Windsor House – Fire Risk Appraisal of External Walls

BUILDTECH CONSULTANCY LTD

Windsor House

Belmont Road

Whitstable

CT5 1QN

February 2023

Buildtech Consultancy Ltd.

T +44 (0)1962 798129

E enquiries@buildtechuk.co.uk

W www.buildtechuk.co.uk

Report Number – **JL/230503**

Prepared for

Name:	Canterbury Council

Report Prepared By

Name:	Joe Levey, DipHE
Position:	Technical Manager
Date:	01/06/2023

Fire Engineering by:

Name:	Kimon Pantelides MSc, MIFireE, CFPA Eur Dip, MIFSM, MCABE, CBuildE
Position:	Fire Engineer
Date:	01/06/2023

Document Control

Rev.	Date	Issued By	Amendments
01		Joe Levey	

Table of Contents

Competency Statement

Report Writer – Joe Levey

I, Joe Levey am a full-time specialist façade consultant and fire risk assessor. I am a full member of the Fire Protection Association and have over 13 years of working experience in the design, supply, installation and assessment of all major external wall systems and architectural glazing types. I undertake in-depth investigations and reviews of existing external wall systems taking note of workmanship, compliance with building legislation, installation to manufacturers requirements and government issued guidance. For this assessment I have followed the guidance in PAS 9980:2022 and used the methodology set out in clause 13 for the completion of an FRAEW to basic wall construction. My previous investigations and external wall assessment have already determined the requirement for a full FRAEW as per the executive summary below.

Due to the complexity of the as built external wall construction and observed residual risk to occupant life I have opted to enact clause 14 of PAS 9980: 2022, whereby I have worked alongside a fire engineer to conduct further assessment of the external wall system to determine an appropriate outcome.

Fire Engineer – Kimon Pantelides

I, Kimon Alexander Pantelides, am a full member of the Institution of Fire Engineers, with membership number 00054536. I am also a Chartered Building Engineer with the Chartered Association of Building Engineers with membership number 71093820. I have been undertaking external wall assessments since 2018 averaging approximately 50 such assessments each year. I can confirm that I have reviewed this report and provided commentary on the FRAEW undertaken by Buildtech. These comments are my own and have considered the methodology set out in PAS 9980: 2022.

Executive Summary

Building Description

Buildtech conducted investigations to Windsor House on the 5th of December 2022 and found the following:

- Generally, the construction of the building appears to be of structural concrete with a pre-existing concrete infill panel, similar in construction to the Wimpy no-fines system.
- The existing external wall system has been overclad with an insulated render system. The render is a concrete based product applied directly to expanded polystyrene insulation. The insulation is installed directly to the existing double masonry external wall system with a small irregular void 0 and 10mm deep between the insulation and the masonry.
- Fire breaks were observed regularly to the compartment floor levels. The breaks were a mineral wool product, held in place by mechanical fixings and dot and dab adhesive.
- Buildtech did not observe any cavity barriers, fire breaks or fire barriers to the perimeter of windows vent penetrations or to any party wall junctions.

The building is situated in a corner plot with a perimeter garden laid to turf on all four side. The site can be accessed via a private road leading to a private car park. Cross hatching is present immediately outside the main entrance to keep clear for attending emergency services.

Recommended Remedial Actions

The resulting fire risk appraisal of external walls concludes residual risk of the as built external wall system is moderate. The following recommendations are required to maintain the safety to residents of the building

- The emergency evacuation policy, if not already should be changed from a stay put policy to either phased vertical evacuation or simultaneous evacuation.
- The automatic fire detection system should be re-programmed to reflect the change in EEP.
- The vertical party wall locations in the external façade should be remediated to install adequate resistance between compartments. This is typically achieved by installing full fill mineral wool fire breaks.
- The current provision for fire alarms should be reviewed by a specialist provider and any upgrades recommended to make the system appropriate for above recommendations should be instigated.

The following recommendations relate to ensuring adequate maintenance of the external wall system to ensure continued protection for the occupants.

