leeds, Oldham, Warwickshire and Herefordshire,
 - The British Automatic Sprinkler Association,
 - Armstrong Priestley Ltd (sprinkler installers),
 - Mark Barry, Zurich Municipal (insurers), with schedule of rates by Wormald Fire Systems,
 - Bromsgrove Schools PFI Project Leader, Worcestershire County Council,
 - The Head of Financial Practice and Standards, Worcestershire County Council.
- 1.9. A list of the documents considered by the Task Group is attached as an Appendix.

2. Fires in schools in Worcestershire

- 2.1. To put the discussion in context, and to help establish the level of risk in Worcestershire, we asked how many fires there had been on school premises, in the county over the last seven years. There is considerable variation in Districts, as shown in the following graph:

**Number of Fires on School Premises Per Station in North and South District
(from 1 Jan 96 to end Nov 2003)**

Total School Fires (Worcestershire) 9326166455331892674221101020304050607080901001101201301401501601701801902002122232425262728293



Key:

21 – Worcester

22 – Stourport on Severn

26 – Droitwich Spa

27 – Redditch

32 – Upton upon Severn

41 – Malvern

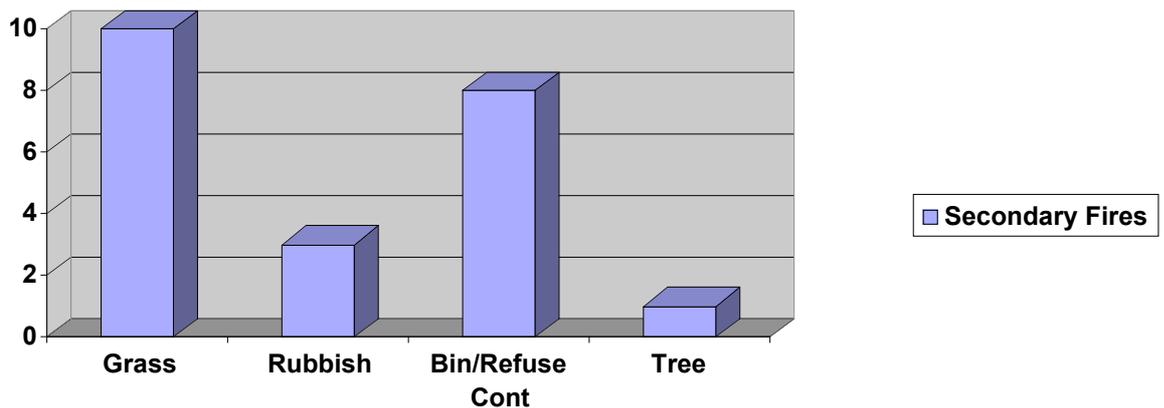
23 – Bewdley
24 – Kidderminster
25 – Bromsgrove

28 – Evesham
29 – Pebworth
31 – Pershore

53 – Tenbury Wells

- 2.2. The fires quoted in the graph range from vegetation fires on the periphery or within the school grounds, to bin and refuse fires and also fires within school buildings.
- 2.3. The Fire Brigade advised that a certain trend can often be identified leading up to a large school fire. This starts with minor vandalism or graffiti, followed by a series of small fires in the school grounds, which get progressively bigger, until finally the school is set on fire. The Fire Service reported that no child had been killed in a school time fire in the UK in the last 50 years.
- 2.4. We asked how most fires on school premises were caused. Data provided for Bromsgrove (see chart below) confirms that most are caused by rubbish and bins being deliberately set alight. Out of 25 fires at LEA school premises between 1 April 1999 and 31 December 2003, 13 were caused by rubbish or refuse.

Number and Type of Secondary Fires



- 2.5. We asked if the number of fires in schools in Worcestershire had been increasing. The Fire Service gave us data for Bromsgrove that showed that between 1999 and 2002 there were three or four incidents per year, where as last year (2003) there were eleven incidents.

Cost of School Fires

- 2.6. Nationally, the Arson Prevention Bureau reported in September 2003, that losses through school fires have increased to approximately £97 million, representing a doubling in costs over the last decade.
- 2.7. Locally, since Worcestershire County Council was created in April 1998, there have been 58 instances of fires in school which have cost the authority £1,876,785. One instance related to a fire at Callowbrook School where the entire school was damaged at a cost of £1,657,264. With this exception, fire damage has been fairly light averaging about 9.5 instances per year at an average cost of £3,851 per instance.

