

Brentwood Borough Council

Brentwood Town Hall

Fire Safety Compliance Review

REPORT REFERENCE: 17159-R-01-C

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Brentwood Borough Council

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Report Status:

Issue	Description	Prepared by	Reviewed by	Date
C	Client details updated	AR		01/02/2018
B	Indicative costs added to the report	AR	GN	30/01/2018
A	Issued to client.	AR	GN	10/01/2018

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TABLE OF CONTENTS

1	INTRODUCTION	4
1.1	General Description of the Development	4
1.2	Purpose and Scope of the Report	5
1.3	Principle Guidance Documents	5
2	INITIAL REVIEW AND COMMENTS	6
2.1	Means of Escape.....	6
2.2	Automatic Fire Detection and Means of Warning.....	10
2.3	Internal Fire Spread	10
2.4	External Fire Spread.....	11
2.5	Fire Service Access and Facilities	11
2.6	Smoke control	11
2.7	Other Items for Consideration	12
3	AUTOMATIC SUPPRESSION SYSTEM.....	13
4	CONCLUSION	15
	REFERENCES	16

1 INTRODUCTION

Lawrence Webster Forrest Ltd (LWF) have been commissioned by Brentwood Borough Council to review the current fire strategy design proposals for the Brentwood Town Hall redevelopment project to ensure compliance with current fire safety standards and then to provide further information regarding the possible installation of a sprinkler system and its impact.

1.1 General Description of the Development

The Brentwood Town Hall Redevelopment is an existing 5 storey building, comprising basement, ground and three upper floors.

The building will be multi occupied and will comprise of police and council offices, a community hub and lettable offices on the basement, ground and first floors. 19 residential units will be provided on the second and third floors and these will be let on short term tenancy agreements by the council.

There will be 3 main staircases, which will run the entire height of the building. It is envisioned that day-to-day access to the residential units will be via Stair Core 2 and both Stair Cores 1 and 3 will only be used as alternative means of escape in the event of an emergency.

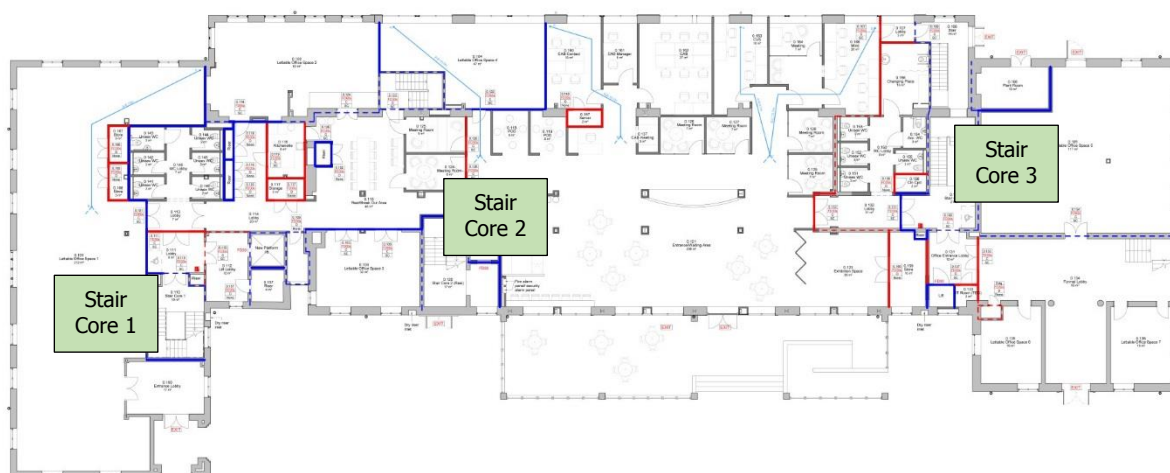


Illustration 1 - Ground floor layout.

1.2 Purpose and Scope of the Report

The purpose of this report is to review the proposed fire strategy for the redevelopment of Brentwood Town Hall to current fire safety standards and highlight any areas which may require further review due to non-compliance. For the purpose of this report and in line with the principle design guidance, the report makes recommendations for life safety only.

Additionally this report will look at the requirement for a sprinkler system throughout the building and some of the associated advantages and disadvantages.

This report relates to the plans below provided by Millbridge Project Management Ltd.