- It is recommended that all elevations of the building are monitored to identify any potential damage to the external render finish. Should any damage be identified exposing the insulation material behind, and immediate repair should be conducted using a non-combustible product.

Recommended Interim Measures

The change detailed above to the EEP should be implemented immediately however, this is an interim action only, and once the compartmentation of the external wall system is adequately achieved then the EEP can return to a stay put policy.

PAS 9980 provides guidance on the risk of fire spread via external wall construction. It sets out a methodology to conduct and record Fire Risk Appraisals of External Walls, which can be scaled up or down depending upon the complexity of individual buildings. The methodology for completion of an FRAEW is covered specifically in clause 13 of the document and is broken into six distinct steps:

Step 1: Does the building require an FRAEW?

In this step the available documentation is reviewed, and an initial intrusive investigation is conducted to conclude whether an FRAEW is appropriate for the façade construction present on site. In some cases, an additional review by fire engineer may be required to determine the requirement.

Step 2: Gathering all necessary information to complete the FRAEW

If it is confirmed that an FRAEW is required, the next step is to gather all relevant information on the building and its external wall construction. This needs to cover all the different external wall build-ups and attachments, what materials and components the system is constructed with, the extent of each of the cladding on each elevation and all relevant building documentation including FRA's O&M's and construction drawings.

Step 3: Identify and group factors that are significant in determining the risk rating.

Using the information gained on the building and its external wall construction, the third step is to determine and collate, from knowledge of the external wall construction and the building's fire safety features and attributes, the factors that are influential and relevant to the risk posed by fire spread over the external walls.

Step 4: Consider each group of risk factors to determine their potential contribution to the overall risk.

This step requires consideration of the influence that the various positive, negative and neutral risk factors have on the perception of where the overall risk lies for each group of factors.

Step 5: Review the risk factor analysis against the benchmark for success to determine an outcome.

Step five involves overlaying the findings from step 4 for each group on the low to high scale to establish where this positions the overall risk.

Step 6 (Clause 14): Application of fire engineering analysis as part of further technical assessment

Where the conclusion for step 5 is inconclusive further assessment may be required by an appropriately competent fire engineer. This may involve but is not limited to further review of the evidence gathered previously or potentially further investigations taken of the building.

Limitations

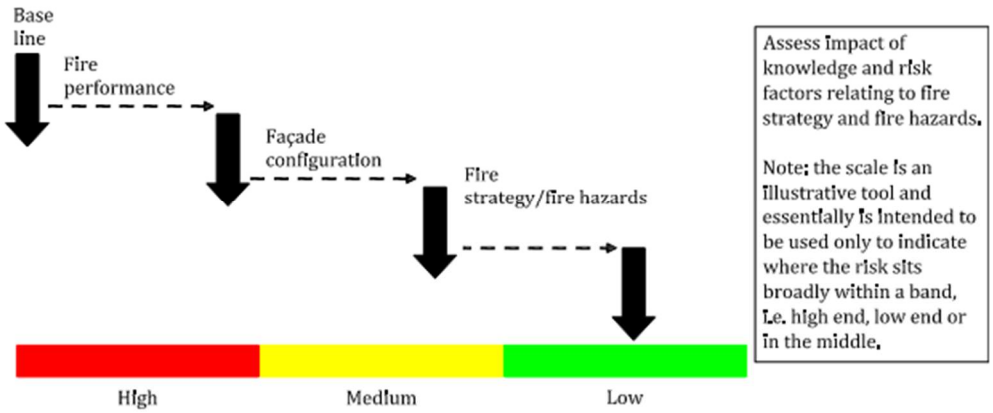
The construction of the PAS 9980:2022 guidance is such that it possesses certain limitations when compared with other methods of assessing the external wall construction of a building. These include:

a) It is intended primarily to inform the buildings fire risk appraisal.
b) It cannot warrant absolute safety, as it will be risk-based and therefore reliant on professional judgement.
c) It might not be possible to identify the full scope of work needed as part of the FRAEW from the outset, as the conclusion might be that a further inspection or in-depth technical assessment Is needed.
d) It is not specifically intended to address protection of firefighters.
e) It is not intended to address property protection.
f) It can only be based on available industry knowledge at the time of FRAEW and more definitive information on the fire performance or external wall construction might come to light subsequently.

