INTERNATIONAL FIRE CONSULTANTS LTD

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FIRE SAFETY STRATEGY

IFC Report FSS/11004/01

Cleatham Hall, Gainsborough, Lincolnshire

Prepared on behalf of:

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ISSUE RECORD

Issue	Date	Recipient	Comments
FSS/11004/01	14.04.11	Design Team	Draft for comment

AMENDMENT RECORD

Date	Paragraph	Amendment

Revision	Draft				
Author	PB				
Reviewer	PH				

EXECUTIVE SUMMARY

International Fire Consultants Ltd. (IFC) has been commissioned by Mr J Anderson to advise on the fire safety strategy for the proposed use of Cleatham Hall, Lincolnshire as a wedding venue with sleeping accommodation.

This report outlines the Fire Safety Strategy for Cleatham Hall and includes recommended fire safety provisions that will, in our opinion, achieve compliance with the Building Regulations 2010.

The Fire Safety Strategy uses the relevant recommendations contained within Approved Document B 2006 and relevant British Standard documents as a benchmark.

Cleatham Hall is a large Grade II listed house situated within its own grounds. It is proposed that the house is partially converted for use as a wedding venue with a small number of guest rooms for members of the wedding party to stay overnight.

The key fire safety features of Cleatham Hall have been identified and summarised in the following ways:

- Domestic sprinkler protection to the guest bedrooms to offset the lack of lobby separation of the main stair from the guest corridor.

- Enhanced Automatic Fire Detection (AFD) to provide early warning of a fire and provide reasonable time for the occupants to make a safe evacuation of the building in the event of a fire.

It is expected that the information contained in this report will form the substantive basis for the Part B and Regulation 38 elements of the Building Regulations 2010 submission to the Building Control Body and upon completion, used by the Responsible Person to inform the risk assessment of the building, as required by the Regulatory Reform (Fire Safety) Order 2005.

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1. INTRODUCTION

1.1 International Fire Consultants Ltd (IFC) has been commissioned by Mr J Anderson to advise on the fire safety strategy for Cleatham Hall, Lincolnshire, with a view to operate the property as a wedding venue.

1.2 The property is an existing large house set in its own grounds in rural North Lincolnshire.

1.3 This fire safety strategy report outlines the suggested changes that will need to be made in order that the property is suitable for use as a wedding venue, both for ceremonies and for a limited number of guests to stay overnight.

1.4 There will be 5 guest bedrooms along with separate living accommodation for Mr and Mrs Anderson.

1.5 Cleatham Hall is a Grade II listed building which limits the extent to which material changes can be made to the fabric of the building and to the interiors.

1.6 The main issue in this project is the lack of separation between the main stair and the guest bedrooms. In a new build hotel, there would be a lobby between the stair and the guest corridor. This is not possible in this project due to the grade II listed interiors.

1.7 IFC will propose a number of measures in order to maintain a suitable level of life safety in the event of a fire.

1.8 This Fire Safety Strategy provides information on means of escape, fire safety systems, internal and external fire spread, access and facilities for the Fire and Rescue Service.

1.9 This Fire Safety Strategy has a specific set of fire safety systems, active and passive, following consultation with the Owner and Architect and should be reviewed by the design team.

1.10 The Fire Strategy has been based on the architectural drawings received on February 7th 2011 from Hodson Architects as outlined in Table 1.

Drawing Number	Date	Drawing Description
2218-001	December 2010	Existing Site Plan
2218-002	December 2010	Existing Floor Plans
2218-003	January 2011	Existing Elevation
2218-101	December 2010	Proposed Site Plan
2218-102	December 2010	Proposed Floor Plans
2218-103	January 2011	Proposed Elevation

Table 1 – Drawings Reviewed

1.11 Approved Document B (ADB) has been used as a performance benchmark whereby the recommendations in ADB are used as a basis for the fire strategy. Where departures from the generic guidance occur due to the proposed design any other solutions adopted offer at least a level of equivalence in life safety.

1.12 The analysis may also, at the client's request, consider the issues of property protection and business continuity although these are outside of Regulatory control and therefore not covered by this fire strategy report.

1.13 Some of the objectives identified within these documents can be met by using alternative solutions developed using the principles of fire safety engineering, which is an accepted means by which compliance with Building Regulations can be shown.

1.14 It is important that both the guests and the building management have a clear understanding of the fire safety strategy adopted and of the operation and maintenance of the equipment designed to protect lives and property. The development of accurate and concise documentation will be required for both the occupiers and management.

