EWS1 Report

463- 549D Lodge Lane Croydon

30th April 2021

Croydon Borough Council

12125BB

Revision History

Version	Date	Author	Comments
01	30/04/2021	John McLean	Initial issue to client

Document reference
12125BB

This document has been prepared by BB7 Fire Ltd for the sole use of our client (the "Client") and in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between BB7 Fire Ltd and the Client. Any information provided by third parties and referred to herein has not been checked or verified by BB7, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of BB7 Fire Ltd.

Prepared by

John McLean MSc MIFireE
johnmclean@bbseven.com
0203 603 5535

BB7 Fire Ltd
23 Star Hill
Rochester
Kent
ME1 1XF

Reviewed by

James Groves
MEng (Hons) CEng MIFireE
jamesgroves@bbseven.com
0203 603 5535

BB7 Fire Ltd
23 Star Hill
Rochester
Kent
ME1 1XF

Prepared for

Robert Hunt
0208 726 6000 (ext 62045)
Robert.Hunt2@croydon.gov.uk

The Mayor and Burgesses of the London Borough of Croydon
Bernard Weatherill House,
8 Mint Walk,
Croydon
CR0 1EA

Contents

1. Introduction 4

2. Building Description 5

3. LPS Construction 7

4. Assumptions, scope & liabilities 10
4.1 Scope 10
4.2 Limitations 10
4.3 Relevant Legislation & Guidance 10

5. EWS1 Assessment Scheme 11
5.1 Requirements 11
5.2 Mechanism for Fire spread 11

6. Survey findings 13
6.1 Survey 13
6.2 Location 1 14
6.3 Location 2 16
6.4 Internal Survey 20
6.5 Fire Risk Assessment 25

7. Fire Service Access & Facilities 26

8. Analysis 28
8.1 Overview 28
8.2 Background issues 28
8.3 System Analysis 32

9. Conclusions and recommendations 34
8.2.1 Interim recommendations 34

1. Introduction

BB7 have been appointed to conduct an intrusive survey and provide a comprehensive report forming an EWS1 assessment for the block 463 to 549 Lodge Lane, Croydon, known as 463 Lodge Lane.

This report outlines BB7's intrusive survey findings, analysis of the external wall systems, and conclusions. BB7 intrusively surveyed the building on 30th March 2021; the survey was conducted by John McLean.

The full building description is found in Section 2 of this report.

Figure 1. Block prior to cladding circa 1988

Figure 2. Block overclad. Taken March 2021

This document and the associated EWS1 form are only applicable to 463 to 549 Lodge Lane Croydon. Please note that this document and associated EWS1 form is valid for a period not exceeding 5 years. In accordance with Note 03 of the EWS1 form, this report and the associated EWS1 form have been reviewed by a chartered registrant with the Engineering Council UK (Chartered Engineer) who is registered through the Institution of Fire Engineering.

In reviewing and applying their signature to these documents the Chartered Engineer is verifying that, although they may not have attended site in person, they agree that the inspection was carried out by a suitably experienced engineer and they agree with the assessment and outcome.

2. Building Description

The buildings consist of Lower ground, ground and eleven upper storeys and is served by a single stair core. The residential accommodation is housed from the ground to eleventh floor with storage and plant on the lower ground floor. There is also a bin chute that runs the height of the building accessible from the residential lobby discharging into a ground floor bin store, a standalone single sprinkler head is fixed to the wall near the wheelie bin, the quartzoid bulb is coloured red indicating actuation at 68°C. A spring loaded shutter held open by a fusible link is positioned at the base of the chute. The building is provided with sprinkler protection, which by tracing pipework indicates that it covers the flats only and appears to correspond to the provisions of BS: 9251. However, without entering the flats or seeing a specification document this cannot be confirmed. Stop valves are positioned (in secure cupboards) in the lobby of each floor.

The single stair core is separated from common area by Georgian wire glass partitioning, and part glazed fire door, although the doors appear original, they have been upgraded at some point by the addition of intumescent strips and seals. There is no ventilation at the head of the stair. Purpose built block of this age were designed and built using guidance contained in the document as *British Standards Code of Practice CP3: Chapter 1V (1962)* which would have incorporated a PV and the head of the stairs. This issue was noted in the latest fire risk assessment document. Exit signage directs occupants back through the ground floor lobby which goes against the principle that once the stair is entered occupants should not have to re-enter the comparatively higher risk of the flat lobby area. It is likely a route through the lower ground floor corridor was designed as the original escape route.

Smoke detection in each lobby is designed to operate automatic opening vents (AOVs) these are formed from adapted windows, there is no audible alarm. A Fireman's lift is installed to facilitate access to the upper floors and the use of the dry rising main outlets positioned in each lobby.

There are 44 dwellings provided as general needs housing and therefore has no special features to help with those with mobility or other special needs. There are two lifts one which serves odd numbered floors and the other serving even floors.

The building was built by Wates and completed in 1965 at the same time as a its sister block, 551-637D Lodge Lane; the original construction was a large panel system, details this style of construction is noted in Section 3 of this report. The obvious features of the original construction have been obscured by the addition of the aluminium cassette panel system consisting of mineral wool sheets held by grommets screwed into the concreted panels and covered by aluminium panels which are hung from a rail system also affixed to the original façade. It is believed that this work was carried out in the mid to late 1990s.

The Fire Service access complies with guidance on in respect of internal firefighting, essentially this involves the provision of a dry rising main with fire appliance access to within 18m on the ground floor inlet. Dry riser outlets are provided to alternate floors with the inlet to the ground floor flat lobby. This statutory access does not include provisions in respect of fighting a fire on the external faces. Although the height of fire service arial appliance is around 28m to 30m access roads are not designed to allow for operations to all parts of the elevations, although the application of effective jets would be possible.

Figure 3 shows a site plan of building demonstrating the location of the buildings and the boundary formed by the surrounding streets.

Figure 3. Ariel view of the development

Since the building was constructed, the façade from first to roof level has been overclad with an aluminium cassette panel system. Mineral wool insulation has been fixed directly onto the original external walls. A ventilated cavity exists between the insulation and the aluminium cassette panels. It is understood that the aluminium cladding was installed in the late 1990s. There are no private balconies.

3. LPS Construction

Large Panel System (LPS) construction is a form of construction where large storey height pre-cast Reinforced Concrete panels are assembled together on site to form the buildings' structure, this was a very popular method of construction for council housing in the 1960's and 1970's made infamous by the Ronan point collapse in May 1968 following a gas explosion. LPS buildings can be designed to be up to 24 storeys, but 463 Lodge Lane House is substantially lower than this.

Figure 4. Ronan point collapse

The Ronan point collapse was caused by a gas explosion on a mid-level floor. The explosion dislodged loadbearing panels which triggered a disproportionate collapse. This report does not consider collapse mechanisms under Approved Document A; such an assessment should be carried out by a structural engineer. Croydon Council should satisfy themselves that the structural health of the building is not a risk to life safety during a fire event. Furthermore, it has not been possible to determine the insulation present inside external wall panels, and as such it cannot be determined whether a deflagration event could occur. It was typical for the blowing agent to be Pentane in the 60's and 70's. This report therefore does not consider deflagration risks as this would need to be determined by a DSEAR expert.

There are many types of LPS construction, and it is not possible to definitively state which type of structure was used; however, it is known that 463 Lodge Lane House was constructed by Wates in the mid 1960's. A large number of LPS buildings were based on the Bison method of construction. Typically, the external walls of LPS buildings are similar to that shown in the figure below and correspond to the site findings.