Description	Drawing Number	Revision
Existing Site Plan – Contractors Compound, Main Works	BTH-MAR-XX-00-DR-A-0052	B
Proposed Basement Fire Strategy	BTH-MAR-XX-B1-DR-A-0108	-
Proposed Ground Floor Fire Strategy	BTH-MAR-XX-00-DR-A-0118	-
Proposed First Floor Fire Strategy	BTH-MAR-XX-01-DR-A-0128	-
Proposed Second Floor Fire Strategy	BTH-MAR-XX-02-DR-A-0138	1
Proposed Third Floor Fire Strategy	BTH-MAR-XX-03-DR-A-0148	-

1.3 Principle Guidance Documents

The principle guidance document used for the evaluation of fire safety precautions for the proposed development will be Volume 2 of the Building Regulations Approved Document B: Fire Safety – 2006 Edition (ADB) as amended 2007, 2010 & 2013. Reference will also be made to relevant British and European standards where appropriate.

The Building Regulations are fully functional. This means that the guidance given in ADB is not mandatory. Nevertheless, it is intended that due notice will be taken of the guidance of ADB and, where appropriate, deviations from the guidance will be discussed and justified based on compensatory measures and fire engineering design.

2 INITIAL REVIEW AND COMMENTS

2.1 Means of Escape

Millbridge Project Management Ltd have provided the following occupant capacities for the building:

Basement: 30 people

Ground Floor: 38 people (this does not include the lettable office spaces)

First Floor: 140 people

Second Floor: No capacities provided

As the capacities for the lettable offices are unknown, the occupancy figures for these areas have been calculated based on the maximum capacity the space will hold. This has been calculated by applying the relevant Floor Space Factors as detailed in Table C1 of ADB to the available floor space.

Lettable Office No.	Floor Area (m ²)	Floor Space Factor	Occupant Capacity (persons)
1	212	6.0	35
2	63	6.0	11
3	32	6.0	5
4	47	6.0	8
5	117	6.0	20
6	18	6.0	3
7	19	6.0	3

It is also not known at this time the occupancy figures for the second and third residential floors, however this is likely to continuously change due to the short term nature of the residential lettings. Additionally in the event of a fire, only the occupants of the flat in which the fire is located would need to initially evacuate, therefore only a couple of additional people would need to be considered when considering suitability of escape routes throughout the building.

The travel distances within the building can be split into 2 main categories; offices and residential dwellings.

All of the residential dwellings appear to meet the requirements set out in ADB for the internal planning of flats. This includes a protected entrance hallway with a maximum travel distance of 9 metres to the flat front door. Each multi storey flat is indicated as being provided with a 30 minute protected stairway, however in order to meet the guidance set out in paragraph 2.16 of ADB, smoke detectors should also be provided in all habitable rooms and a heat detector should be fitted within the kitchen.

The travel distances within the common ways of the residential floors should be no more than 7.5 metres in a single direction and no more than 30 metres where there is an alternative means of escape. All residential units appear to meet the required common way travel distances with the exception of the flat labelled on the plans as 2.115, which has a travel distance of 9.75 metres in a single direction.

In addition to the flat described above, the second floor flat labelled as 2.101 also has a dead-end condition, however the travel distance is less than 7.5 metres. The guidance within ADB states that any dead-end portion of a common corridor should be separated from the rest of the corridor by a self-closing fire door. Currently the plans do not show any fire resisting separation between the dead-end sections and the rest of the corridor, therefore this may need to be reviewed.

The travel distances for the office areas on the basement, ground and first floors should be no more than 18 metres in a single direction and no more than 45 metres where there is an alternative means of escape. It would appear that the travel distances within the office areas are generally acceptable.

In accordance with Table 3 of ADB one escape route from a room or storey is acceptable providing there are no more than 60 persons within that area. At least 2 exits must be

provided for rooms or storeys where there is between 60 and 600 persons. The current proposals show that the number of exits per storey and room are acceptable.

There are a number of inner rooms on the basement, ground and first floors, however due to the installation of a Category L1 fire alarm and detection system, all access rooms will be provided with suitable detection and therefore the inner room requirements outlined in ADB are satisfied.

There are 3 core staircases within the building. Stair Core 2 accessed via a new door at ground floor level only accesses the basement and the residential levels. Stair Cores 1 & 3 serve both the offices and the residential units and access is available at all levels. This will be acceptable provided that the stairs are separated from the different occupancies by protected lobbies. Currently the plans show that the stairs are all suitably lobbied with the exception of Stair Core 3 at first and second floor levels, where the Council Chamber and Viewing Gallery both open directly into the staircase. This will need to be reviewed, however if this cannot be achieved, one possibility could be the use of a fire curtain in lieu of the protected lobby. The lettable office spaces located within the formal lobby do not require lobby protection, providing that the occupants of the flats can exit the staircase at the rear of the building rather than passing through the formal lobby.