1.15 It is envisaged that this report will be used to inform and assist the person or persons responsible for this building in the assessment of risk in the common areas with relation to fire as required under the Regulatory Reform (Fire Safety) Order. As such this report should be considered along with the recommendations and findings of the risk assessment.

1.16 It is recommended that the insurers be approached so that their requirements can be considered as part of the scheme.

1.17 The report does not address contractors' site fire safety issues during construction.

1.18 It is expected that all design disciplines and other stakeholders will familiarise themselves with the contents of this report and the codes referenced herein.

1.19 Unless otherwise stated in this Fire Safety Strategy, all aspects of the fire safety design should comply with the recommendations of ADB and the documents therein referenced.

2. MEANS OF WARNING AND ESCAPE

Means of Warning

Ground Floor

2.1 Automatic fire detection (AFD) should be fitted in all rooms on the ground floor due to the effect on the occupants on the first floor of a fire on the ground floor.

2.2 Manual call points (break glass units) should also be fitted adjacent to the final exits.

First Floor

2.3 As the guest bedrooms are not separated from the main stair by a lobby, an increased level of fire detection will give earlier warning of a fire and therefore more time for the occupants to safely evacuate the building.

2.4 IFC propose that a BS5839 part 1 L1 AFD alarm is installed. This will have detector heads in all rooms and will provide comprehensive fire detection.

Means of Escape

Ground Floor

2.5 The front of house areas on the ground floor will either have an exit directly to the outside of the building, or they will exit into the entrance hall.

2.6 The back of house areas, which will not be accessed by guests, have sufficient means of escape.

First Floor

2.7 ADB recommended limitation on single direction travel distances in the common corridor is 9m from the guest room door to stair door. It this case there is no separation between the corridor and the stair, so these recommendations will be exceeded.

2.8 In order to offset this, IFC propose that the guest rooms on the first room are fitted with a domestic sprinkler system. This will limit the size a fire in the guest rooms and although it may not extinguish a fire, it will limit its spread.

2.9 The inclusion of sprinklers along with the increased level of fire detection will give the occupants early warning of the presence of a fire in its early stages, and therefore more time in which to make a safe evacuation of the building before conditions become untenable.

Disabled Egress

2.10 Provision should be made for the egress of disabled occupants in the event of an evacuation. This should be addressed and included within the fire risk assessment for the building for its use as wedding venue. This fire risk assessment will not apply to the private apartment area of the building.

Emergency Lighting and Escape Signage

2.11 The common escape routes and staircase should be adequately lit and be provided with emergency escape lighting. The emergency escape lighting should comply with BS5266: *Emergency lighting*: Parts 1-7.

2.12 It is recommended that storey exits and final exit doors are automatically illuminated to a higher level than the rest of the area on activation of the fire alarm, in order to distinguish them should some smoke be present. Occupants can then move towards the bright light to an exit.

2.13 Emergency lighting will be supplied by a local battery/inverter.

2.14 Signage in the escape routes, stairs and other public areas should be installed to BS5499 - Part 4 2000 *Code of practice for escape route signing*. In residential storeys, the colours and style of the signage can be agreed with Building Control so that it may be more architecturally sensitive and sympathetic to the surroundings.

2.15 IFC suggest that escape plans and instructions on what to do in the event of a fire are located in each guest bedroom.

3. INTERNAL FIRE SPREAD (LININGS)

3.1 The wall and ceiling linings of an enclosure such as a room can have a dramatic effect on the development of a fire and, in particular, the time it takes for the room to become completely involved. It is considered that the floor finishes do not significantly contribute to the development of a fire and are generally not controlled.

3.2 ADB suggests that wall and ceiling linings should have the classification as shown in Table 2, when evaluated by the methods described in BS476: Parts 6 and 7 as appropriate.

Location	National Class [B]	European Class [C], [D]
Small room of area not exceeding 4m^2 in a residential building and 30m^2 in a non-residential building and domestic garages not exceeding 40m^2	Class 3	D-s3, d2
Other rooms (including garages)	Class 1	C-s3, d2
Circulation spaces within dwellings	Class 1	C-s3, d2
Other circulation spaces including the common areas of flats	Class 0	B-s3, d2

NOTE *Linings which can be effectively tested for "surface spread of flame" are rated for performance by reference to the method specified in BS 476-7:1987, under which materials or products are classified 1, 2, 3 or 4, with Class 1 being the highest.*

(A) *Recommendations are given in Clause 34 for linings of concealed voids.*

(B) *The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class, unless they have been tested accordingly.*

(C) *When a classification includes "s3, d2", this mean that there is no limit set for smoke production and/or flaming droplets/particles.*

(D) *Large rooms such as open plan offices, shops display areas and factories need not be regarded as circulation spaces even though there are circulation routes in them.*

Table 2 - Classification of Linings

3.3 In this table, Class 0 is better than Class 1. It is not identified in any BS test standard. A Class 0 product is either:

- Composed throughout of materials of limited combustibility; or
- A material having a Class 1 surface spread of flame and which has a fire propagation index (I) of not more than 12 and a sub-index (i_1) of not more than 6.