2.8. This is light in comparison to places like Leeds which in the last 3 years alone has had losses amounting to £12 - £13m. The most recent £2m+ loss of a sports centre attached to a school in December 2003 was not malicious, but was caused by an electrical fault in a fixed heater.

2.9. Worcestershire appears to be a low risk area, although as national figures are continuing to show an upward trend, continuing low levels of losses in Worcestershire in future can not be guaranteed.

3. Current County Council Policy

3.1. The County Council must comply with current fire precaution regulations. This means that a Fire Risk Assessment (FRA) should be carried out for each County Council owned building and appropriate precautions taken as a result. This does not preclude fitting sprinklers in Council owned buildings, but there is no blanket policy for installing sprinklers. The Council is also responsible for ensuring that staff are adequately trained in basic fire prevention processes. In schools there is joint responsibility for fire safety between the LEA, head teachers and school governors.

What fire precautions are required by regulations?

3.2. The Fire Precautions (Workplace) Regulations 1997 and Amendments define certain fire safety measures, such as ensuring means of detecting and fighting fire, escaping from workplace in the event of a fire, and requiring employees to include fire hazards in their risk assessment. Under these regulations every premises where five or more people are employed must have a Fire Risk Assessment (FRA) carried out and a written record of this maintained on each site. There are three key areas that need to be assessed with regard to fire precautions:

- risk to users of buildings;
- risk to buildings and contents; and
- risk to Fire Brigade personnel tackling a fire.

3.3. Properly completed, FRAs should ensure aspects such as closure of fire doors; and making flammable materials absolutely unavailable in school grounds.

3.4. Property Services told us they had carried out FRAs for most County Council properties including schools. At present there is a revenue budget of £200,000 per annum allocated for fire precautions from the Property Maintenance budget. This is used for funding the smaller items of fire precaution works that arise from FRAs. Schools have delegated responsibility for fire precautions below their capital limit. We discuss these other fire precaution methods in more detail in section 8.

3.5. Property Services described the following modern measures – many of them mandatory – to minimise fires and fire damage.

- Modern building standards, such as compartmentalisation of a building, with fire doors and fire walls and fire resistant materials. They advised that these, like sprinklers, localised the fire and stopped it spreading.
- Fire Risk Assessments to enable improved observance of fire-avoidance procedures.
- Automatic Fire Alarm systems which alerted the brigade to fires automatically.
- Emergency Lighting systems.

These are explored in more depth in section 8.

4. Sprinklers: Advantages and Disadvantages

4.1. We asked the Fire Service why they supported the installation of sprinklers. They argued that sprinklers:

- detect fire;
- extinguish fire;
- raise the alarm (both in the building and linked directly to Fire Brigade);
- protect occupants (the spray reduced the harmful effects of large particles in smoke);
- protect the building;
- provide additional safety for fire fighters;
- are reliable;
- tackle a fire far sooner than the Fire Brigade could usually arrive; and
- were reassuring in an area where schools were subject to a high incidence of arson.

4.2. They also emphasised the distress caused by fire and argued that the ensuing educational disruption, sense of loss and psychological damage should be taken into account when considering what preventive measure to put in place.

Residential Homes

4.3. Concern was expressed by the Task Group about the length of time it might take older people to vacate a home in the event of a fire. It was confirmed that the Fire Service encouraged the installation of domestic sprinkler systems in homes and bail hostels for example. We were advised that all residential homes in Worcestershire were already fitted with automatic fire alarm systems.

Disadvantages

4.4. We put a number of apparent problems with sprinklers to the Fire Service.

Water damage

4.5. Concerns were raised about the water damage caused by sprinklers due to the high volumes of water they use. During a presentation by Assistant Divisional Fire Officer Chris Blake, it was explained that firemen's hoses can cause more water damage than sprinklers. Modern sprinklers have a localised action and often only one or two sprinklers directly above a fire would be activated. It was

also extremely rare for sprinklers to cause water damage through faulty mechanisms.

Vulnerable to vandalism

- 4.6. We were also concerned that sprinklers may be deliberately set off. Mr Blake noted that this was extremely rare. We asked several local authorities that had fitted sprinklers, whether they had suffered from vandalism or any cases where sprinklers were deliberately set off. There were no recorded instances.

