Public Document Pack

Barbican Residential Committee

Date: **FRIDAY, 17 JUNE 2022**

Time: 1.45 pm

Venue: **COMMITTEE ROOMS, 2ND FLOOR, WEST WING, GUILDHALL**

Members:

Deputy Mark Bostock, Cripplegate - resident
Anne Corbett (Non-resident)
Helen Fentimen, Aldersgate - Resident
Deputy John Fletcher (Non - resident)
John Foley (Non-resident_
Steve Goodman OBE, Aldersgate - Resident
Elizabeth Anne King, Cripplegate - Resident
Frankie Leach, Cripplegate - Resident
Andrew McMurtrie (Non-resident)
Deputy Susan Pearson (Non-resident)
Ruby Sayed (Ex-Officio)
Paul Singh, Cripplegate - Resident
Mark Wheatley (Non-resident)

Enquiries: **Julie.Mayer@cityoflondon.gov.uk**

Accessing the virtual public meeting

Members of the public can observe this virtual public meeting at the below link:
https://youtu.be/5DjgFrMO1ZU

A recording of the public meeting will be available via the above link following the end of the public meeting for up to one municipal year. Please note: Online meeting recordings do not constitute the formal minutes of the meeting; minutes are written and are available on the City of London Corporation's website. Recordings may be edited, at the discretion of the proper officer, to remove any inappropriate material.

John Barradell
Town Clerk and Chief Executive

AGENDA

1. **APOLOGIES**

2. **MEMBERS' DECLARATIONS UNDER THE CODE OF CONDUCT IN RESPECT OF ITEMS ON THE AGENDA**

3. **ORDER OF THE COURT OF COMMON COUNCIL**

To receive the Order of the Court of Common Council from Thursday, 21st April 2022.

For Information
(Pages 7 - 8)

4. **ELECTION OF CHAIRMAN**

To elect a Chairman in accordance with Standing Order 29.

For Decision

5. **ELECTION OF DEPUTY CHAIRMAN**

To elect a Deputy Chairman in accordance with Standing Order 30.

For Decision

6. **MINUTES OF THE PREVIOUS MEETING**

To approve the public minutes and non-public summary of the meeting held on 27th January 2022.

For Decision
(Pages 9 - 16)

7. **DRAFT MINUTES OF THE RESIDENTS CONSULTATION COMMITTEE (RCC) - *TO FOLLOW***

To receive the draft minutes of the RCC meeting held on 6th June 2022.

For Information

8. **TO APPOINT A MEMBER TO THE CAR PARK CHARGES WORKING PARTY**

Chairman and Town Clerk to be heard - Terms of Reference attached.

For Decision
(Pages 17 - 18)

9. **'YOU SAID; WE DID': OUTSTANDING ACTIONS LIST**

Report of the Director of Community and Children's Services.

For Information
(Pages 19 - 20)

10. **UPDATE REPORT**

Report of the Director of Community and Children's Services.

For Decision
(Pages 21 - 26)

11. **UPDATE REPORT: ARUP FIRE SAFETY STRATEGY REPORTS**

Report of the Director of Community and Children's Services.

For Decision
(Pages 27 - 112)

12. **PROVISION OF EWS1 FORMS**

Report of the Director of Community and Children's Services.

For Decision
(Pages 113 - 118)

13. **CONCIERGE AND BARBICAN ESTATE OFFICE SERVICE UPDATE**

Assistant Director, Barbican and Property Services to be heard.

For Information

14. **BARBICAN ESTATE TOWER LIFT REFURBISHMENT - GATEWAY 1-4: PROJECT PROPOSAL AND OPTIONS APPRAISAL**

Report of the Director of Community and Children's Services.

(Pages 119 - 138)

15. **UPDATE REPORT - BEECH GARDENS (NORTH WEST PODIUM) WATERPROOFING PROJECT**

Report of the Director of Community and Children's Services.

For Information
(Pages 139 - 142)

16. **BLAKE TOWER**

Assistant Director, Barbican and Property Services to be heard.

For Information

17. **WORKING PARTY UPDATES**

To receive the minutes/reports of the RCC's various working parties.

For Information

a) Gardens Advisory (Pages 143 - 144)

b) Electric Vehicle (Pages 145 - 146)

c) Leaseholder Service Charge (Pages 147 - 148)

d) Service Level Agreement (Pages 149 - 150)

e) Asset Management (Pages 151 - 154)

f) Underfloor Heating (Pages 155 - 156)

18. **PROGRESS OF SALES AND LETTINGS**

Report of the Director of Community and Children's Services.

For Information
(Pages 157 - 162)

19. **BARBICAN ARREARS**

Report of the Director of Community and Children's Services.

For Information
(Pages 163 - 166)

20. **QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE**

21. **ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT**

22. **EXCLUSION OF THE PUBLIC**

MOTION – That under Section 100(A) of the Local Government Act 1972, the public be excluded from the meeting for the following item(s) on the grounds that they involve the likely disclosure of exempt information as defined in Part 1 of the Schedule 12A of the Local Government Act.

For Decision

23. **NON-PUBLIC MINUTES**

To approve the non-public minutes of the meeting held on 27th January 2022.

For Decision
(Pages 167 - 168)

24. **BARBICAN ARREARS - NON PUBLIC APPENDIX**

Report of the Director of Community and Children's Services.

For Information
(Pages 169 - 172)

25. **COMMERCIAL LEASE RENEWAL**

Report of the Director of Community and Children's Services.