3.4 The fire propagation index is established by reference to the method specified in BS 476-6. European classifications are described in BS EN 13501-1.

3.5 Parts of walls may be of a lower class than above provided that the total area in any one room does not exceed half of the floor area, up to a maximum of 20m^2 in residential accommodation and 60m^2 in non-residential accommodation.

3.6 IFC recommend that Class 3 products are avoided where possible.

3.7 Because of the listed nature of the building, it may not be possible to retrospectively apply these requirements to the existing internal coverings, however, should these coverings be change in the future or during the work to convert the house, the recommendations in this section should be followed.

4. INTERNAL FIRE SPREAD (STRUCTURES)

4.1 It is important that the structure and key construction elements of a building remain fully functional for a reasonable period of time during a fire. It is obviously beneficial if these elements remain in a serviceable condition after the fire for ease of reinstatement. In addition a fire should be contained by fire resisting elements of the building to prevent it spreading to other parts of the building. This containment should include voids and cavities that could provide a path for fire.

4.2 As a building with a top floor less than 5m above ground floor level within the Other Residential classification, the structure should provide a minimum of 30 minutes fire resistance.

4.3 All pipes, ductwork and services passing through fire-resisting barriers should be penetration sealed with an appropriate sealing system and/or fire damper which has been shown by test or assessment to maintain the period of the fire-resistance of the barrier. The penetration sealing system should be designed and installed in accordance with the recommendations contained within The IFSA Code*: Sealing Apertures and Service Penetrations to Maintain Fire Resistance*.

4.4 All fire and smoke control assemblies should be provided with appropriate certificate from a recognised third party accreditation body, such as IFC Certification Ltd, in order to demonstrate compliance with Clause 0.15 of Volume 2 of Approved Document B and Regulation 16B of the Building Regulations 2000. Assessment and test evidence should also be available for inspection by the approving authorities and other interested parties.

4.5 Cabling for fire safety systems should comply with Table 1 of BS8519.

4.6 This is an existing building which is predominantly constructed from stone and brick and will therefore have an inherent fire resistance greater than that recommended in paragraph 4.2

4.7 The guest bedrooms should be separated from the stair with 30 minutes fire resisting construction. There is no requirement to separate neighbouring rooms with fire resisting construction.

4.8 Due to the inclusion of sprinkler on the first floor and the enhanced AFD system, IFC feel that there is no need to upgrade the floors or ceiling between the ground and first floor to compartment standard.

4.9 All doors onto the main entrance hall and stair on both ground and first floors should be upgraded to provide 30 minutes fire and smoke resistance. However, the inclusion of sprinklers on the first floor will control the size of the fire so that it does not reach the flashover temperature that a standard fire door is tested against, it could therefore be possible to assess the doors to a lower level of fire resistance which could mean that the same level of fire resistance is achieved with less intrusive alterations to the doors.

4.10 Due to the listed nature of some of these doors, it may not be possible to upgrade them to FD30S standard. In this case it may be possible to have replica doors made which will provide the necessary performance whilst the original door is safely stored elsewhere.

4.11 Concealed cavities, e.g. any significant voids between a suspended ceiling and the soffit of the floor above or raised floors that are not used for services, etc, will require cavity barriers, typically installed so as to observe a 20 metre maximum linear dimension. These will need to achieve 30 minutes fire resistance.

5. EXTERNAL FIRE SPREAD

5.1 When a building is on fire, heat will radiate through non fire-resisting openings in the external walls. This heat can be intense enough to set fire to adjoining buildings. In order to reduce the chance of this occurring, the Building Regulations place limits on the area of external elevation with no fire resistance. This area is known as the 'unprotected area' (UPA) and is affected by such factors as distance from the boundary, use of the building and compartment size.

5.2 Cleatham hall is sufficiently remote from neighbouring properties for external fire spread not to be an issue.

5.3 AD B suggests that external wall surfaces should have the classification as shown in Table 4, when evaluated by the methods described in BS 476 (Fire tests on building materials and structures): Parts 6 and 7 as appropriate.