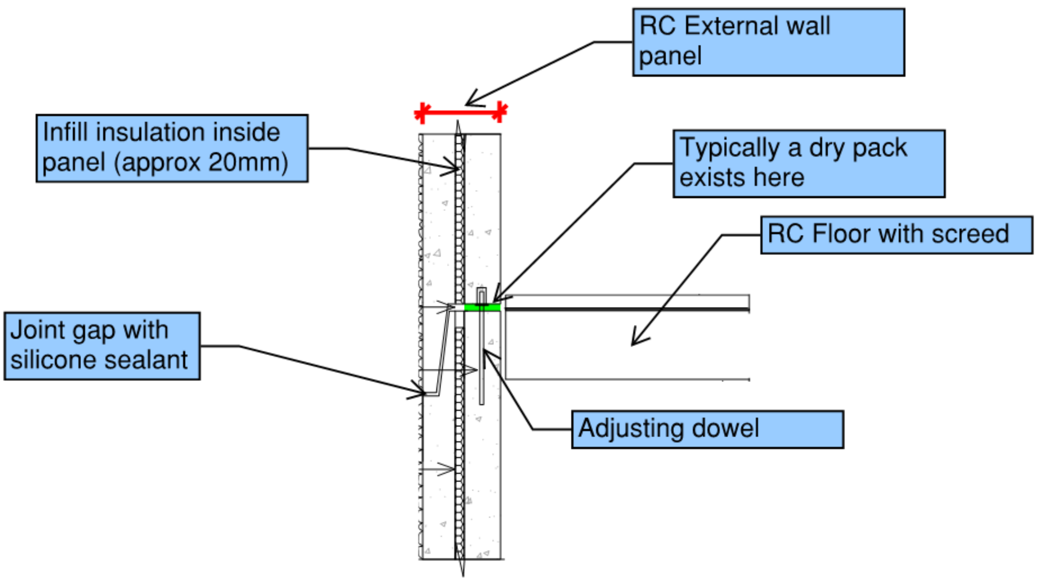


Figure 5. Typical composition of external walls

It can be seen that there is a thin insulation layer within the panel itself and there is a path to this cavity from outside at the joint gap. This insulation is typically a form of EPS or XPS which is a highly combustible substance, however, it is encapsulated between two >100mm leaves of RC which means it is offered a significant degree of protection. The cavity in which the insulation exists is generally 20mm wide, but this can very across the different manufacturers. Based on making drill holes at the building it was found that the cavity was within the 20-25mm range. There is a route for fire spread via the joint between panels, the silicone sealant used is of a substantial volume and will offer some fire resistance into the panel system, however, a period of time cannot be determined. Typically, a dry pack is present which aids in preventing fire re-entry into the building.

Whilst there is a risk of fire making its way to this zone, the risk is substantially lowered by the 100mm layer of mineral wool insulation which has been provided as part of the re-cladding works. On that basis the combustible insulant in the structural panel itself has been largely not considered as part of this report. Due to the location of the insulant, it is not likely to contribute to uncontrolled fire spread. Furthermore, if fire did reach the insulation the rate of fire spread in this cavity would be likely low on the basis that the cavity has a small width and will not entrain air to any great degree, and the fire would need sufficiently make its way through the insulation to spread which would take time to accomplish. On that basis it is considered reasonable to omit this layer of insulant from the main risk assessment, however, it will still be acknowledged to exist.

Due to the different types of structural wall present in LPS buildings (i.e. flank wall, side wall, etc) there are panels of different styles which have been noted. Typically, most panels are the same as that noted in Figure 2, the difference of note is the coarseness of the facing material. The other system that exists commonly is a facing brickwork system. The exact method of construction is not known, however, from investigations it is clear that a cavity exists between the brick work and the substrate behind. Again, there are multiple types of construction method that could be employed here, so assumptions based on common practice have been made as part of this assessment.

Similar to the method shown in Figure 6 there are a number of instances where the facing brick work is supported with an RC upstand/downstand. The residual cavity formed is similar to that shown in Figure 7.

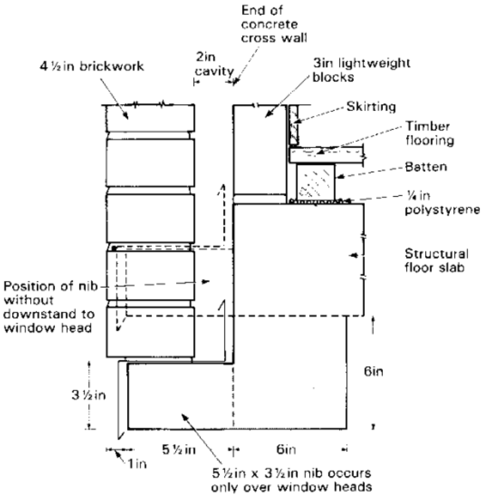


Figure 6. Typical brick on RC downstand

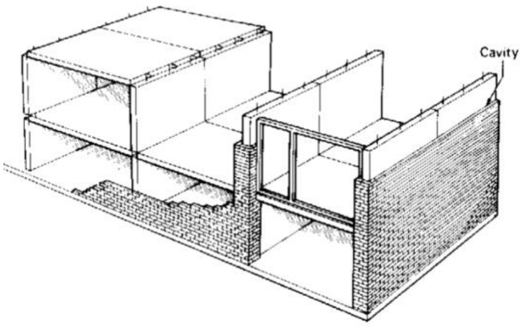


Figure 7. Typical brick façade to LPS

A cavity is typically formed between the facing brick work and the RC structure/block work substrate. Based on drill hole surveys this cavity was found to exist., but it could not be determined whether insulation exists in this cavity.

Typically, cavity barriers can be omitted from cavities formed between two layers of masonry which are >75mm thick, and the guidance has historically allowed for combustible insulation to be present in such cavities. This is due to the fact that masonry is dense, inert, robust and non-combustible and is very unlikely to contribute to uncontrolled fire spread. As per the rest of the wall system the brick work is situated by c. 100mm mineral wool insulation which will offer a high degree of protection. On that basis it is considered reasonable to omit the areas behind the facing brick work from the risk assessment, however, the presence will still be acknowledged.

4. Assumptions, scope & liabilities

4.1 Scope

This report is based on the information provided by Croydon Borough Council. The scope was to review the building and the product will be an EWS1 form and accompanying report. Please note that this report and the EWS1 form issued will only apply to the buildings specifically noted in Section 1 of this report.

Under the EWS1 process, the building may require remedial works before it is satisfactory. As part of this scope, we will provide a completed EWS1 form for the building, which is designed to satisfy lenders.

We cannot guarantee that lenders will be satisfied with the EWS1 form but this form has been agreed by many lenders and, as far as we are aware, is the only system available for this purpose.

The EWS1 form has been coordinated by RICS and supported by MHCLG in principle.

4.2 Limitations

This review is for the sole and exclusive use by Croydon Borough Council in relation to the buildings noted in Section 1 of this report only.

This review considers the combustibility and risks of external fire spread via the external walls only, and does not endorse any other elements of the design such as alarm, suppression, structural protection, etc.

In the site survey a reasonable sample of locations were reviewed. We can only base the findings of our report on the sample information gathered during these site surveys.

4.3 Relevant Legislation & Guidance

The decision was taken by the client that the building will be subject to an assessment to quantify the risk posed by the wall materials to residents with respect to health and safety.

As part of the UK Government approach to fire safety since the Grenfell Tower fire, information has been supplied to building owners, particularly those who own and manage multi-storey residential buildings. Most recently, a document entitled '*Advice for building owners of multi-storey, multi-occupied residential buildings, (2020)*' provided advice for multi-storey buildings of any height.

As part of that guidance, it states that, the Requirement B4 is clear and requires that "*the external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and location of the building. The need to assess and manage the risk of fire spread applies to buildings of any height*".

5. EWS1 Assessment Scheme

5.1 Requirements

Irrespective of the application of regulation to existing buildings and those under construction, valuations for residential apartments in a block now seek confirmation of compliance with the limitations in the use of combustible materials.

As it is not possible to verify this in a majority of existing premises a scheme has been devised in conjunction with the Building Societies Association and UK Finance to include an inspection and assessment option on the relative risk in case of fire.

In summary, the concept is for a technically competent engineering professional to inspect or otherwise ascertain the material used and construction of the external walling types and associated attachments. Subject to the findings of the inspection and the combustibility of the materials, options are available to assess whether it is considered to present an unacceptable level of risk and if remedial action is necessary.