For Decision
(Pages 173 - 176)

26. **HOUSING MANAGEMENT SYSTEM UPGRADE**

Report of the Director of Community and Children's Services.

For Information
(Pages 177 - 186)

27. **NON-PUBLIC QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE**

28. **ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT AND WHICH THE COMMITTEE AGREES SHOULD BE CONSIDERED WHILST THE PUBLIC ARE EXCLUDED**

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KEAVENY, Mayor	**RESOLVED:** That the Court of Common Council holden in the Guildhall of the City of London on Thursday 21st April 2022, doth hereby appoint the following Committee until the first meeting of the Court in April, 2023.

BARBICAN RESIDENTIAL COMMITTEE

1. **Constitution**

A Non-Ward Committee consisting of,

- 7 Members who are non-residents of the Barbican Estate elected by the Court of Common Council, at least one of whom shall have fewer than five years' service on the Court at the time of their appointment
- 2 Members nominated by each of the following Wards/Sides of Ward:-
  - Aldersgate
  - Cripplegate Within
  - Cripplegate Without
- the Chairman or Deputy Chairman of the Community & Children's Services Committee (ex-officio)

The Chairman and Deputy Chairman of the Committee shall be elected from the Members who are non-residents of the Barbican Estate.

2. **Quorum**

The quorum consists of any three Members who are non-residents of the Barbican Estate.

3. **Membership 2022/23**

Non-Residents:-

3 (2) Andrew Stratton McMurtrie, J.P.
1 (1) Deputy John William Fletcher
5 (1) Mark Raymond Peter Henry Delano Wheatley
6 (1) Deputy Susan Jane Pearson *for two years*
1 (1) John Ross Foley *for one year*
1 (1) Anne Corbett *for one year*

Residents:-

Nominations by the Wards of Aldersgate and Cripplegate (Within and Without), each for the appointment of two Members:

Aldersgate

Stephen Goodman
Helen Lesley Fentimen O.B.E.

Cripplegate (Within and Without)

Mark Bostock, Deputy
Elizabeth Anne King, B.E.M
Frances Leach
Paul Singh

together with the ex-officio Members referred to in paragraph 1 above and six Members to be appointed this day.

4. **Terms of Reference**

To be responsible for:-

(a) the management of all completed residential premises and ancillary accommodation on the Barbican Estate, e.g. the commercial premises, launderette, car parks, baggage stores, etc. (and, in fulfilling those purposes, to have regard to any representations made to it by the Barbican Estate Residents' Consultation Committee);

(b) the disposal of interests in the Barbican Estate pursuant to such policies as are from time to time laid down by the Court of Common Council.

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BARBICAN RESIDENTIAL COMMITTEE (BRC)
Thursday, 27 January 2022

Minutes of the meeting held at Guildhall at 11.00 am

Present

Members:
Mark Wheatley (Chairman)
Michael Hudson (Deputy Chairman)
Randall Anderson
Mark Bostock
Deputy David Bradshaw
Mary Durcan
Jeremy Mayhew
Deputy Barbara Newman
Susan Pearson
Jeremy Simons
Deputy John Tomlinson

Officers:

Paul Murtagh	-	Assistant Director, Barbican and Property Services
Barry Ashton	-	Community and Children's Services
Anne Mason	-	Community and Children's Services
Helen Davinson	-	Community and Children's Services
Mark Jarvis	-	Chamberlains
Alan Bennetts	-	Comptroller and City Solicitor's Department
Julie Mayer	-	Town Clerks
Tom Nancollas	-	Department of the Built Environment

1. **APOLOGIES**
   Were received from Dawn Wright and Andrew McMurtrie.

2. **MEMBERS' DECLARATIONS UNDER THE CODE OF CONDUCT IN RESPECT OF ITEMS ON THE AGENDA**
   There were no declarations.

3. **MINUTES OF THE PREVIOUS MEETING**
   RESOLVED, that – the minutes of the meeting held on 8th October 2021 be approved, subject to a correction in that '*management costs are null and void as they are not fully service chargeable'.*

4. **DRAFT MINUTES FROM THE RESIDENTS' CONSULTATION COMMITTEE (RCC)**
   The draft minutes of the RCC Meeting on 17th January 2022 were received.

   Members noted a resolution from the RCC in respect of the condition of the canopy over Brandon Mews and an unsuccessful attempt at cleaning it. The

Assistant Director advised that the discolouration was due to UV light exposure. Members noted that, originally, the roof was meant to be temporary but was now part of the listing. It was therefore moved by Michael Hudson, Seconded by Jeremy Simons and RESOLVED, that - the BRC receive a full report at the next meeting, setting out options and implications in terms of the listing and available funding.

5. **'YOU SAID; WE DID' - OUTSTANDING ACTIONS LIST**

In respect of the Beech Gardens Project, the Assistant Director had provided an update at the recent RCC Meeting. Members noted that there had been a delay to the Gateway 6 (Outcome Report) on Beech Gardens Podium Resurfacing Project - Phase 1. Whilst it was expected that the report would be ready for the next round of RCC and BRC meetings, the Assistant Director would bring an interim outcome report if this was not the case. Members noted that, in respect of Phase 2 of the works, there had been several stakeholder meetings between officers and representatives from the relevant residential blocks. The Project Manager had also set up a Working Party with officers from Building Control, Planning and the Barbican Arts Centre.