Therefore, the advice given within this report is specifically in the interest of life safety to the occupants / users of the building as addressed in the title of this document. Any recommendations or conclusions given should not be applied to alternate properties despite apparent similarities. Should any changes be made to the design or fire safety features of the building, a re-assessment may be required to ensure any advise or conclusions made are still appropriate.

Risk Factors

On completion of the evidence gathering portion of the FRAEW process all appropriate risk factors will be identified and collated into relevant groups. For each group, the likely influence of each of these factors needs to be considered when assessing their contribution in terms of achieving the success criteria. Each group will be concluded to have a positive, negative or neutral influence on the residual risk presented by the external wall system. Once each risk factor is identified and its influence weighted the results are applied to a High, Medium, Low scale, with the base line set as the highest risk and each group effecting the position of the risk along said scale. Please see below illustration as an example.



Existing Fire Safety Features

General Construction

The property at Windsor House consists of properties 1 – 70 in a single block format with ground plus eleven floors.
Each floor contains six individual residential properties, with an electrical shut of accessed internally from the ground floor. Drawings plans show a dry riser inlet adjacent to the main entrance of the building, with a protected firefighting shaft centrally to the building.
FD30 doors are specified to all flat entrance doors, corridor doors and stair well access. The bin store is accessed internally from the ground floor.

Evacuation plan and escape.

No evacuation procedure has been provided. For the purpose of this report, it is assumed the building employs a defend in place (Stay put) policy requiring residents of un-effected properties to remain in their properties while the situation is managed by the authorities. As a result of this escape routes will need to be available for an extended period in line with the firefighting operations.
Automatic detectors/sounders/beacons and manual call points are present to all protected corridors and stair wells as part of the evacuation's routes. Sprinklers are installed to all properties and communal corridors and stair wells.
The design principles of this building are such that residents are expected to be safe in their own properties while a fire is fought at the point of origin, and an escape route will be available with firefighting assistance if required.
A dry riser inlet is present to the ground floor and a fireman's switch is installed to the lift controls to override the operations of the lift.

Building Environs

The building is situated in an individual plot with grass and public highway to the north, south and east elevations. To the west is car park an open area laid to grass. The carpark is approximately 2m from the external wall of the building.
A public hydrant is 40m from the building in a northwest direction.
The nearest fire station is less than 3 minutes away in reasonable traffic. It is expected that the fire service is able to attend in a reasonable time to tackle an occurrence.

External Wall Construction

External Wall type 1 – Render to EPS insulation with masonry construction

The existing double masonry wall construction observed is constructed as such that is exempt from cavity barrier requirements in line with approved document B. The retrofitted insulated render system to the external face of the masonry wall construction contains a combustible insulation product likely to contribute to the intensity of a fire. The render finish is a 7mm thick concrete based system of limited combustibility. The build-up generally is of 7mm render to 130mm EPS insulation and double masonry wall construction internally.
Effective fire barriers are evidenced to the floor level compartment lines adequately preventing the passage of fire and smoke. No barriers were observed to the party wall junctions. Vent penetrations appears to be lined with a plastic flue sufficiently to exhaust all gasses to atmosphere. The PVC windows appear to be set within the double masonry wall construction, with a rendered reveal externally encapsulating the EPS insulation.

General risk of fire spread across the external wall	Medium
Risk of fire entering the external wall system from an external or internal source	Low
Risk to building occupants from a fire effecting the external wall system	Low
Overall risk of this external wall system against PAS 9980: 2022 guidance	Medium

Fire engineers Comments

As the building was developed in 1968, it is anticipated that the relevant benchmark for fire safety standards at the time of construction would have been CP3 IV Part 1 (1962). This standard does not make comment on the fire performance of external wall materials. Fire performance of external wall materials did not come in to play until the implementation of the Building Act 1984. However, at this time the building construction was inherently safe, being represented by a masonry cavity wall and other non-combustible materials used on the external walls.