Dependent on the outcome the following reports and documents will be required:

- A1 – EWS1 form completed with A1 confirmed plus inspection report.
- A2 – EWS1 form completed with A2 confirmed plus report of assessment and conclusions regarding acceptable risk.
- A3 – EWS1 form completed with A3 confirmed plus report of assessment and conclusions regarding unacceptable risk plus report giving remedial and interim measures.
- B1 – EWS1 form completed with B1 confirmed plus report of assessment and conclusions regarding acceptable risk.
- B2 – EWS1 form completed with B2 confirmed plus report of assessment and conclusions regarding unacceptable risk plus report giving remedial and interim measures.

An EWS1 form is primarily intended for buildings where the highest floor is greater than 18m above ground level, or where there are reasons where a higher risk is associated with the building type; e.g., care homes etc. This building is in scope as it is >18m in height.

5.2 Mechanism for Fire spread

When reviewing a building with combustible products on the façade, the EWS1 form asks for the following to be considered in accordance with note 9 of the aforementioned (as detailed under the scope section 1.2 of this document.)

There is obviously some subjectivity as to exactly how to apply these requirements and further uncertainty as to how a particular wall build up or a wall with multiple build ups will behave in a fire.

BR 135 describes the mechanism for fire spread in Figure 03 of the document. This is illustrated in the figure below of this document.

This details that it is possible for fire to spread even on a building with a non-combustible façade via the windows. This mechanism is called restricted fire spread because fire may spread to the apartment above but it would then need to grow and develop before breaking out again to spread to the apartment above. This is described in BR 135 as follows:

"Following the initiation of a fire inside the building, if no intervention occurs, the fire may develop and break out from the room of origin through a window opening or doorway . Flames breaking out of a building from a post-flashover fire will typically extend 2m above the top of the opening prior to any involvement of the external face, and this is therefore independent of the material used to construct the outer face of the building envelope.

This form of fire spread should be feasible for the fire service to extinghuish and prevent it from spreading.

Rapid fire spread may be due to combustible materails which form part of the external wall build up or via fire spread within the cavity.

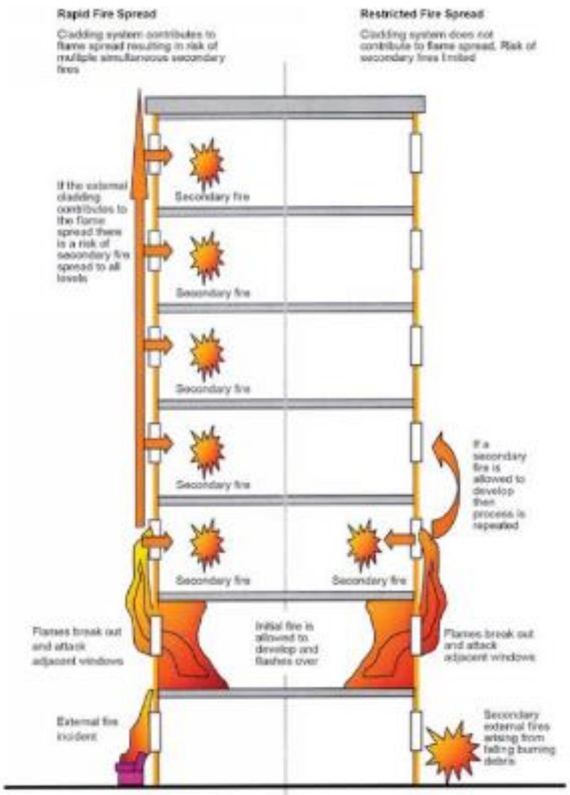


Figure 8. Mechanism for fire spread

When considering the requirements of the EWS1 form, the most probable prediction is made of the most possible worst reasonable case is reviewed against this criteria.

Then factors such as the height of buildling, the number of stairs, the provision of fire service access, the passive and active measures, are reviewed to evalulate the risk.

This is detailed in Section 9: External wall analysis.

6. Survey findings

6.1 Survey

BB7 intrusively surveyed the building on 30th March 2021. The survey was conducted by John McLean. BB7 had pre-determined multiple survey locations on the building to maximise the findings of the visit and provide a representative sample, these were specified at compartment lines and around openings to ensure that cavity barriers were provided in their respective locations.

The locations were agreed with the contractor ahead of the survey. BB7 surveyed 8 locations across the building.

When surveying buildings from a fire safety perspective, confirming the existence of issues over several areas is key to ensuring a reliable survey. The number of survey points were specified so that any issues could be confirmed where found or could be proven as a "one off" if only found once. The number of locations surveyed was intended to provide reliability in the findings.

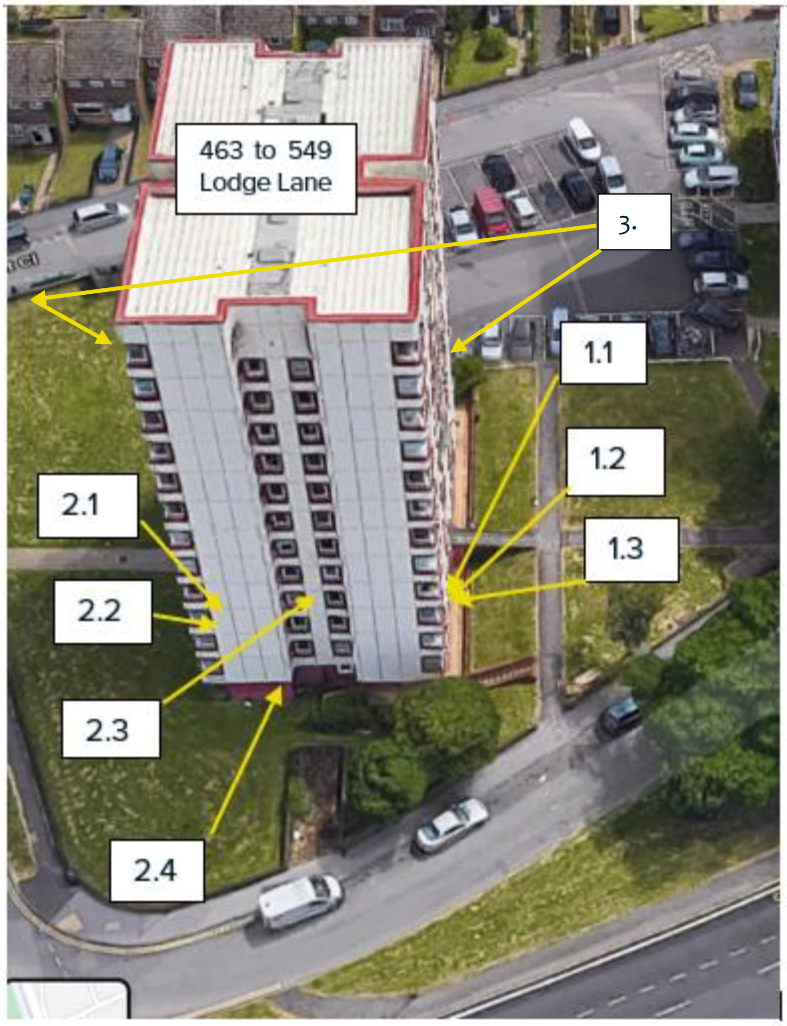


Figure 9. Locations of areas inspected

6.2 Location 1

Location 1 on the South elevation at second and third floor levels.

The system was found to be:

- 5mm solid aluminium cassette panel attached to aluminium rail system.
- 100mm horizontal (floor level) and vertical (party wall) high density mineral wool cavity barrier. The expectation is that cavity barriers should be in place which are aligned with compartment floors within the building, these were not in place in some locations.
- 60-70mm clear cavity.
- 110mm mineral wool insulation with metal fixings.
- >100mm solid concrete. A hole was drilled through the concrete to determine the thickness; however, it could not be further determined what was behind the concrete without potentially compromising the integrity of the structure and causing damage internally. Please refer to Section 3 for further details.

The same build up was identified at each of the following locations, however, they have been separated into four for the review.