6. **UPDATE REPORT**

The Committee received the update report of the Director of Community and Children's Services. Members noted that, in respect of anti-social behaviour, it would be possible to put a report before the Court, seeking an 'Act of Common Council' to amend the Bye Law and increase fines. Officers were asked to work with colleagues in the Remembrancer's Department in respect of presenting a report to the Court after June 2022; i.e. – once a full year of data had been collected. Deputy David Bradshaw was thanked for his work on the Barbican Security Committee.

RESOLVED, that – the report be noted.

7. **BARBICAN AND GOLDEN LANE CONSERVATION AREA CHARACTER SUMMARY AND MANAGEMENT STRATEGY - SUPPLEMENTARY PLANNING DOCUMENTS FOR ADOPTION**

Members received a report of the Executive Director, Environment and noted that the Draft Supplementary Planning Document (SPD) for the Barbican and Golden Lane Conservation Area had been issued for public consultation during May, June and July 2021. In response to comments received, several amendments were proposed as set out in appendices B and C to this report. Members of the RCC had agreed to pass this report on to the Barbican Association Planning Committee for comment, as they have the relevant expertise in this area. There were no further comments or questions at the RCC meeting.

During the discussion on the report the following points were noted:

1) The boundary of the Conservation area had not been articulated, just the nature of the area.

2) The Wildlife Garden had been included, and there had been some helpful feedback from residents concerning the management and upkeep of the gardens.

3) The Church is part of a wider consideration of the boundary and was not under consideration as part of this document. Members asked for their views in terms of including the Church within the boundary to be considered.

4) The officer advised that boundary reviews generally took place once every 10 years. The next would be undertaken once the Local Plan review; which had been paused and re-started to take account of the pandemic and other factors, had reached a more advanced stage.

5) Members noted that the LED lighting failure on the Dorothy Anan Mural and the Matthew Spender 'Happy Faces' structures fell within the remit of the Barbican Arts Centre and the Estate Officers agreed to pass this on.

RESOLVED, that :

1. The amendments to the Barbican and Golden Lane Conservation Area SPD as set out in appendices B and C to the report be approved.

2. The amended Barbican and Golden Lane Conservation Area SPD (appendix D) be recommended for formal adoption by the Planning and Transportation Committee.

8. **TASK AND FINISH GROUP: CONCIERGE SERVICE - ORAL UPDATE**

The Assistant Director, Barbican and Property Services, advised that the work of the original Task and Finish Group was now complete, culminating in the resolution put forward to the Barbican Residential Committee (BRC) at its last meeting. Members were reminded that the Resolution had agreed to the collection of an interim payment, from the leaseholders of terrace blocks, to enable further options to be considered in terms of savings targets and the Car Park Attendants. However, there had been some confusion amongst the Barbican Association/ Barbican RCC Members as to whether this should be a voluntary payment or mandated as part of the Lease.

The Assistant Director now sought approval from the BRC to collect this additional amount, on a pro rata basis, given that it would not apply to a full financial year. The Director and Assistant Director would be writing to residents in March/early April, and there would be further consultation on the various options with the Leaseholder Service Charges Working Party and the Barbican Association.

During the discussion on this matter, the following points were noted:

1) There was a perception of a lack of communication on the ongoing process, with no further updates since the residents' meeting in October

2021. The Chairman had been very impressed by residents' contributions at the October meeting.

2) The employee part of the consultation and consequences in changes to scale and services should not have come ahead of consultation with service charge payers.

3) Whilst choice is always preferable over compulsion, legal advice has been sought in this matter and the City of London Corporation is able to mandate the charge. Members noted that Parts 4 and 5 to the Fixed Schedule of the Lease contains a wide discretion on the City of London Corporation to recharge staff costs without a Lease Variation. The one-third to the City and two-thirds to Service Charges can be changed, provided that the split is reasonable, and any costs levied on long lessees reflect the cost of services provided to them. All evidence based information has to be kept up to date.

4) There are smarter ways for Car Park Attendants (CPAs) to carry out their work. There was a perception, however, that these might not have been investigated fully due to the lack of management resources available to consider such efficiencies, and this might have reduced the need for redundancies. The CPAs are highly valued by Barbican residents and their services are more akin to concierges.

5) The Chairman thanked the Task and Finish Group for their work in seeking a way forward in this matter.

It was Proposed by Jeremy Simons, seconded by Michael Hudson and RESOLVED, that - the charge for the CPA be mandatory, based on actual evidence and capped at an average amount of £127.50 for the current financial year, with any further increases by reference to evidence given.

9. **BLAKE TOWER - ORAL UPDATE**

The Assistant Director was heard, and Members noted that, despite some progress and co-operation towards the end of 2021, there had been a recent surge in the number of complaints and issues with the quality of workmanship. Therefore, the Barbican Estate Office was still some way off taking over the management of Blake Tower. Some residents had taken independent legal action against Redrow, and the City Corporation could not engage further in these individual disputes. However, work was ongoing in terms of resolving issues to the common areas.

The Assistant Director had visited the site in December to inspect the issues, which included considerable damage from a burst sprinkler. The Assistant Director would also be writing to residents again with a further update on the action being taken by the City Corporation. Whilst it was acknowledged that the Assistant Director was doing his utmost to resolve this matter, concerns were expressed about lessons which should have been learnt from Frobisher Crescent, and Members were disappointed at the Estate Office having been put in this position once again.

10. **FIRE SAFETY UPDATE**

The Committee received a report of the Director of Community and Children's Services which provided an update on progress made in relation to fire safety matters since the last update report submitted to Committee in June 2021. In respect of the EWS1 forms, Members would receive a more detailed report at the next meeting.