It appears that in 2014, additional works were commissioned to an install a rendered EPS system to the external wall façade. As is often the case with purpose built high-rise blocks of flats of that era, insulation was poor creating damp issues inside the flats, and the works were most likely commissioned to address this issue. The provision of additional materials would need to satisfy design guidance at the time of construction.

Paragraph 12.6 of ADB, 2006 (as amended) would not permit the provision of combustible insulation materials on buildings over 18m in height. In this regard, the insulation used on the rendered EPS system would not have satisfied design guidance at the time of installation, unless the wall system had successfully passed a BS 8414-1 test to the criteria of BR 135. No such evidence has been produced for review.

As horizontal fire breaks are provided, vertical fire spread will likely be contained at compartment floor level without rapid development beyond the fire floor such that the fire service resources deployed in the initial pre-determined attendance for high-rise residential would be overwhelmed in the early stages of a fire. If vertical fire breaks are not provided, then the risk of lateral fire spread will be heightened in contrast, although the risk is not perceived to be unacceptably high.

An additional issue is that the rendered EPS wall system starts at ground floor level, meaning that an external fire could spread directly to impinge on the EPS insulation materials. However, the building perimeter is set-back from the roadway meaning that the impact of a vehicle fire on the external walls of the building is low, although arson cannot be precluded. In such an event the risk of lateral fire spread is heighted. The risk of vertical fire spread is normal.

Although the insulation is shielded from either side, the 7mm thick cement based render would likely not satisfy the provisions for a 'thick' inorganic render described in section K.10 of PAS 9980. In this respect, it is unlikely that the risk rating would be neutral. As the EPS is applied directly onto the masonry substrate the risk of fire spread to the interior of the building by the wall configuration is not possible. As the façade openings sit inside the masonry cavity wall, fire spread is unlikely.

Secondary fires could originate above the fire floor from a flash-over fire inside a flat, although BR 135 demonstrates sufficient performance of horizontal fire breaks in rendered EPS wall systems. As such, vertical spread is not considered to present an unacceptable risk. As far as lateral fire spread is concerned, relevant guidance suggests that vertical fire breaks maybe required to provide fire compartmentalisation between adjoining rooms. The requirement and location of these fire breaks should meet Fire Officer/ Building Control specifications (BR 135: 2013).

Although this would not typically comply with the provisions set out in Diagram 33 of ADB, 2006 (as amended), it must be understood whether the absence of vertical fire breaks has arisen as a result of misinterpretation of relevant guidance by the installer or whether the design has been approved by building control. It must also be understood whether the system has passed a BS 8414-1 test. The provision of vertical fire breaks is reasonable but further investigation should confirm whether this is an approved system design and whether the actual risk outweighs the cost of the works and associated disruption to the building.

Remedial Action required:	Yes

Mineral wool-based cavity barriers required to compartment party wall junctions vertically.

External Wall type 2 – Spandrel Panel

The spandrel panels appear to be constructed from the pre-existing concrete infill system. The panels are formed from pre-cast concrete over the structural floor slab. There appears to be no cavity in the construction of these spandrel panels, and no combustible materials identified.

General risk of fire spread across the external wall	Low
Risk of fire entering the external wall system from an external or internal source	Low
Risk to building occupants from a fire effecting the external wall system	Low
Overall risk of this external wall system against PAS 9980: 2022 guidance	Low

Fire engineers Comments

There are no comments in respect of this wall system insofar as fire spread over the external walls is concerned. These materials would satisfy design guidance criteria contemporarily and comply with the functional requirements set out under Regulation B4 of the Building Regulations, 2010.

Remedial Action required:	**None**

Summary

The principal features of the external wall system at Windsor House do not present a significant risk of fire spread over the façade. The majority of the outer finishes consist of non-combustible cement based render providing an appropriate barrier against external fire source. The combustible polystyrene insulation is encapsulated with non-combustible materials to the external and internal surfaces though appears to be missing the correct compartmentation to party wall junctions.
No fire barriers were observed to the perimeter of the façade openings (windows, doors vents) however, the PVC windows and doors appears to be set within the internal concrete opening, with the external reveals finished in non-combustible render, and the internal reveals being a plaster board finish.