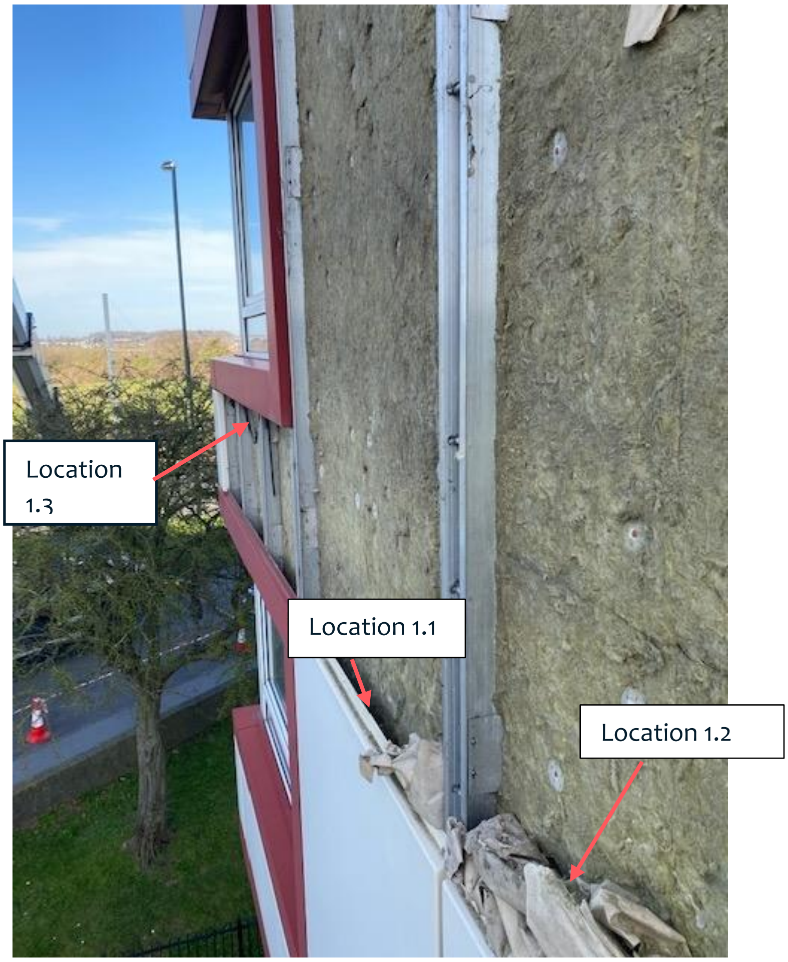


Figure 10. Location 1 areas inspected

Location 1.1

The photo taken before the building was clad helps to identify the line of the compartment floor as shown by the lighter strips on the image of the flats taken before the building was overclad. There is an expectation that where over cladding is carried out cavity barriers are put in place to inhibit fire spread over the façade of the building. These should be fitted in line with the compartment floors and walls inside which are in place to facilitate the stay put strategy. Figure 12 shows the gap between the insulation and the outer panels which should have been infilled. Clearly this is not the result of any form damage or collapse, simply that the barriers were not fitted at the time when the cladding was fitted.

Figure 11. Location 1.1 - Compartment floor lines can be seen, showing as pale lines running laterally above the windows.

Figure 12. Location 1.1 - Showing the gap between the panelling and insulation, where the cavity barrier should be.

Location 1.2

The building paper has come away from the face of the mineral wool sheets to which it was originally attached and has subsequently gathered on the horizontal rails of the framing system. It should be noted that the paper is resting on the edge of the panel and not a cavity barrier which was also missing from this location.

Figure 13. Location 1.2 – Membrane fallen away from the insulation

Location 1.3

Location 1.2 Showing the second floor window surround. It was not possible to identify if there were cavity barriers in place as it was not possible for the operatives to remove the surrounding panels without fear of damaging the rail system. from the restricted view it appeared that cavity barriers were not provided, and this would be in line with the other buildings surveyed. The 1992 version of Approved Document B did not require barriers around openings, so it is likely that no barriers have been provided.

Figure 14. Location 1.3 - looking up showing that there is no cavity barrier surrounding the window

6.3 Location 2

Location 2 was on the West elevation.

The system was found to be:

- 5mm solid aluminium cassette panel attached to aluminium rail system.
- 100mm horizontal (floor level) and vertical (party wall) high density mineral wool cavity barrier. The expectation is that cavity barriers should be in place which are aligned with compartment floors within the building, these were not in place in some locations.

- 60-70mm clear cavity.
- 110mm mineral wool insulation with metal fixings.
- 100mm masonry. A hole was drilled through the masonry to determine the thickness; however, it could not be further determined what was behind without potentially compromising the integrity of the structure and causing damage internally.

Figure 15. Location 2 areas inspected The green lines indicate internal compartment lines.

Location 2.1

Location 2.1 was on the second floor and two panels between windows were removed. building. There is an expectation that where over cladding is carried out cavity barriers are put in place to inhibit fire spread over the façade of the building. These should be fitted in line with the compartment floors and walls inside which are in place to facilitate the stay put strategy, in addition to satisfy the functional requirement of the Building Regulations which states that the building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.

Figure 16. Location 2.1 Missing cavity barrier.

Location 2.2

Shows the cavity barrier in line with the compartment floor, although the insulating material is broken by a vertical rail used affix the aluminium panels the method by which the panels are hung creates closure ensuring a continuous horizontal barrier. The horizontal barrier appears to be an off cut of insulation rather than an intended cavity barrier product. The barrier is not under compression to the rear of the panel, as such it will not inhibit fire and smoke spread.

Figure 17. Location 2.2

Figure 18. Cavity barrier

Location 2.3

A single panel was removed in line with the partition between two flats. In addition to the lateral barriers that should be in place with the compartment floors, vertical barriers are required to align with the flat boundary walls. Each flat consists of a 60 minute 'box' the boundaries of which are required to be followed, by the cavity barriers incorporated in the over cladding. figures 19 indicates where a vertical barrier should be. Figure 20 clearly shows no barrier in place, the impact of this is an increase chance of lateral fire spread on via the external façade.

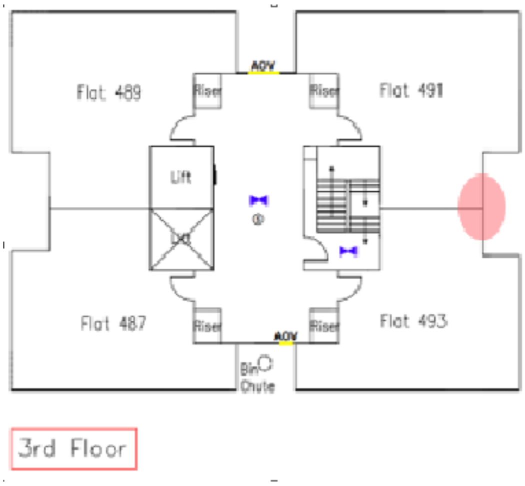


Figure 19. Location 2.3 Identified as the wall between flats 491 and 493

Figure 20. Location 2.3 the equivalent area is shown on the outside of the building. No vertical cavity barrier is in place.

Location 2.4

The external face has not been overclad with insulating material, the paint, which was colour matched to parts of the cladding has been directly applied to the original concrete surface. Figures 23 and 24 show the other faces of the building without the addition of insulating panels.

Figure 21. Location 2.4 refers to the ground floor external walls

Figure 22. Location 2.4. Close up showing the lightning protection strip

affixed to the original outside façade of the building

Location 3

The external face of the stair enclosure on the south face is formed by glazed panels. The internal faces of the of the chute recess are clad in the same material as the rest of the building. The glazing forms a major part of the face, there are no infill panels.

Figure 23. The external face of the stair enclosure on the south face.

Figure 24. The internal faces of the of the chute recess. Major part of the face, there are no infill panels.

6.4 Internal Survey

The common areas in 463 Lodge Lane House were reviewed internally on a selection of typical levels to understand if there are any factors internally which would impact on the external wall.