Building Section	Performance	
	National Class	European Class (1) (2)
Building section over 18m	Class 0 (national class)	B-s3, d2 or better
Building section under 18m	Index (I) not more than 20 (national class)	C-s3, d2 or better

(1) The National classifications do not automatically equate with the equivalent classifications in the European column; therefore products cannot typically assume a European class, unless they have been tested accordingly.

(2) When a classification includes "s3, d2" this means that there is no limit set for smoke production and/or flaming droplets/particles.

Table 4 - Classification of External Wall Surfaces

5.4 In this table, Class 0 is better than Class 1. It is not identified in any BS test standard. A Class 0 product is either:

- Composed throughout of materials of limited combustibility; or
- A material having a Class 1 surface spread of flame and which has a fire propagation index (I) of not more than 12 and a sub-index (i_1) of not more than 6.

5.5 The fire propagation index is established by reference to the method specified in BS 476-6. And European classifications are described in BS EN 13501-1A.

5.6 Generally, all cavities within external walls should be fitted with cavity barriers at all compartment boundary locations (floors, party walls etc).

5.7 Insulation used as part of the external wall construction should be non-combustible.

5.8 These restrictions on external wall surfaces will only apply to the sunroom/breakfast room as all other parts of the building are existing.

6. ACCESS AND FACILITIES FOR THE FIRE SERVICE

6.1 In order to extinguish a fire within this building it is important that the fire service can gain access onto the premises, and from there, into the building. The fire safety strategy relies on the intervention of the fire service to extinguish the fire before it has the opportunity to spread significantly, as the fire separation is not designed to operate indefinitely.

6.2 Fire service vehicle access is available to more than 15% of the building perimeter and the building is less that 11m tall and has a floor area of less than 200m² and will therefore not need to be equipped with a fire main.

6.3 The nearest fire station is in Kirton in Lindsey which is less than 5 miles away, and although this is a retained station, a reasonable fast reaction time can be expected.

6.4 There is vehicular access which should be suitable for a fire service pump appliance. Access provisions for a high reach appliance would not be required for a building of this height.

6.5 The minimum width of the access roads is to be 3.7m between kerbs and 3.1m between gateposts; the minimum carrying capacity is 14 tonnes.

7. Fire Safety Systems

7.1 In order to offset the lack of a lobby separating the stair from the guest bedrooms, a domestic sprinkler system will be installed on the first floor. This system will be designed and installed in accordance with BS 9251.

7.2 This system should have a water supply flow rate of not less than $50l.s^{-1}$ either directly from the water main or via the use of a fire pump.

7.3 A flow and pressure test should be carried out on the water main to ascertain whether a fire pump will be needed.

7.4 The sprinkler systems flow alarm should be interlinked to the AFD system as the sprinkler heads will act as heat detectors to supplement the smoke detector heads of the AFD system.

7.5 The sprinkler system should be service annually by a competent person and a log book of al maintenance and testing should be kept in the Fire Safety File as part of the fire risk assessment.

8. CONCLUSION

8.1 International Fire Consultants Ltd. are of the opinion that were Cleatham Hall, Lincolnshire to be designed, constructed and operated in accordance with this report, the building would fully comply with the requirement of Part B of the Building Regulations 2010.

8.2 It is envisaged that this document will be used as part of the Building Regulations submission in support of Regulation 38 and Part B Fire Safety and by the responsible person in the risk assessment produced by the Management of the building under the Regulatory Reform (Fire Safety) Order 2005 (FSO).

8.3 The building control body and the local fire service should be consulted as part of the Building Regulation submission.

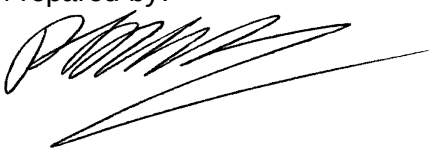
8.4 It is noted that there are departures for from code recommendations, which have fire engineered solutions applied.

9. LIMITATIONS

9.1 Our advice is strictly limited to the scope of our current brief, i.e. to consider the fire safety of Cleatham Hall, Lincolnshire.

9.2 International Fire Consultants Ltd have not reviewed any other fire safety issues arising within Cleatham Hall, Lincolnshire other than those identified in our reports. We offer no comment on the adequacy of any other fire safety precautions within the development, and any absence of comment on such issues should not be regarded as any form of approval. The advice should not be used for buildings other than that named in the title.

Prepared by:



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