Access for attending emergency services is good from each roadside elevation, and to the east elevation access is present across the grass area. It is likely that the fire service would be able to deploy in an acceptable time, and that the firefighting provisions within the building are sufficient to provide an adequate response to a fire.

The external wall system as viewed in the sample locations within the external façade report appears to present an appropriate level of protection to suit a defend in place evacuation policy.

Fire Engineers Comments

The rendered EPS wall would not have satisfied design guidance criteria at the time of construction (circa 2014) unless the entire system had successfully passed a BS 8414-1 test to the criteria of BR 135. No such evidence has been produced for review. As such, it must be assumed that the absence of vertical fire breaks is as result of either a construction error or that the system as installed has been approved as built.

In any case, the risk of vertical fire spread is tolerable subject to the provision of adequately installed horizontal fire breaks. The risk of lateral fire spread is heightened due to the absence of vertical fire breaks.

Conclusion

Following the above fire risk appraisal of external walls, with supporting external façade report and intrusive investigations, it is our opinion that the overall risk presented to occupants by a fire effecting the external wall system is **Moderate**. As a result, our recommendations made in the first section are required to improve the residual risk to an appropriately low condition.

Report Disclaimer

This disclaimer governs the use of this report. (*By using this report, you accept this disclaimer in full*)

1. Credit

This disclaimer was created using an SEQ legal template.

2. No advice

The report contains information about cladding systems installed on your building and is prepared from visual inspection sand information provided by the managing agent at the time of the report. The information in this report does not offer any advice on further action and should not be treated as such.

[You must not rely on the information in the report as an alternative to [legal / financial / regulations] advice from an appropriately qualified professional. If you have any specific questions about any [legal / financial / regulations] matter you should consult an appropriately qualified professional.]

[You should never delay seeking legal advice, disregard legal advice, or commence or discontinue any legal action because of information in the report.]

3. No representations or warranties

To the maximum extent permitted by applicable law and subject to section 5 below, we exclude all representations, warranties, undertakings and guarantees relating to the report.

Without prejudice to the generality of the foregoing paragraph, we do not represent, warrant, undertake or guarantee:

- That the information in the report is correct, accurate, complete, or non-misleading.
- That the use of guidance in the report will lead to any particular outcome or result.

4. Limitations and exclusions of liability

The limitations and exclusions of liability set out in this section and elsewhere in this disclaimer are subject to section 5 below, and will govern all liabilities arising under the disclaimer or in relation to the report, including liabilities arising in contract, in tort (*including negligence*) and for breach of statutory duty.

We will not be liable to you in respect of anu losses arising out of any event or events beyond our reasonable control.

We will not be liable to you in respect of any business losses, including without limitation loss of or damage to profits, income, revenue, use, production, anticipated savings, business, contracts, commercial opportunities or good will.

We will not be liable to you in respect of any special, indirect or consequential loss or damage.

5. Exceptions

Nothing in this disclaimer shall; limit or exclude our liability for death or personal injury resulting from negligence, limit or exclude our liability for fraud or fraudulent misrepresentation, limit any of our liabilities in any way that is not permitted under applicable law, or exclude any of our liabilities that may not be excluded under applicable law.

6. Severability

If a section of this disclaimer is determined by any court or other competent authority to be unlawful and/or unenforceable, the other sections of this disclaimer continue in effect.

If any unlawful and/or unenforceable section would be lawful or enforceable if part of it were deleted, that part will be deemed to be deleted and the rest of the section will continue in effect.

7. Law and jurisdiction

This disclaimer will be governed by and construed in accordance with English law, and any disputes relating to this disclaimer will be subject to the exclusive jurisdiction of the courts of England and Wales.

8. Our Details

In this disclaimer "we" means (*and "us" and "our" refer to*) [Buildtech Consultants Limited], a company registered in [England and Wales] under registrations number [11670730].