The single stair core separated from common area by Georgian wire glass partition, and part glazed fire door, although the doors appear original, they have been upgraded at some point by the addition of intumescent strips and seals. There is no ventilation at the head of the stair. This is unlikely to have been the case when the building was constructed, a hatch is now in place in what may have been a permanent vent (PV). The original design code in force at the time of construction was CP3, this would have recommended a PV at the head of the stairs. **It is recommended that the PV is reinstated at the head of the stair.**

The flats open into a lobby with ventilation via an AOV. It is presumed that the AOV works on detection which was identified in the lobby. There were also service risers located in the lobby with 'Masterboard with Intumescent sealant' fire stopping provided to service penetrations, however, there were some issues identified, including poor fire stopping around cable penetrations. The sprinkler stop valve is housed in as secure cupboard located in the lobby and the sprinkler the tank is located in the roof plant room, fire stopping to the pipework where it passes through compartment floor is suitable.

Figure 25. AFD in place to operate the AOV in the lobby

Figure 26. Partition between the flat lobby and stair

There were service risers in the protected stair. The majority were provided with 'Masterboard with Intumescent sealant' fire stopping and, although the stair should be kept sterile and remain free of fire load, the riser is not considered to prevent a significant risk.

The flat entrance doors (FEDs) were of more than one type suggesting that tenants may have replaced them themselves, however due to covid restrictions no attempt was made to make contact occupants in a bid to ask them to open the doors for further in inspection and therefore no further comment can be made. The doors between the stair and lobbies are part glazed and have been upgraded at some point by the addition of intumescent strips and seals, this is in line the Purpose built blocks guide which allows for upgrade if there is a lobby between the stair and FEDs.

Figure 27. View of Masterboard

Figure 28. Location 2.4. Close up showing where the sprinkler pipe passes through the compartment floor.

The rubbish chute hoppers are located in the flat lobbies, there is no separate lobby access, however, the provision of AOVs in the flat lobby is deemed as suitable compensation for the lack of protection at each level.

In the refuse store at ground level a standalone single sprinkler head is fixed to the wall near the wheelie bin, it is activated when the quartzoid is burst by heat; the bulb is coloured red indicating actuation at 68°C. A spring loaded shutter held open by a fusible link is positioned at the base of the chute, the bin store on the ground floor directly accessed from the outside at ground floor level. The sloping site has facilitated a lower ground floor which is accessed directly from the stair. It is likely that this was the original final part of the escape route, now however signage directs occupants back through the ground floor lobby which goes against the principle that once the stair is entered occupants should not have to re-enter the comparatively higher risk of the flat lobby area. It is recommended that the exit signage is changed to indicate the route from the base of the stairs passes through the lower ground floor and not the ground floor lobby. This change will require that the door that currently used to prevent access to that route is opened for escape purposes.

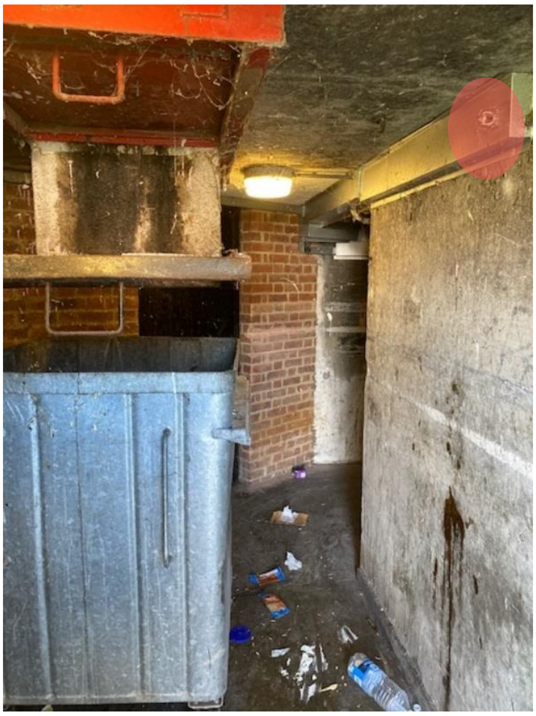


Figure 29. Showing sprinkler head (highlighted) and the spring loaded fire shutter over the wheelie bin

Figure 30. Typical bin chute hopper. An AOV can be seen to the top left.

Figure 31. Showing the rubbish chute on the north face of the building

Figure 32. The internal faces of the of the chute recess are clad in the same material as the rest of the building.

The internal faces of the bin chute recess are clad in the same material as the rest of the building, spandrel panels are glazed. This combination offers very low risk of fire spread of its surface.

Dry riser outlets are provided to alternate floors. The intake is to the flat lobby at ground floor level.

Despite the plethora of signage storage combustible storage is being stored in the stairs and lobbies.

Figure 33. In the 5th floor stair

Figure 34. In the 5th floor lobby.

6.5 Fire Risk Assessment

The following information has been provided:

- 463 Lodge Lane House FRA 2019
- Fire Risk Assessment REF. RB-XX1UI1 GENERATED 11/02/2020 14:26
- The following provides a review of the documents and the information provided represents that found in the reports. This was to gain additional understanding of the building and potential risk but does not endorse or influence the findings of the documents. The FRA suggesting that there were area(s) of concern requiring essential action to be taken to reduce the risk.

Ridge & Partners LLP

A Type 4 FRA dated 25th October 2019 was conducted by Ridge and Partners LLP. The overall risk rating determined is provided in the following figure.

FIRE RISK RATING

LIKELIHOOD **MEDIUM**	SEVERITY **EXTREME HARM**	RISK **SUBSTANTIAL**
Normal fire hazards for this type of occupancy, with fire hazards generally subject to appropriate controls (other than minor shortcomings).	Significant potential for serious injury or death of one or more occupants. Includes high dependency occupants such as a care home or properties with poor compartmentation.	Considerable resources might have to be allocated to reduce the risk. Improvements should be undertaken urgently.

Figure 35. Fire Risk Rating from Ridge & Partners LLP FRA

This rating was based on the assessment findings which were that there was generally poor housekeeping, with some storage in the stair lobby, and there were issues with compartmentation and fire stopping identified. Additionally, although ventilation was identified in the stair and lobby, it could not be confirmed how these operated.

Summary

There are high-risk items detailed in the Type 1 & Type 4 FRA and these should be actioned to reduce the risk.

The findings of the FRA align with the findings of the internal walk round carried out; however, it was not part of the scope of this assessment to review in detail.

It was noted that there were a number of action stating the doors should be rehung or replaced door to close gap between the door and the threshold to a maximum MEDIUM TERM of 3mm (or as close as reasonably practicable) and to between 2 to 4mm between the door and frame. These are very tight tolerances for existing doors and are generally applied to new doorsets, a more appropriate working gap is 5mm.

7. Fire Service Access & Facilities

External provisions

This section has been added to demonstrate the access for a fire appliance to each elevation to fight a fire, statutory access does not include provisions in respect of fighting a fire on the external faces. Although the height of fire service arial appliance is around 28m to 30m access roads are not designed to allow for rescue operations to all parts of the elevations, there is likely to be sufficient access to provide a reasonable application of water to the elevations.