5. Costs

- 5.1. The main obstacle to fitting sprinklers is the cost of installation and maintenance. It was hard to pin down exact costs and at the start of the scrutiny we found there were conflicting figures from the Fire Service and Property Services.

Sprinkler Costs – Retro-fit

- 5.2. Sprinkler systems are expensive to install within existing buildings since they require a network of pipes throughout the building to provide adequate sprinkler cover. This is very disruptive to the building fabric with installation work above ceiling and may involve asbestos removal prior to installation. In addition, they require a fairly large water storage capacity, pumps and controls on site, as in many cases the mains water supplies to the site are inadequate to cope with the demands of a sprinkler system.
- 5.3. Costs are dependent on the building structure and type of system to be fitted and are therefore hard to accurately estimate. However, for this scrutiny Property Services carried out a survey at a medium-size school (1500m²) to ascertain the cost of installing a system complete with all the necessary controls and water storage. The price quoted was £83,500, i.e. about £55 per square metre. In addition there would be costs to remove and reinstate ceilings, and possibly remove asbestos.
- 5.4. We conclude that the costs of installing sprinklers in all existing schools is too expensive for the County to bear and do not recommend installation in existing schools.**

Sprinkler Costs – New Build

- 5.5. Determining the cost of fitting sprinklers in 'new build' schools is also quite complicated. Costs vary considerably depending on, for example, the size of the building, its design and the water pressure in the town's main.
- 5.6. The Fire Service advised initially that a low cost sprinkler system could be installed into a new build school for as little as 1.8% of the total build cost. They argued this roughly equated to the cost of a reasonable quality fitted carpet. If the system automatically alerted the Fire Brigade, the water flow to the sprinklers would only have to last for up to 30 minutes (assuming the fire engines would arrive by then) thus removing the need for expensive storage tanks/pumping

equipment.¹ The Local Government Association booklet, '*Automatic Fire Sprinklers – A Toolkit For Schools*', has also quoted the figure 1.8%.

- 5.7. However, Stewart Kidd, Secretary General of BASA, when asked about the 1.8% estimate explained that this figure was out of date. The figure they quoted in 2001 “was based on the cost of the sprinklers less the cost of simpler fire protection measures (such as fire compartmentation/detection). These measures can be reduced when sprinklers are installed, assuming that the existing water supply network is adequate. Our current data suggests that the gross cost of installing sprinklers is between 3% and 4.5% if no trade off is applied and if the system requires water storage and pumps.”
- 5.8. Stuart Blackie of Education Leeds agreed that such ‘reductions’ in fire engineering were possible. He advised that:
- “We have seen the benefits in our fire rebuild schemes with 'varying of the provisions' of certain aspects of the Building Regulations, ie. reduced standards of fire resistance to elements of structure (period of fire resistance), number/positioning of fire doors, fire compartment sizes and travel distances. Other aspects have also seen some flexibility as a result of the sprinkler provision.”
- 5.9. This concept of 'fire engineering' becomes much more viable if the schools are sprinkler protected, which offers a less prescriptive method of achieving compliance with Building Regulations and fire safety legislation.
- 5.10. On the question of actual costs, we sought examples from authorities that had fitted sprinklers and found that the average cost was higher than 1.8%. Warwickshire’s pilot project, building a new Special School for Nuneaton and Bedworth, is currently being planned. The total project cost is about £7m and the architect has estimated that £350,000 (5%) approx is the cost of installing sprinklers. Stuart Blackie of Education Leeds advised that his estimate would be nearer 2-3% in a new-build scheme (although no hard figures were available).
- 5.11. Property Services estimated the installation costs to be higher still (around 5% for new build cost and 8% for retro fit). They had obtained figures from the Principal Architect from the Department for Education and Skills (DfES).
- 5.12. Our findings, based on actual current figures, are that we agree that Property Services’ estimate of installation costs, on average around 5% of the total build costs, is a realistic figure. However, we accept the possibility that a low cost system (where no storage tanks or pumps are required) may be possible. In most cases though, it is likely that pumps and storage tanks would be needed.
- 5.13. A summary of these costs is given below:

Description	Capital £	Revenue Ongoing £	Revenue One-off £
Fit sprinklers into all schools			
Cost per school (excluding ceiling removal and re-instatement)	83,500	1,300	
Total estimated cost	20,958,500	326,300	

¹ These details were taken from the joint code of practice between Zurich Municipal and the British Automatic Sprinkler Association (BASA).