The current proposals show that the stairs will run through the entire height of the building. This may need to be reviewed as at least one of the Stair Cores serving the upper floors should terminate at ground floor level and should not continue down to the basement. From the plans provided the most viable option to achieve this would be to terminate Stair Core 2 at ground floor level and have this staircase purely for access to the residential floors.

All three Stair Cores will have a minimum width of 1100mm. This is deemed acceptable for the required occupant capacities on the upper floors. Additionally all final exits from the staircase enclosures will at least be as wide as their corresponding staircases therefore the risk of 'bottlenecking' is effectively eliminated.

Refuge points will be provided in the following areas:

Basement: Stair Core 2 & Stair Core 3

Ground Floor: Stair Core 1 Lobby & Stair Core 3

First Floor: Stair Core 1 Lobby & Stair Core 3

Second Floor: None

Third Floor: None

An emergency voice communication (EVC) system, complying with BS 5839-9: 2011 and consisting of a main control panel, remote units with call buttons and two-way voice intercom will be provided. Each disabled refuge alarm system shall be linked into the main control panel, located in either the main entrance or security room so that staff can keep in contact with the refuge areas throughout an emergency. Each activated refuge system shall have an auto listening facility to monitor activity in the refuge area. As each disabled person is moved to safety, the system shall have the capability of being reset by a key operated switch on the refuge area remote unit.

Refuges should normally be provided for each protected stairway affording egress from each storey. Stair Core 2 only contains a refuge point at basement level as anyone using the staircase from the upper floors will be occupants of the flats and it is therefore not deemed necessary to provide refuges at these levels.

Currently there is no refuge point at basement level in Stair Core 1 therefore this may need to be reviewed.

As the project is currently at the design stage, the evacuation strategy including disabled evacuation has not been produced, however the strategy should take into account the evacuation of disabled persons from the refuge points to a place of ultimate safety.

Emergency lighting and signage will be provided throughout the premises in accordance with BS 5266 & BS 5499 respectively.

2.2 Automatic Fire Detection and Means of Warning

A Category L1 system, as described in BS 5839-1: 2017, will be fitted throughout the commercial areas of the premises and will comprise of a mixture of detectors and audio and visual alarms. The fire alarm will not be linked to the residential units situated on the upper floors, however two way communication and alarm will be provided between this system and the current system currently covering areas occupied by the police.

The fire alarm control panel will be located in the ground floor entrance/waiting area and will also be remotely monitored.

The type of fire alarm system normally required for this type of premises will vary from a Category M system all the way to a Category L1 system depending on complexity and size of the premises, therefore as a Category L1 system has been proposed it is deemed acceptable.

For each of the residential units a Grade D LD2 system, as described in BS 5839-6: 2013, will be fitted. This will provide coverage to the escape routes within the flat as well as in areas of high fire risk such as the kitchen and living room. This is the benchmark standard expected, however for the multi storey flats, where there is no alternative exit provided from the upper storey, all habitable rooms should be provided with detection.

A standalone Category L5 system, as described in BS 5839-1: 2017, will be fitted within the common ways of the second and third floors. This system will comprise of smoke detectors and its sole purpose will be to activate the automatic openings vents in the event of smoke escaping into the corridors, lobbies or staircases. This system is the benchmark standard expected within blocks of flats and is therefore deemed acceptable.

2.3 Internal Fire Spread

All floors will provide a minimum of 60 minutes fire resisting compartmentation and each residential unit will form its own 60 minute fire resisting compartment. This meets the required minimum periods of fire resistance as outlined in Table A2 of ADB. As there is no limit to compartment sizes for offices, this does not need to be considered.

There are a number of existing walls on the current drawings where their levels of fire resistance have been assumed. This will need to be checked and confirmed during the building stage. Additionally the plans provided show 30 minute fire resisting ceilings within the flat hallways and landings. It has now been confirmed that each flat will be a 60 minute fire resisting compartment, however an additional 30 minute fire resisting suspended plasterboard ceiling will also be provided as service ducts will be located above these areas.