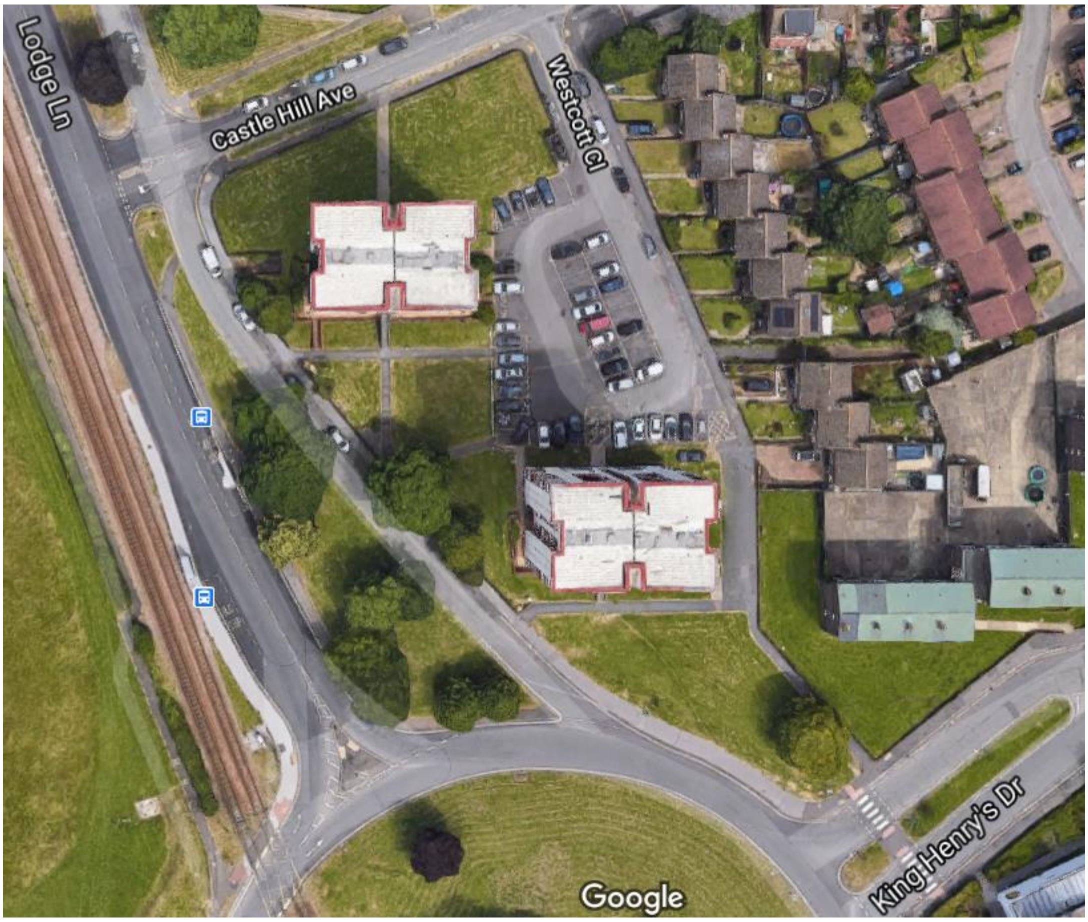


Figure 36. Site Plan

The buildings are bounded on three sides by Lodge Lane, Castle Hill Avenue, and the car park access from Westcott Close.

This is considered to provide good Fire Service access within sufficient proximity to many of the elevations on the development.

From Penge Road, the Fire Service can reach the front within 18m and the car park provides access to the rear within 18m.

Where access cannot be achieved by an appliance directly to the façade, there are pedestrianized routes with paved pathways which would enable them to reach the façade and apply water without delay.

Internal Provisions

There are dry riser outlets provided on alternat floors levels within the lobby serving the stair. The riser inlet is provided in the lobby on the ground floor.

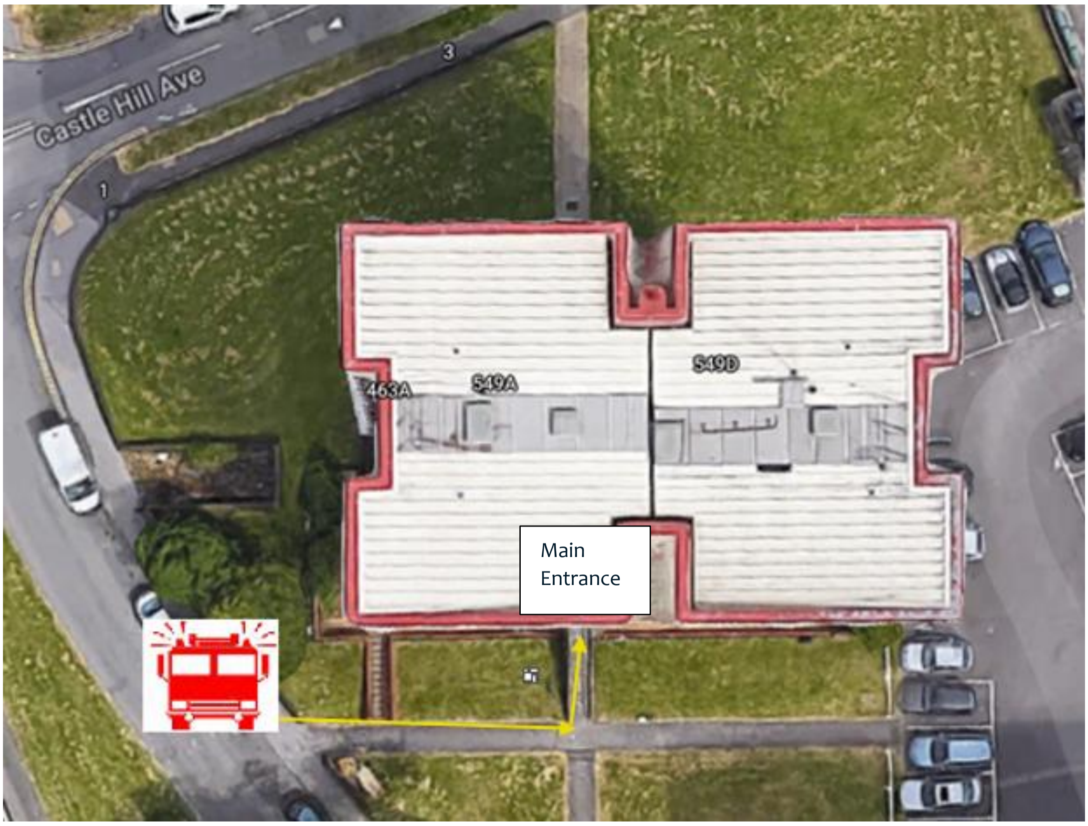


Figure 37. Site Plan showing access route to the dry riser inlet.

The building is provided with a 'fireman's lift' which does not have the overall protections of a 'firefighting lift' however firefighting operations over the years have evolved to make best the best use of these facilities and as a result will be used by the fire service in the event of a fire. The stairs are approx. 1100mm, which is sufficient width for a firefighting stair.

The building is also provided with sprinkler protection which appeared to be fitted into each flat which is likely to reduce the potential fire size and spread. Isolating valves are located at each floor level, allowing the fire service to turn off the sprinklers immediately prior to crews entering the fire compartment.

8. Analysis

8.1 Overview

There were two systems present due to the original construction and the overcladding;

1. Original LPS external walls.
2. Aluminium cladding.

Analysis of the build-up behind the original concrete construction was not carried out on site as removing large panels could be potentially damaging to the building

The cladding system was found to be:

- 5mm solid aluminium cassette panel attached to aluminium rail system.
- 100mm horizontal (floor level) and vertical (party wall) high density mineral wool cavity barrier. The expectation is that cavity barriers should be in place which are aligned with compartment floors within the building, these were not in place in some locations. These were only found in one location only.
- 60-70mm clear cavity.
- 110mm mineral wool insulation with metal fixings.
- 100mm solid concrete / masonry. A hole was drilled through to determine the thickness; however, it could not be further determined what was behind without potentially compromising the integrity of the structure and causing damage internally. However, the construction methods are likely to correspond with the methods detailed in section 3.

8.2 Background issues

There are some items which should be addressed before the analysis of each system, these items will feed into each analysis.

Large Panel System (Original build)

The existing large panel system (LPS) was not reviewed in any detail as an intrusive survey could damage the integrity of the structure or cause damage internally to the building. However photographic evidence from the image taken in 1988 shows the facades which bear a significant resemblance to the outside faces of Ronan Point and therefore indicating that the LPS system was used to construct the block.

Small holes were drilled from external to establish the thickness of the structure but that was the extent of the review.

LPS construction was a popular method of building high rise flats in the 1960s and 1970s as it could be manufactured remotely and assembled on site. Significantly speeding up the build.

The system is essentially a method of construction in which walls, floors and ceilings, called panels, are produced in factories and then put together on site.