Description	Capital £	Revenue Ongoing £	Revenue One-off £
Fit Sprinklers into new Schools (non PFI)			
Cost per school – with fire engineering reductions and no water storage. Based on Fire service estimates (1.8% of total build cost).	144,000	1,300	
Cost per school without compensating fire engineering reductions, based on BASA data (3%- 4.5% of build cost – 4% used for example)	400,000	1,300	
Warwickshire’s Pilot (5%)	350,000		
Fit sprinklers into new schools PFI			
PFI contractor will determine the risk factor and build to accommodate this, either including or otherwise those elements he/she considers appropriate. Cost will be part of agreed fee.			

Maintenance Costs

5.14. If a sprinkler system is installed, it is important that it is monitored closely and properly maintained. Routine maintenance should include checks for Legionella (a risk in any static water system). We asked Property Services what the costs of maintenance would be. They advised that actual costs would vary dependent on the size of the property, but an average estimate would be £1000 pa.

5.15. Stuart Blackie of ‘Education Leeds’ confirmed that they had “just agreed a new maintenance contract on a sprinkler installation at a large high school (approx. two thirds sprinklered) and the annual cost is £1280+vat. This was after negotiation with a number of companies and is considerably less than quoted by the firm that installed the system. It is based upon two visits per year.”

5.16. The LGA ‘toolkit for schools’ booklet states that ‘the annual maintenance cost of a sprinkler system is estimated to be approximately £140, excluding materials’. We feel that examples quoted are optimistic and do not reflect the true range of possible costs. **We conclude that Property Services’ average estimate of maintenance costs is a realistic figure.**

6. Insurance

Current Buildings

6.1. The Fire Service believed that installing sprinklers would reduce insurance premiums or result in lower excess payments and we wanted to examine this possibility.

6.2. The Head of Financial Practice and Standards told us that our insurance policy offers blanket coverage for all county buildings. Since April 1998, several insurance companies have provided insurance to the County Council and common to each policy has been the excess (or self insurance) whereby the Council is required to meet the first part of each claim. The current policy costs approximately £500,000 per annum and has an excess of £200,000 for school buildings and £10,000 for all other buildings. In addition, for those schools built using a type of design known as SCOLA, the Council is also responsible for the first 20% of any claim.

6.3. Discussions had been held with the insurers on the issue of sprinklers. Whilst the company could not give a precise cost, they gave an example for a single school which implied that the premium could be reduced by about 65%. However, the blanket nature of the council's policy means that installation of sprinklers in a small number of schools would not impact on the overall policy, making reduced premiums or excess very unlikely. Savings of 65% as suggested above would only materialise if almost all schools were fitted with sprinklers of an approved standard.

PFI New Build Schools

6.4. PFI project built schools could be different. The contractor would be responsible for insuring the school, independent of the Council's block coverage, so there might be a saving on insurance to the contractor. However, the Council would need to specify sprinklers in the contract and then make assurances that any insurance saving accruing to the contractor was reflected in the unitary charge paid by the County Council. We make our conclusions on new build schools in paragraphs 9.10 – 9.14.

6.5. A summary of financial implications for insurance is as follows:

Description	Capital £	Revenue Ongoing £	Revenue One-off £
Impact on insurance			
PFI schools – responsibility with contractor, will be built into financial model.	None	Part of contract negotiation on risk	
County owned schools – covered by comprehensive policy with a £200,000 excess. Most claims small and below this level.	None	minimal	

7. What are other local authorities doing?

7.1. Of the dozen or so authorities we contacted Oldham, Leeds and recently Hertfordshire and Durham had chosen to fit sprinklers to all new build schools.

- 7.2. Warwickshire are currently involved in the same debate about sprinklers as Worcestershire. We found that Warwickshire, like many authorities, acknowledge that some benefits accrue from sprinkler systems but are concerned about costs.

They are therefore using a pilot scheme to pursue this issue. They believe that “there are some health and safety benefits in that, particularly in special schools, pupils with profound learning and physical disabilities are more vulnerable and slower to evacuate.” Although they do have well established evacuation procedures, “the benefits are more about continuity of education, minimising the likelihood of loss of buildings, children's and staff resources, and minimising disruption to the education process.”

- 7.3. A typical response was from Bristol. In reply to our questions about installing sprinklers in schools, they advised that:

“we have looked at this but the cost saving in insurance premiums does not make this economically viable. We have a joint fire insurance policy and the reduction in premiums by having a new school covered by a sprinkler system is very small compared to the capital cost of installing a sprinkler system plus the need for a maintenance contract to keep the system operable.