2.4 External Fire Spread

This report only takes into account the redevelopment of the Town Hall and does not assess the boundary conditions of the building. Since the building is existing, it is assumed that it complies with the functional requirements of the Building Regulations.

2.5 Fire Service Access and Facilities

Dry rising mains will be provided to all 3 stair cores with outlet valves provided at every floor of the building. This ensures that fire-fighting access is no more than 45 metres to the furthest point within each of the residential units.

It would appear that pumping appliance access with a clear line of sight to the dry riser inlet is possible within 18 metres for Stair Cores 1 & 2, however it would appear that this distance is extended to approximately 25 metres for Stair Core 3. This may need to be reviewed and discussed with the local fire & rescue service.

2.6 Smoke control

Automatic opening vents (AOVs) will be provided within the three Stair Cores and also within the common ways of the second and third floors. The smoke control is currently still in the early stages of design, however it shall be enabled to automatically ventilate smoke from the residential corridors, residential staircases and common use stairwells.

The following areas, as described on the drawings, will be served by the AOVs:

Second Floor	
AOV 1	Corridor 2.123
AOV 2	Corridor 2.119 & Lift Lobby 2.121
AOV 3	Corridor 2.122

Third Floor	
AOV 1	Corridor 3.100
AOV 2	Corridor 3.123
AOV 3	Access Lobby 3.132

The plans currently do not show any form of ventilation to the staircase lobbies. Ventilation within these areas is required within ADB, therefore this should be reviewed within the smoke control design strategy.

2.7 Other Items for Consideration

It is noted that there is an area at basement level, which does not form part of the current project, however it should be highlighted that there appear to be a number of inner rooms. The current occupier should review this within their fire risk assessment.

3 AUTOMATIC SUPPRESSION SYSTEM

The current scheme meets current standards (subject to the items outlined in this report), however the installation of a sprinkler system can provide many benefits. Not only does it significantly increase the life safety within a building, but it also increases the property protection. Statistics show that the quick reaction of a suppression system and the rapid dousing of a fire will limit the extent of damage that the fire could have caused and also reduce the number of fire related injuries. There are also some environmental benefits associated with sprinkler systems. This is primarily due to the fact that sprinkler will suppress a fire and keep it to a much smaller fire size. This means that there is a reduction in CO₂ emissions directly from the fire and additionally a smaller quantity of water is required to fight the fire. The addition of a sprinkler system may also considerably reduce the insurance premiums of the building over its lifetime.

Although there are many benefits, there are other factors which need to be taken into account when considering the installation of a sprinkler system. For some systems, a large amount of space is needed to store the water tanks and pumps, which does not seem readily available. Additionally the initial installation outlay may be quite costly and following the installation there will be ongoing maintenance normally consisting of weekly, monthly, quarterly, 6-monthly, annual, 3 yearly and 10 yearly tests/services and therefore associated maintenance costs.

In conclusion, a sprinkler system can be considered a positive benefit to reduce both life and property loss potential due to fire. However, the provision of an active means for fighting fire should not be seen as the only solution to providing a satisfactory level of fire safety.

4 CONCLUSION

Providing that the few non-compliant items highlighted within this report are reviewed, the current proposals for Brentwood Town Hall demonstrate a level of fire safety equal to the general standard implied by compliance with the current recommendations in ADB, therefore it is not deemed necessary to install a sprinkler system throughout the premises. Should a sprinkler system be installed, it will be an added benefit rather than an essential component needed to ensure the benchmark fire safety standard is achieved.

REFERENCES

1. Building Regulations 2010 Part B "Fire Safety" Approved Document B (2006 Edition) incorporating 2007, 2010 and further 2013 amendments
2. British Standard BS 5839-6:2013, Fire detection and fire alarm systems for buildings. Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in dwellings
3. British Standard BS 5839-1:2017, Fire detection and fire alarm systems for buildings. Code of practice for system design, installation and maintenance
4. British Standard BS 5839-9: 2011, Fire detection and alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems
5. British Standard BS 5266-1: 2016 Emergency lighting. Code of practice for the emergency lighting of premises
6. British Standard BS 5499 Fire safety signs, notices and graphic symbols
7. British Standard BS 12845:2015 Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance.
8. British Standard BS 8458:2015, Fixed fire protection systems. Residential and domestic watermist systems. Code of practice for design and installation
9. British Standard BS 9251:2014, Fire sprinkler systems for domestic and residential occupancies. Code of practice