However, given that the forms might become mandatory during that time, it was RESOLVED, that – authority be delegated to the Chairman and Deputy Chairman to agree to a Policy on this matter, should the EWS1 forms become mandatory before the next meeting of the BRC in June 2022.

Whilst the pandemic was a factor in the delay, Members were very concerned that the Arup Survey had been commissioned in March 2020 and the issue appeared to lack a sense of urgency. Furthermore, the findings of the survey were still outstanding, together with issues in respect of compartmentation in the Tower Blocks, and discrepancies in notices as to whether residents should stay put or evacuate.

The Assistant Director advised that the Fire Safety Working Party reconvene once the Arup Survey was complete. Members were told that the Arup report had been more detailed than expected, and their recommendations in respect of Cromwell Tower were expected this month.

In concluding, the Chairman suggested that the Working Party should reconvene and arrange to meet urgently, and that Fire Safety Reports should be higher on future BRC agenda. Additionally, the Arup report should be circulated to all Members of the Committee, as soon as it is completed, and a briefing session arranged for BRC Members ahead of a full report to the next Committee.

RESOLVED, That – the report be noted.

11. **REVENUE & CAPITAL BUDGETS: LATEST APPROVED BUDGET 2021/22 AND ORIGINAL BUDGET 2022/23 (EXCLUDING DWELLINGS SERVICE CHARGE INCOME & EXPENDITURE)**

The Committee considered a report of the Chamberlain and the Director of Community and Children's Services, which provided the annual submission of the revenue and capital budgets overseen by the BRC. In particular it sought approval to the provisional revenue budget for 2022/23, for subsequent submission to the Finance Committee, and details of the Committee's draft capital budget were also provided.

RESOLVED, that:

1. The provisional 2022/23 revenue budget be approved for submission to the Finance Committee.
2. The draft capital budget be approved.

3. The Chamberlain revise these budgets to allow for further implications arising from departmental reorganisations and other reviews, including corporate projects.

12. **SERVICE CHARGE EXPENDITURE & INCOME ACCOUNT: LATEST APPROVED BUDGET 2021/22 & ORIGINAL BUDGET 2022/23**

The Committee considered a report of the Chamberlain and Director of Community and Children's Services which set out the original budget for 2021/22 and 2022/23 for revenue expenditure included within the service charge in respect of dwellings. The report did not include any expenditure or income pertaining to car parking or stores.

In respect of energy charges, the officer advised that the contract was renewed in September 2021. The City Corporation now had a 4-year variable purchase contract in place and energy would be purchased when the market is most advantageous.

The Chairman advised that the RCC had asked for budgetary reports to be set out as clearly as possible, noting that local authority systems can be complex. The RCC had also asked to see the Department's structure, setting out where budgetary responsibility lies.

RESOLVED, that:

1. The provision 2022/23 net £Nil revenue budget be approved for submission to the Finance Committee.

2. The Chamberlain be authorised to revise these budgets to allow for further implications arising from departmental reorganisations and other reviews, and corporate projects.

13. **PROGRESS OF SALES AND LETTINGS**

The Committee received a report of the Director of Community and Children's services which advised Members of the sales and lettings approved by officers since the last meeting, under delegated authority and in accordance with Standing Orders. The report also provided information on surrenders of tenancies received and the number of flat sales.

RESOLVED, that – the report be noted.

14. **REPORT OF ACTION TAKEN**

The Committee received a report of the Town Clerk which advised Members of action taken by the Town Clerk, in consultation with the Chairman and Deputy Chairman, in accordance with Standing Order No. 41 (b) since the last meeting.

Members noted that the Town Clerk, in consultation with the Chairman and Deputy Chairman and Members of the Barbican Residential Committee, had approved :

1) an uplift in the service charge, of approximately £25 per flat, per annum, to allow the continued employment of an extra gardener to work in the private gardens of the Barbican Estate; and

2) instructed officers to review this annually, in consultation with the Residents' Consultation Committee. *NB. Following further consideration of item (2) above, Members agreed that a bi-annual review would suffice.*

15. **BARBICAN ARREARS UPDATE**

The Committee received a report of the Director of Community and Children's Services, which advised Members of the current arrears in respect of tenants and leaseholders on the Barbican Estate.

RESOLVED, that – the report be noted.

16. **BARBICAN COMMERCIAL ARREARS UPDATE**

The Committee received a report of the Director of Community and Children's Services, which is presented annually, and advised Members of the current arrears in respect of commercial property tenants on the Barbican Estate and the action being taken with these arrears.

At 12.50 pm, the Committee agreed to extend the meeting to conclude the business on the agenda.

17. **QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE**

A member asked about major works being undertaken at Mountjoy House, resulting in unacceptably high noise levels, including Sundays. There had been further problems in that the leaseholder was not contactable, and it was difficult to decipher which of two properties being worked on was in transgression at any given time. Members noted that the Considerate Contractor Scheme offered redress and residents should also report incidents of noise nuisance to the City Corporation's Public Health Team, who are on duty 24 hours. The Chairman and Deputy Chairman agreed to attend a meeting of all parties to discuss a resolution.

18. **ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT**

The Chairman said farewell to those Members choosing not to stand again in the forthcoming City of London Common Council elections and thanked them for their contributions to the Committee.

Members noted that, for the time being, and under the terms of the City Corporation's Governance Review, the Barbican Residential Committee is still convened as a Committee of the City of London Corporation.