We also have four new schools which are being built under a PFI contract with the contractor having to maintain the schools for 25 years after completion. They have chosen not to install sprinklers which again points to the uneconomic capital cost of the installation.”

- 7.4. Several other authorities explained they did not have a blanket policy on installing sprinklers, mostly down to economic constraints. In some areas, where fire risk assessments indicated that risks were high, steps had been taken to either fit sprinklers or fund anti-vandalism projects.

8. Fire Precautions Other Than Sprinklers

- 8.1. Property Services described several measures other than sprinklers to deal with the risk of fires as follows.

Fire Risk Assessments

- 8.2. Fire Risk Assessments, when properly done, made sure of aspects such as closure of fire doors and making flammable materials absolutely unavailable in school grounds. Property Services carry out for most County buildings, including schools, at an average cost of £500 for each assessment, although some schools hired independent Fire Risk Assessors. Property Services noted some concern that not all schools had adequate measures in place.
- 8.3. Some Fire Risk Assessments have highlighted a number of concerns within the existing building structures and services in complying with current standards. Also highlighted by FRAs were areas where the fire precautions within the County Council's properties could be improved as follows.

- Training of key staff in fire precautions and management of fire precautions within properties,
- Compartmentation within certain older buildings,
- Installation of automatic detection to all buildings,
- Installation of automatic signalling to a receiving station,
- Emergency lighting.

Training of staff

8.4. FRAs have highlighted several areas of improvement required with the management of County Council occupied properties:

- Regular maintenance and checking of fire precautions
- Signage
- Misuse of equipment
- Use of fire-fighting equipment
- Inappropriate storage of materials and rubbish
- Vandalism and site tidiness.

8.5. It is vital that there are clear roles for staff responsible for precautions (such as keeping fire doors closed) and that they are adequately trained to carry out these duties. All properties should have nominated staff to fulfil these roles and these staff should be recorded, together with their training record, in the Fire Register held at each property and on Human Resources records.

8.6. Much of this training could be done in house but would require additional resources.

Revenue Costs:

Year 1:	£50,000
Future years:	£10,000 per annum

8.7. We recommend a formalised system of training in the management of Fire Precautions, for appropriate staff, is set up and maintained (estimated cost year 1 £50,000 and £10,000 per annum thereafter). Property Services should maintain a dialogue with the Fire Brigade to ensure that appropriate literature on necessary fire pre-cautions is circulated to schools.

Compartmentation of buildings

8.8. Modern building standards, with fire doors, fire walls and compartmentation within voids of ceilings, roofs and ducts, to reduce the rate of spread of smoke and fire, localise the fire (albeit to a larger area than sprinklers) and stop it spreading.

8.9. Many of the County Council's buildings were constructed in the 1960s and 70s. They complied with building regulations in force at the time and are known as 'system' (or SCOLA) buildings. Much of the original compartmentation has been damaged over the years, resulting in poor separation within the building space. Also in many cases the compartmentation relies upon asbestos-based materials.

- 8.10. The County Council's insurers have recently raised the issue of poor compartmentation on the County Council's properties and because the Council is currently unable to confirm that these 'system' buildings comply with current standards, the premiums and excess have increased considerably.
- 8.11. It is estimated that there are about 100 buildings of this type, mainly schools. Surveys of the buildings which fall within this category are being undertaken.
- 8.12. On current information, as a very rough guide, it is believed that the cost of upgrading would be on average approximately £10,000 per building.

Total Capital Cost: £1 million
Revenue Cost: Nil

Installing Automatic Detection

- 8.13. One fire precaution method is automatic smoke or heat detection, as appropriate, which sets off the fire alarm under certain conditions. The earlier an alarm is given the less risk there is of persons being trapped within a building in the event of a fire, by smoke and fumes. In addition, automatic detection gives protection when the building is unoccupied. Automatic detection systems, when installed, require regular testing and servicing.
- 8.14. We were advised by Property Services that almost all County Council properties have fire alarm systems. However, they do not have automatic detection, relying on activation by break-glass points. The only properties with exterior automatic detection are residential properties such as Homes for Older People and Children's Homes, and also major offices such as County Hall.
- 8.15. Fire Risk Assessments have highlighted the need to install automatic detection in high-risk areas including computer rooms, cooking areas, circulation and escape routes. However, to give the greatest possible protection this provision would need to be extended to a much wider protection throughout the buildings.
- 8.16. The cost to upgrade existing fire alarm systems and extend provision of automatic detection to all County Council buildings is estimated at:

Capital cost: £1.5 million
(Assuming 300 properties @ £5,000 per property)

There would also be an annual cost to service and check these systems.
Revenue Cost: £60,000 per annum

- 8.17. However, we later found that Education Leeds had carried out a number of new installations of automatic detection schemes, costing from approximately £10k up to £80k in their schools. Obviously, costs are dependent on the complexities of the building/s, although these figures suggest a far higher cost.

Automatic Signalling to Receiving Station

- 8.18. Only a few of the County Council's properties have an automatic external link direct to the Fire Brigade or to an approved monitoring station. The earlier the Fire Brigade responds to a fire, the less the risk to the occupiers of the building and also to the building and contents. An automatic signalling system therefore removes the need for manual summoning of the Fire Brigade and subsequently reduces the risk due to human error.
- 8.19. Automatic signalling linked to automatic detection gives protection to the building and contents when the building is unoccupied and when many of the fires, particularly within schools, occur due to vandalism and arson.
- 8.20. Costs of installing a digital communicator and dedicated telephone line:

Capital Cost: £200,000

Annual cost for the telephone line rental and monitoring station charges:
Revenue Cost: £87,500 per annum

Emergency Lighting

- 8.21. Most County Council's properties, other than schools, have basic emergency lighting. However, although standards at the time of building were met, in many cases, properties do not come up to the standard recommended by the current British Standards.
- 8.22. Because schools are operating for longer hours and providing services such as breakfast clubs and after-school care, the hours of use are extending into darker periods during the winter months. Therefore emergency lighting should be considered, if not to the full school, at least to the areas of extended use.
- 8.23. Upgrading existing installations and installing systems in areas not already covered:

Capital Cost: £2 million

Maintenance and servicing of emergency lighting systems:
Revenue Cost: £40,000 per annum

Revenue Costs

- 8.24. Most of the proposals have a revenue consequence. With delegation of revenue budgets, particularly to schools, this has a direct effect on the day-to-day cost of service provision and can reduce the level of service that each budget holder is able to provide.
- 8.25. Schools have delegated responsibility for fire precautions below their capital limit. However, for the purpose of this report, schools have been included in the Capital and Revenue figures.

8.26. A summary of financial implications, if all the above upgrading is carried out, (based on assumptions that WCC has 300 schools, and the cost of an average new school build is £8m) is as follows:

Description	Capital £	Revenue Ongoing £	Revenue One-off £
Upgrading basic smoke and heat detection			
Based on 300 properties @£5000	1,500,000	60,000	
Automatic signal to fire station			
Initial outlay and high ongoing revenue relating to line rentals for c.300 properties	200,000	87,500	
Compartmentation			
Based on an estimated 100 buildings@ £10,000 per building	1,000,000		
Installation of emergency lighting			
Broad estimate based on need for schools to be open for longer periods	2,000,000	40,000	
Training for Staff (Fire Risk assessments)	none	10,000	50,000

9. Conclusions

Cost effectiveness

9.1. **The costs of installing and maintaining sprinklers are considerable, even in just one school (eg £350,000 in Warwickshire’s pilot). We have found that the cost of installing sprinklers in all existing buildings is too great for the County to bear.**

9.2. The latest research on cost benefit analysis from the Building and Research Establishment (Feb 2004) on the effectiveness of sprinklers in residential establishments concluded that “residential sprinklers are probably cost-effective for residential care homes”. It also concluded that in order for sprinklers to become cost-effective in a wider range of buildings:

- Installation and maintenance costs must be minimal, and/or;
- Trade-offs may provide reduced costs by indirect means, and/or;
- High risk buildings may be targeted, and justified on a case-by-case basis using the cost benefit approach of this project, but with actual cost quotations, risk estimates based on more detailed local risk data, etc.