This type of construction is known to cause concern as the structural design is considered to be weak and there are frequently gaps between floor and wall panels. There is considered to be an increased risk if the blocks have gas in them. The annual probability of occurrence of these hazards was found to be very small.

The risk of the limited amount of combustible insulation is considered to be low due to the robustness offered by the RC.

Many LPS buildings have been overclad due to inadequate weathertightness and deterioration along with the intent to improve thermal insulation and appearance. This can also create problems if the over cladding system is not installed adequately with appropriate cavity barriers, etc.

Although there was a gap above the window with no fire stopping or cavity barrier, it is not considered to be a route for fire uncontrolled fire spread given that the concrete and the cladding insulation is non-combustible. Although there is an inherent risk from this type of construction, it is not considered to contribute to the risk of external fire spread.

Building Regulations at the time of the over cladding work did not require cavity barrier around and the regs are not retrospectively enforceable. From an EWS1 perspective the lack of barriers around the windows would be acceptable providing compression barriers at compartment floor lines were in place at compartment floor levels. These were found to be missing in more than one location, an issue that will these will need to be resolved in order for

Cavity barriers

Based on the contractor's knowledge of the building the re-clad occurred in the mid-late 90's, it is likely that the cladding system would be designed to Approved Document B: 1992 (ADB). Section 9 of ADB 1992 requires that cavity barriers should be provided at compartment floors and walls, the period of fire resistance which should be achieved by products are:

- Cavity barrier – 30 minutes integrity and 15 minutes insulation; and
- Fire barrier (i.e. fire stopping) – the integrity and insulation time should be the same as the fire resistance time for the compartment it serves in line with compartment floors only evidenced by Diagram 27 and Table 13

Diagram 27 and Table 13 of ADB: 1992 provide the guidance requirements for the placement of cavity barriers. Diagrams 39 and 40 below show the requirements at the time of construction, and that no cavity barriers are required around openings.

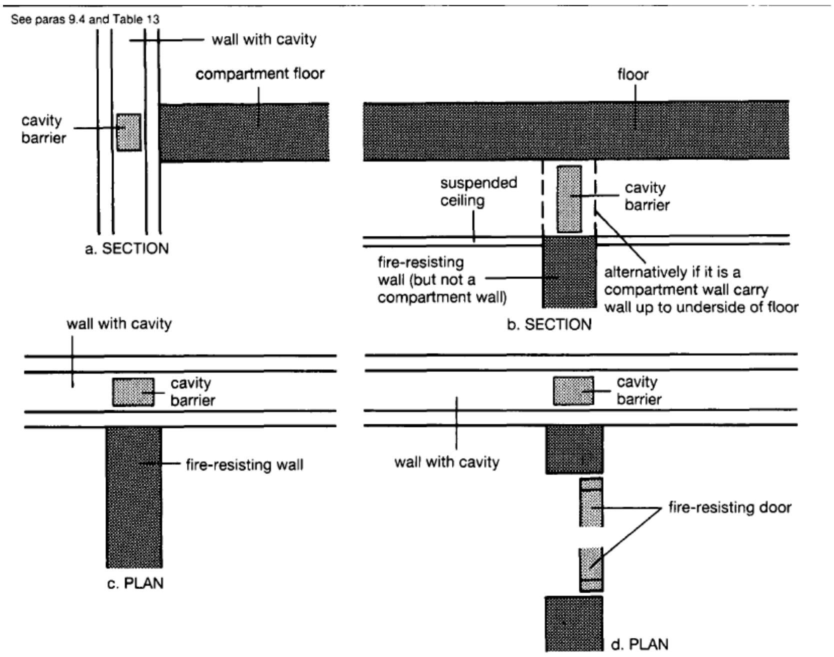


Figure 1. Diagram 27 ADB1992

B3

Openings in cavity barriers

9.14 Any openings in a cavity barrier should be limited to those for:

a. doors which have at least 30 minutes fire resistance (see Appendix B, Table B1, item 8(a)) and are fitted in accordance with the provisions of Appendix B;

b. the passage of pipes which meet the provisions in Section 10;

c. the passage of cables or conduits containing one or more cables;

d. openings fitted with a suitably mounted automatic fire shutter; and

e. ducts which (unless they are fire-resisting) are fitted with a suitably mounted automatic fire shutter where they pass through the cavity barrier.

Table 13 **Provision of cavity barriers**

Cavity barriers to be provided:	Purpose group to which the provision applies(3) 1b & c dwelling houses	1a Flat or maisonette	2 Other residential and institutional	3-7 Office, shop & commercial, assembly & recreation, industrial, storage & other non-residential
1. At the junction between an external cavity wall, which does not comply with Diagram 28, and a compartment wall that separates buildings; and at the top of such an external cavity wall.	x	x	x	x
2. Above the enclosures to a protected stairway in a house of three or more storeys (see Diagram 29a). (1)	x	-	-	-
3. At the junction between an external cavity wall which does not comply with Diagram 28, and every compartment floor and compartment wall.	-	x	x	x
4. At the junction between a cavity wall which does not comply with Diagram 28 and every compartment floor, compartment wall, or other wall or door assembly which forms a fire resisting barrier.	-	x	x	x
5. In a protected escape route, above any fire resisting construction which is not carried full storey height, or (in the case of a top storey) to the underside of the roof covering.(1)	-	x	x	x
6. Above any bedroom partitions which are not carried full storey height, or (in the case of the top storey) to the underside of the roof covering.(1)	-	-	x	-
7. Above any corridor enclosures which are not carried full storey height, or (in the case of the top storey) to the underside of the roof covering, where the corridor (which is not a protected corridor) should be sub-divided to prevent fire or smoke affecting two alternative escape routes simultaneously (see paragraph 3.21 & Diagram 30).(2)	-	-	x	x
8. To sub-divide any cavity (including any roof space) so that the distance between cavity barriers does not exceed the dimensions given in Table 14.	-	-	x	x
9. Within the void behind the external face of rainscreen cladding at every floor level, and on the line of compartment walls abutting the external wall, of buildings which have a floor more than 20m above ground level.	-	x	x	-

Key x provision applies
- provision does not apply

Notes
1. The provisions in items 2,5 and 6 do not apply where the cavity is enclosed on the lower side by a fire resisting ceiling (as shown in Diagram 31) which extends throughout the building, compartment or separated part.

2. The provision of item 7 does not apply where the storey is sub-divided by fire resisting construction carried full storey height and passing through the line of sub-division of the corridor (see Diagram 30), or where the cavity is enclosed on the lower side as described in Note 1.

3. The classification of purpose groups is set out in Appendix D, Table D1.

Internal fire spread (structure) Approved Document

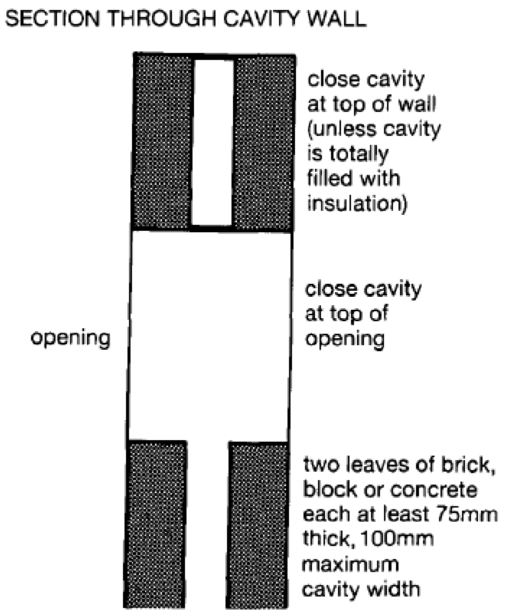
62

Figure 2. Table 13 - ADB1992

Cavity barriers should be provided in the outer cavity in line with all compartment walls and floors based on the guidance at the time of construction. The outer cavity is considered to exist between the RC/brick substrate and the rear of the Aluminium cassette panel.