19. **EXCLUSION OF THE PUBLIC**

RESOLVED, that - under Section 100A(4) of the Local Government Act 1972, the public be excluded from the meeting for the following items of business on

the grounds that they involve the likely disclosure of exempt information as defined in Paragraph 3 of Part I of Schedule 12A of the Local Government Act.

Item no (s)	Para no (s)
20-26	1, 2 & 3

20. **NON-PUBLIC MINUTES**
Resolved, that - the non-public minutes of the meeting held on 8 October 2021 be approved.

21. **BARBICAN ESTATE RESIDENTIAL TENANCY RENEWALS**
The Committee considered and approved a report of the Director of Community and Children's Services.

22. **BARBICAN ARREARS UPDATE - APPENDIX**
The Committee received an appendix in respect of agenda item 15.

23. **BARBICAN COMMERCIAL ARREARS - APPENDIX**
The Committee received an appendix in respect of agenda item 16.

24. **LEASE APPROVAL**
The Committee considered and approved a report of the Director of Community and Children's Services.

25. **NON-PUBLIC QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE**
There were no questions.

26. **ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT AND WHICH THE COMMITTEE AGREES SHOULD BE CONSIDERED WHILST THE PUBLIC ARE EXCLUDED**
There were no items.

The meeting ended at 1.25pm

Chairman

Contact Officer: Julie.Mayer@cityoflondon.gov.uk

BARBICAN RESIDENTIAL COMMITTEE (BRC)

CAR PARK CHARGES WORKING PARTY

COMPOSITION AND TERMS OF REFERENCE

Membership:

Chairman and Deputy Chairman of Barbican Residential Committee (non-residents)
3 x resident Members

Officers:

Assistant Director – Barbican and Property Services
Head of Barbican Estate
Revenues Manager
Car Parking Manager
City Surveyor – as required

Terms of Reference

'To proceed in the reference of the Grand Committee to review the charging policy for car parking and storage in the car parking areas of the Barbican and to report back thereon, with recommendations'.

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"You Said; We Did" - Action List – June 2022

Actions from October 2021 Barbican Residential Committee (BRC) & other outstanding issues *(updates appear in bold italics)*

Issue	Source	Officer
Barbican Highwalks - Planned Maintenance of the Public Realm		
This relates to additional funding for the Walkways, for the inspection and maintenance for a number of items; i.e. smoke vents, drainage gulleys, railings, planters, benches and signage. There are currently no funds available but Officers will continue to review if there are any savings to progress any of these works.	RCC March 20	Paul Murtagh
Leaseholder Service Charge Working Party		
The Assistant Director had been working with residents on the Working Party in respect of a detailed review of service charges; looking at efficiency savings that could protect and possibly reduce charges in the future. This would be an extensive piece of work, likely to take about six months, and the findings would be reported to both the RCC and BRC. It was stressed that any benefits from the findings of the Working Party would not become apparent until the next financial year. ***A special BRC committee meeting will be held in June/July 2022 to review the paper BEO and Concierge Service Update. This will follow consultation with RCC.***	BRC September 2020	Anne Mason Paul Murtagh
Barbican Podium Waterproofing Beech Gardens Phase 1		
In respect of the Gateway 6 (Outcome/Lessons Learnt Report) for Phase 1, as there were issues outstanding with this project, officers have commissioned Sandberg to undertake a review of the project from design to completion. The new Project Team would be taking the lessons learnt into Phase 2. *Meetings between Officers and Sandberg are ongoing and an interim report is expected to be presented to a future Committee.* ***A report will be presented to June committee. Item complete.***	BRC June 2021	Paul Murtagh Mike Saunders

Condition of the play areas		
A resident has raised concern about the condition of the play area including the soft play surface. The roundabout was removed, but unfortunately was found to be beyond repair. The BEO is currently waiting for quotes for a replacement and well as quotes for the repair and renewal of the soft play surfaces. This is an area of property maintenance where significant delays have been encountered due to supply chain issues.	RCC and BRC June 22	Helen Davinson
Brandon Mews Canopy		
A report detailing options for cleaning is planned for September committee.	RCC and BRC Jan 22	TBC.
Contact: Helen Davinson, Resident Services Manager E: helen.davinson@cityoflondon.gov.uk		

Committee:	**Date(s):**
Residents' Consultation Committee	6 June 2022
Barbican Residential Committee	17 June 2022
Subject: Update Report	**For information**
Report of: Director of Community and Children's Services	**Public**

Summary

Barbican Estate Office

1. Agenda Plan

Property Services – see appendix 1

2. Public lift availability

3. Asbestos inspections

Recommendations that the contents of this report are noted.

Background

This report updates members on issues raised by the Residents' Consultation Committee and the Barbican Residential Committee at their meetings in January 2022. This report also provides updates on other issues on the Estate.