- 9.3. We have found it difficult to quantify the apparent savings that can be made on the trade-offs referred to above if sprinklers are installed.
- 9.4. It is also evident that money spent on sprinklers in one building could be used very effectively to improve fire safety in a number of establishments, thereby benefiting many more people.
- 9.5. We therefore conclude that the decision to install sprinklers cannot be based on figures alone. It is clear that fitting sprinklers will add to the cost of a new school. Whether the extra expenditure is worth it – in terms of reassurance, of public confidence, or of ensuring against the educational disruption, sense of loss, psychological damage and personal distress of a fire – is a matter of judgement.
- 9.6. Our recommendations therefore reflect our view that sprinklers are an additional safeguard, but an important one. Installing sprinklers is therefore worthwhile, providing that the costs are contained and measured against risk. Full consideration needs to be given to existing measures and levels of training to relevant staff.
- 9.7. We recommend the following other measures to improve fire protection:**
- a) **depending on the results of surveys currently being carried out on ‘SCOLA’ buildings (built during the 60’s and 70’s), upgrades where necessary, should be undertaken by specialist approved contractors (estimated capital cost £1 million)**
 - b) **automatic detection and signalling and emergency lighting should be part of ongoing investment and their installation should be prioritised in buildings which are in areas deemed to have a higher fire risk, based on the Fire Risk Assessment**
- 9.8. We recommend that when Fire Risk Assessments are undertaken on schools in areas of possible higher risk, consideration should be given to whether retro fitting of sprinklers may be worthwhile (average cost £83,500 per school).**
- 9.9. We recommend that the Fire Risk Assessments should form an integral part of the budget setting and prioritisation process**

New Build Schools

- 9.10. At the start of this scrutiny we hoped that our findings could help inform the building of new schools in Bromsgrove under the Private Finance Initiative (PFI). As we have said above, installation of sprinklers is worthwhile, providing that the costs are acceptable. As it is very difficult to accurately determine costs for individual buildings, we considered that bidders should be asked to put forward two quotes, one with sprinklers and one without.

9.11. We asked Peter Parkes, the Council's Bromsgrove PFI Project Leader, his views on whether the Council might specify an option A and option B type of tender, where A would be to design and build a school with sprinklers and B without, taking into account the different design needs. We also asked if the contractor could be made aware of potential cost savings on insurance for the life of the contract by fitting sprinklers. Mr Parkes explained that:

"PFI projects differ from more normal building projects in that the specification is an Output specification as opposed to a Input Specification. This means that we will specify what the accommodation and services must deliver, not how it should be done. The theory is that by doing so, the PFI bidders will seek to provide the most innovative, economically viable solution to deliver the outputs.

On a subject such as sprinklers, unless the County Council has a specific policy to provide them, the tender documents would allow the provider to make a judgement as to what is the most economic solution, based on the capital, life cycle, maintenance and insurance costs.

They will also make a judgement of the risk, based on previous experience of similar PFI projects to Bromsgrove and the likelihood of a fire problem in the particular area. We would therefore have no need to "specify" an A or B option as the bidders should automatically find the best solution. The cost for the provision over the 30 year life of the project will then be included in their bid."

9.12. We are concerned that if the provision of sprinklers is not specified, then the decision is left to the PFI bidder, who may have little experience of the subject, to put forward the most economical solution. It is unclear what emphasis would be given by a PFI contractor on the human impact and the additional safety to life, buildings and the work of teachers and pupils in the event of loss.

9.13. An important point to note is that it is essential that the concept of sprinkler provision is tabled at the outset and is included at the earliest possible stage of the design process. This allows designers and engineers to look at simple ceiling constructions, easy access/routes for pipework, rather than trying to design a system almost as retro-fit.

9.14. It is clear that the only way of ensuring minimal installation costs is to specify that sprinklers should be considered carefully by contractors before any buildings are designed. The only way to compare overall build costs is to find out what they would be, both with and without sprinklers.

9.15. **We therefore recommend that:**

a) **Contractors are asked to provide two options for build: one including sprinklers and one without. Where the project is being delivered by a PFI contractor we would wish to have highlighted the costs of the sprinklers, savings on building design trade-offs, and the relevant insurance assumptions made within their financial model. The final decision on whether**

to install sprinklers would be made by the Cabinet, based on:

- the results of the 2 tenders; and**
 - the PFI project team's assessment of the cost effectiveness over the life of the project.**
- b) The Council should consider writing in to the contract that any fire precautions should be discussed with appropriate representatives from the Fire Brigade, insurance company the Councils' Property Services and water authority representatives, before the design stage is reached. This will ensure that due consideration is taken of relevant legislation and recommended best practice.**

APPENDIX

**Evidence and Documents provided to the Task Group
(available on request)**

APPENDIX