Double skin masonry systems

Cavity barriers can be omitted from certain types of construction such as construction comprising two leaves of masonry >75mm thick. The reason for this is due to the robustness offered by the masonry. This exemption is not relevant to the re-clad element of the building, it would only be applicable to the existing structure.



Note: Combustible material should not be placed in or exposed to the cavity, except for:

a. timber lintols, window or door frames, or the end of timber joists

b. pipe, conduit or cable

c. DPC, flashing, cavity closer or wall tie

d. thermal insulating material

e. a domestic meter cupboard, provided that:
-there are no more than two cupboards per dwelling
-the opening in the outer wall leaf is not more than 800x500mm for each cupboard, and
-the inner leaf is not penetrated except by a sleeve not more than 80x80mm, which is fire stopped

Figure 3. Diagram 28 – ADB 1992

It should be noted that all other construction types require cavity barriers to be fitted. Furthermore, any cavity existing outside of the masonry cavity will also require barriers.

8.3 System Analysis

System 1: Aluminium panel with mineral wool insulation
cladding system on the building and comprised of the materials in the table below:

Material	Combustibility	Volume	Comments
100mm mineral wool insulation	Typically, Euroclass A1 /A2 to BS EN 13501-1	All locations	Non-combustible, low risk of fire spread in the cavity. Please note that there is likely a thin EPS insulant between two >100mm layers of RC in the structure which is Euroclass E. Due to the encapsulation of this layer and the protection offered by the mineral wool this layer has been discounted as it is very unlikely to contribute to fire.
60-70mm clear cavity	N/A	All locations	No combustible components.
100-110mm reinforced mineral wool cavity barrier	Typically, Euro class A1 /A2 to BS EN 13501-1	Compartment floors, party walls	Locations of cavity barriers not strictly in accordance with ADB, however, generally adequate provision
Solid aluminium cassette panel fixed to aluminium railing	Typically, Euroclass A1/A2 to BS EN 13501-1	All locations	Due to the non-combustibility BB7 consider that this item is low risk in terms of uncontrolled fire spread.

Behind the solid aluminium cassette panel was a 60-70mm cavity and 110mm mineral wool insulation mechanically fixed to the concrete panel system.

In the majority of cases, the mineral wool insulation was tightly fitted and abutted. Any gaps between the insulation were kept to a minimum and generally the installation was considered adequate. The non-combustible insulation is considered to reduce the possibility of uncontrolled fire spread.

Cavity barriers were not found in all locations where they would be expected to be found, typically they would found at compartment floors, party walls however, also they were not provided around window openings and, due to the steel rail system, they were not continuous horizontally at floor level.

The reinforced mineral wool cavity barriers (typical) were compression fixed on top of the insulation (i.e., it was not broken), however, as the insultation is non-combustible, this is considered to be adequate. Both materials are non-combustible or expected to contribute to fire spread expected to reduce fire spread. Although the cavity barrier does not go back to the substrate, the risk is considered to be low as the insulation is also non-combustible.

The survey revealed that only one of the four locations where horizontal barriers should have been in place were in place. This suggest that significant omissions are in place resulting in a recommendation for cavity barrier replacement works to be undertaken. BB7 recommend that cavity barriers are provided at all compartment wall and floor lines where they are found to be missing, and defective barriers should be replaced where found.

Each mineral wool sheet has been lined with a wax paper, designed to assist in the control of moisture, over time much of this lining has become detached and collected on the horizontal rails. It terms of fire spread this is of little significance as the fire loading is minimal as well as the material being positioned between two non-combustible components.

Fixing brackets located at the ends of cladding panels are not considered to present a significant concern. Primarily because the 'C' shape of the bracket is open to external air and the rails sit against the insulation. However, the fixing brackets that are located centrally of wider panels between windows are of greater concern, as they would allow fire and smoke to bypass the horizontal cavity barriers. The brackets are 100mm wide and pass through the horizontal cavity barriers, meaning that the barriers are not continuous. The risk of this is considered to be low as the gap is small. It is also more likely that fire will spread from one dwelling to another externally, rather than through this gap in the cavity barrier, especially considering the channel in the bracket is isolated. The bracket is solid aluminium and there is no combustible insulation to potentially fuel fire spread. Furthermore, the flats are sprinklered which is likely to reduce the potential fire size and spread.

The fire risk assessment has identified that the kitchen ventilation discharges through the external wall at each level, generally where this is the case the vent trunking passes through the insulation and connects with a small vented panel in the rain shield outer panel. No such vent panels are evident on the facades of 463 Lodge Lane. Because the insulation is non-combustible potential fire spread via this route has been nullified, therefore no further action in respect of fire safety is made. However, it is likely that ventilation from the kitchens is compromised and therefore the client may wish to carry out remedial action in that respect.

There were no cavity barriers around the flat windows, however this was not an oversight as there was no need for them to be fitted prior to the 2000 version of Approved Document B.

.

9. Conclusions and recommendations

8.1 Conclusions

BB7 have been appointed to provide an EWS1 form for 463 Lodge Lane located in Croydon, South London. This report has outlined BB7's intrusive survey findings, analysis of the external wall systems, and conclusions. BB7 intrusively surveyed the building on 30th March 2021; the survey was conducted by John McLean of BB7.

Due to the recommendations that are to follow, the building will have a B2 designation on the EWS1 certificates that will be issued in conjunction with this report.

This report and EWS1 forms issued are valid for a period not exceeding five years.

8.2 Recommendations

BB7 make the following interim and long-term recommendations regarding the building:

8.2.1 Interim recommendations

Although the building has a B2 rating due to the recommendations made, it does not necessarily mean that the buildings evacuation strategy needs to change, we consider remedial works are necessary to bring the external walls up to a point where they need to be for the purposes of the form and government advice.

Section 11 of the Governments Consolidated Advice Note provides guidance on this issue. As per this report the building is generally well managed but there are actions on the FRAs which should be actioned, if not done so already.

There are a number of factors which can be considered:

1. Although the buildings are greater than 30m, they are provided with a sprinkler system which can reduce the severity of a fire within a flat. Reducing the chance of fire spread to the exterior via a failed window opening.
2. Fire Service access to the building is generally good and the Fire Service would not experience an undue delay in getting water onto a façade fire. All facades are within reach of a hose from a standard pump appliance. The closest Fire Service station is less than 2 minutes away from the development. The travel time from the station to the flats is one minute. Two pumping appliances are based at the station.
3. The outer face is solid aluminium and the insulation is non-combustible mineral wool. This is unlikely to significantly add to fire spread via the external wall.
4. Bin stores are fitted with fire shutters at the base of the chute in addition to water suppression in the store.

On the basis of the above, BB7 suggest there is no immediate need to change the current escape However, there are some things that should be actioned to do to ensure occupant safety:

- Reinstate the permanent ventilation to the head of the staircase as soon as practical.
- Residents should be informed of their responsibilities in terms of fire safety. Particularly in respect of combustible storage in the stairs and lobbies
- The local FRS will need to be informed of the outcome of this report.

8.2.2 Long Term recommendations

BB7 make the following recommendations:

- Cavity barriers are to be fitted in line with compartment floors and walls.
- Reinstate the exit route leading from the base of the stairs through the lower ground floor corridor to open air.

Imagination powered by borderless thinking

LONDON AND THE SOUTH EAST

23 Star Hill
Rochester
Kent
ME1 1XF

NORTH EAST

Century Way
Thorpe Park
Business Park
Leeds
LS15 8ZA

SCOTLAND

Pentagon Centre
26-38 Washington Street
Glasgow
G3 8AZ

NORTH WEST

2 Jordan Street
Manchester
M15 4PY

NORTH WEST

Claremont House
2 Kelvin Close
Birchwood
Warrington
WA3 7PB

NORTHERN IRELAND

Nextspace
Antrim Enterprise Park
58 Greystone Road
Antrim
BT41 1JZ

CENTRAL AND EAST

Castle Hill House
Huntingdon
Cambridgeshire
PE29 3TE

IRELAND

The Brickhouse
Block 1
Clanwilliam Court
Mount Street Lower
Dublin
D02 CF97