1. Agenda Plan

The table below includes a list of pending committee reports:

Residents' Consultation Committee & Barbican Residential Committee

Report Title	Officer	RCC Meeting Date	BRC Meeting Date
Concierge and BEO Service Update	Paul Murtagh		Special meeting, date TBC
"You Said; We Did" Actions (Separate list for RCC & BRC)	BEO	20 Sept	30 Sept
Service Level Agreement Review	BEO		
Annual Residents' Survey	Helen Davinson		
Brandon Mews Canopy	TBC		
DCCS Business Plan for 2022/23	TBC		
Car Park Charging TBC	Barry Ashton		
Fire Safety Update	Paul Murtagh		
Blake Tower - Oral Update	Paul Murtagh		
2021/22 Revenue Outturn (Excluding the Residential Service Charge Account)	Anne Mason/Chamberlains		
Relationship of BRC Outturn Report to Service Charge Schedules **– RCC Only**	Anne Mason		
Progress of Sales & Lettings	Anne Mason		
Arrears Report **(BRC Only)**	Anne Mason		
Working Party Updates **(RCC Only)** • Gardens Advisory • Asset Maintenance • Background Underfloor Heating • Leaseholder Service Charge • Electric Vehicle	Working Parties		
Update Report: • Main update - Agenda Plan 2022 • Property Services Update (Appendix 1)	BEO		
"You Said; We Did" Actions (Separate list for RCC & BRC)	BEO	28 Nov	9 Dec

Service Level Agreement Review	BEO		
Fire Safety Update	Paul Murtagh		
Blake Tower - Oral Update	Paul Murtagh		
Service Charge Expenditure & Income Account - Original Budget 2022/23 & Original Budget 2023/24	Chamberlains		
Revenue & Capital Budgets – Original Budget 2022/23 and Original 2023/24 - Excluding dwellings service charge income & expenditure	Chamberlains		
Progress of Sales & Lettings	Anne Mason		
Arrears Report **(BRC Only)**	Anne Mason		
Working Party Updates **(RCC Only)** • Gardens Advisory • Asset Maintenance • Background Underfloor Heating • Leaseholder Service Charge • Electric Vehicle	Working Parties		
Update Report: • Main update - Agenda Plan 2023 • Property Services Update (Appendix 1)	BEO		

Contact: Helen Davinson, Resident Services Manager
Tel: 020 7029 3963
E:mail: barbican.estate@cityoflondon.gov.uk

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3. Public Lift Availability

Availability of the public lifts under the control of Property Services is detailed below:

Lift	From April 2020 to March 2021	From April 2021 to March 2022
Turret (Thomas More)	99.92%	97.61%
Gilbert House	99.67%	99.85%

4. Asbestos Re-inspections

Asbestos re-inspections for 2022 are underway and will continue through to July 2022. Any non-urgent remedial works as a result of these inspection will be programmed during the autumn.

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Committee(s): Barbican Residential Committee	**Dated:** 17/06/2022
Subject: Update Report – Arup Fire Safety Strategy Reports	**Public**
Which outcomes in the City Corporation's Corporate Plan does this proposal aim to impact directly?	**1, 2, 12**
Does this proposal require extra revenue and/or capital spending?	**N**
If so, how much?	**N/A**
What is the source of Funding?	**N/A**
Has this Funding Source been agreed with the Chamberlain's Department?	**N/A**
Report of: Andrew Carter, Chief Officer/Executive Director Community and Children's Services	**For Decision**
Report author: Paul Murtagh Assistant Director Barbican & Property Services	

Summary

The purpose of this report is to update Members on the progress made by Arup in carrying out a detailed fire safety strategy audit on a representative sample of residential blocks on the Barbican Estate.

Recommendations

Members are asked to:

1. Note the contents of this report.
2. Consider and discuss the Fire Safety Strategy Reports produced by Arup in respect of Cromwell Tower and Andrewes House on the Barbican Estate.
3. Reconsider the decision of this Committee at its meeting in June 2018, not to pursue the proposal for the retro-fitting of automatic water fire suppression systems (sprinklers) in the three Barbican high-rise tower blocks.

Main Report

Background

1. Due to the unique nature of the Barbican Estate, some Members have previously suggested that a more detailed specialist fire safety survey be undertaken on a representative sample of flat blocks on the Estate. The purpose of this specialist survey would be to review and assess specific fire safety precautions such as:

    - Communal fire doors;

- Smoke control measures;
- Fire alarm and fire detection measures;
- Escape routes;
- Ventilation provisions.

2. This specialist survey would also satisfy some of the recommendations of the FRA's that were carried out by Frankham Risk Management Services Limited in January/February 2018 and, will help fill in some of the 'gaps' in our understanding of how the residential buildings will perform in the event of a fire.

3. In November 2020, following the approval of the Barbican Residential Committee (BRC), Arup, a specialist firm of engineering consultants, was appointed to carry out a detailed fire safety strategy audit on a representative sample of four residential blocks on the Barbican Estate.

4. Members will be aware from previous reports, that Arup's progress with the fire safety strategy audit has been significantly delayed by COVID-19 and associated resource issues.

5. Arup has now completed its surveys at Cromwell Tower, Andrewes House and Mountjoy House and, has submitted its final reports for Cromwell Tower and Andrewes House. The report for Mountjoy House has yet to be finalised and, officers are working with Arup's to provide additional information and mitigation to enable the final report to be issued.

6. The Arup Fire Safety Strategy reports for Cromwell Tower and Andrewes House are included at Appendix 'A' and Appendix 'B' to this report.

Considerations

7. As set out in the 'Executive Summary' at the beginning of each of the two finalised reports, as part of its review of Cromwell Tower and Andrewes House, Arup has:

   - compared the existing fire safety precautions of each building with the requirements in Building Regulations 2010 (as amended) by benchmarking against the current standards including BS 9991 and BS 9999.
   - considered the recommended improvements to existing residential buildings in Phase 1 of the Grenfell Tower Enquiry Report by Sir Martin Moore-Bick.

8. It is inevitable that buildings that are more than 50 years old (even though they were fully compliant when they were built) will simply not meet the requirements of modern-day standards and regulations, as is the case with Cromwell Tower and Andrewes House and, undoubtedly, with all other blocks on the Barbican Estate. What is important however, is that where there are gaps in the existing fire safety precautions against the current standards, fire safety improvements are carried out to remediate the risk on an 'as nearly as practicable basis'.

9. As can be seen from the Cromwell Tower and Andrewes House reports, Arup has identified several 'gaps' in the existing, 'as-built' fire safety precautions and, has set out its recommendations for remedial actions to address those gaps. These are considered separately for both Cromwell Tower and Andrewes House below.

Cromwell Tower

10. In Table 1 of its Fire Safety Strategy Report for Cromwell Tower, Arup sets out the gaps it has identified in the existing fire safety precautions and, its recommendations for dealing with them. Some of the recommendations however, are already included in current workstreams including:

    - identifying persons with restricted mobility in Cromwell Tower.
    - upgrading/replacing existing fire safety signage.
    - survey of existing emergency lighting and necessary remedial works to ensure compliance with current regulations and British Standards.
    - replacement of flat entrance doors and riser cupboards with new fire doors that comply with current regulations and British Standards.
    - regular inspection and testing of fire doors to ensure that they remain in good working order.

11. Some of the recommendations proposed by Arup may simply not be achievable due to the constraints on the building including its construction, its listed status, and the feasibility of the recommendations. Arup has acknowledged this in its report when it says:

    "The recommendations may take some time to be fully implemented. Constraints on site may affect the feasibility of some of the solutions and further option development may occur".

12. Further work is required to analyse the recommendations in detail and, to establish a practical Action Plan to address the deficiencies identified. Officers are working with Arup, colleagues in Building Control, Planning and the CS Fire Safety Team to progress this matter and, a further report will be brought back to this Committee at its next meeting.

13. In acknowledging that some of the recommendations in its report may not be feasible and others, will take time to implement, Arup has set out the following interim temporary measures that will address the risks whilst, permanent solutions are developed and implemented:

    - preparation of PEEPs for persons with restricted mobility.
    - removal of all storage and rubbish within riser spaces that open onto the stairs.
    - consider providing a fire detector within the electrical riser above Level 37.

14. We are currently nearing the completion of an exercise to identify persons with restricted mobility living on the Barbican Estate to enable us to discuss with them what they should do in the event of an emergency. Information on those properties that are identified with occupants needing additional support, will be included in the Premises Information Box (PIB). The PIB contains information for the use of the Fire Brigade such as floor plans to the building, as well as those homes with an identified need for assistance in an emergency evacuation.

15. The matter of storage and rubbish within the riser spaces was first raised four years ago when the 2018 Fire Risk Assessment was carried out. Immediate action was taken to remove all storage and rubbish from the risers and, the riser spaces are subsequently monitored and inspected annually to ensure that they remain clear. In addition, the new Home Improvements process implemented across the Barbican Estate, provides that the City Corporation will post-inspect all works before issuing final approval and, the riser spaces are inspected as part of this process.

16. Possibly, the most significant recommendation in the Arup Fire Safety Strategy Report for Cromwell Tower, is the installation of a sprinkler system. For a high-rise, single stair building that adopts a stay-put policy, effective compartmentation is essential. Arup has concluded that condition of the compartmentation is unknown and, with the extended travel distances within the flats and, the potential number of persons with restricted mobility living in the block, the installation of a sprinkler system is strongly recommended. The installation of a sprinkler system will not only enhance life safety but will also significantly improve the overall fire safety of the building.

Andrewes House

17. In Table 1 of its Fire Safety Strategy Report for Andrewes House, Arup sets out the gaps it has identified in the existing fire safety precautions and, its recommendations for dealing with them. Some of the recommendations are already included in current workstreams including:

- identifying persons with restricted mobility in Andrewes House.
- upgrading/replacing existing fire safety signage.
- survey of existing emergency lighting and necessary remedial works to ensure compliance with current regulations and British Standards.
- replacement of flat entrance doors and riser cupboards with new fire doors that comply with current regulations and British Standards.
- regular inspection and testing of fire doors to ensure that they remain in good working order.

18. As with Cromwell Tower, some of the recommendations proposed by Arup may simply not be achievable due to the constraints on the building including its construction, its listed status, and the feasibility of the recommendations. Further work is required to analyse the recommendations in detail and, to establish a practical Action Plan to address the deficiencies identified. Officers are working with Arup, colleagues in Building Control, Planning and the CS Fire Safety Team to progress this matter and, a further report will be brought back to this Committee in due course.

Summary

19. Although Arup has completed its surveys at Cromwell Tower and Andrewes House and submitted its final reports, there is still work to be done to analyse the recommendations in detail and, to establish a practical Action Plan to address the deficiencies identified. It is expected that a further report will be brought back to the next meeting of this Committee.

20. As a result of the concerns raised by Arup in respect of Cromwell Tower relating to the potential risks to life safety arising from a high-rise single-stair building that adopts a stay-put policy, with unknown levels of compartmentation and, with the extended travel distances within the flats, Members are asked to reconsider the previous decision of this Committee not to pursue the proposal for the retro-fitting of automatic water fire suppression systems (sprinklers) in the three Barbican high-rise tower blocks. This assumes that Lauderdale Tower and Shakespeare Tower are similarly constructed and, the same deficiencies are present.

21. The outcome of the Fire Safety Strategy Report at Mountjoy House will be reported to the next meeting of this Committee once, officers have completed its work with Arup to provide additional information and mitigation to enable the report to be finalised.

Appendices

Appendix 'A' – Fire Safety Strategy Report Cromwell Tower
Appendix 'B' – Fire Safety Strategy Report Andrewes House

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Barbican Estate

Barbican Residential Blocks

Cromwell Tower - Fire Strategy Report

Issue | 16 February 2022

Job number 279095-00

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Document verification

ARUP

Job title		Barbican Residential Blocks			**Job number** 279095-00
Document title		Cromwell Tower - Fire Strategy Report			**File reference**
Document ref					
Revision	**Date**	**Filename**	220211 Barbican_Cromwell Tower_Fire Strategy Report Draft.docx		
Draft 1	11 Feb 2021	Description	First draft		
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Issue	16 Feb 2022	Filename	220216 Barbican_Cromwell Tower_Fire Strategy Report Issue.docx		
		Description	First Issue		
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
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			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document verification with document ✓

Contents

Appendices

Executive Summary

Arup have been appointed by the Barbican Estate (BE) to undertake a fire safety review of Cromwell Tower, an existing building which is part of the Barbican Residential Development, located in the City of London. The purpose of the review is to determine the existing intent of the fire safety design and to document this intent in a fire strategy document (this report). The purpose of this report is as follows:

- To provide a single document that describes the fire safety precautions for Cromwell Tower, including the fire safety principles and fire safety measures within the existing building;
- To compare the existing fire safety precautions with the requirements in Building Regulations 2010 (as amended) by benchmarking against the current standards including BS 9991 and BS 9999;
- To consider the recommended improvements to existing residential buildings in Phase 1 of the Grenfell Tower Inquiry Report by Sit Martin Moore-Bick;
- Where there are gaps in the existing fire safety precautions against the current standards and if those gaps present a risk to the life safety of the occupants, recommend fire safety improvements to remediate the risk on an as nearly as reasonably practicable basis; and
- Where the gaps in the existing fire safety precautions present a low/negligible risk to life safety, the existing precautions are proposed to be retained (on the assumptions that they are maintained in good operational order).

Cromwell Tower was constructed in 1973 and contains 108 flats and 3 penthouse maisonettes. The building consists of one firefighting stair and a lift lobby with a wet riser. The building consists of 39 residential floors above Podium level with a building height of 108 m (assuming floor to floor height of 2.7m) measured from street level (L01) to the floor level of the topmost occupied storey.

An open Podium level which is located above street level serves as the final discharge location from the firefighting stair. The street level (L01) serves as the main firefighting access level to enter Cromwell Tower. Basement levels L02 and L03 are storage and plant rooms below street level.

The balconies on L7-L39 are connected by stairs that lead down to the lift lobbies located one or two storeys below. These stairs provide alternative means of escape from the flats on those levels. However, these stairs do not exist on L1-L6. These are described in detail in the subsequent sections in the report.

Existing Fire Safety Precautions – Overview

The key elements of the existing fire safety precautions for the Cromwell Tower can be summarised as:

- **Stay put strategy:** The building adopts a stay put evacuation strategy. In the event of a fire, only the occupants in the flat of fire origin evacuate the building. The rest of the building occupants will remain in place. This is proposed to be retained.
- **Single stair**: The stair functions as both means of escape for the occupants and means of access for firefighters. It is a priority to protect the stair from being affected by a fire in the building.
- **Risers in stair:** There are three risers that are accessed via the stair and the fire rating of the doors are unknown. The electrical riser (on L37 and above) is connected to the small lobby (at every level) that opens into the stair – this is a risk as a fire in the electrical riser may spread to the small lobby and the stair, affecting the escape route from the building.
- **Flats on L7-L39:** Each flat has alternative means of egress via the balcony or the flat main entrance to reach the single stair. However, for wheelchair-bound residents (Persons with Reduced Mobility – PRM), escape is only possible via the flat entrance and the travel distance to the entrance is greater than the limit within the current guidance.
- **Flats on L1-L6**: Flats in Wings B and C have alternative means of egress via the balconies or the flat main entrances, with the exception of PRMs. The flats in Wing A are only served by a single means of escape via the flat entrance, and the travel distance to reach the entrance is greater than the limit within the current guidance.
- **PRM evacuation**: For the PRM needing assistance with evacuation, there is no safe refuge nor communication system to call for assistance. The procedure for evacuation of PRM is also unclear. This presents a risk to the life safety of the occupants.
- **Exit signage and emergency lighting**: There are existing provisions however, the existing exit signage are not compliant and both systems will need to be inspected.
- **Fire detection and alarm system:** The storage and plant areas in L02 and L03, lift shafts and the upper floor plant rooms are provided with Category LD3 detection and alarm system. However, there is no detection or alarm system within the flats nor in the common areas of the building. Considering the extended travel distances for occupants who can only use the flat entrance as their escape route, the lack of early detection and warning in the flat presents a life safety risk.
- **Fire suppression system**: The building is not sprinkler protected. Considering other gaps that have been identified in the building, this presents a risk to the life safety of the occupants.
- **Structural fire protection**: The existing protection nominally meets the required fire rating in the current standard, based on a desk-top review.
- **Fire compartmentation**: Each flat, services riser, stair, lift shaft and storage area should form separate fire compartments, to support the stay-put strategy. However, the Fire Risk Assessment (FRA) states that there have been structural alterations made in the building, compromising the compartmentation between the flats and risers. This is a risk to life safety as it may compromise the stay-put strategy and the integrity of the single stair.
- **Shunt duct arrangement (kitchen extract and toilet extract risers):** It is considered an acceptable solution for the toilet extract riser. However, the use of shunt duct for kitchen extract presents a risk of fire/smoke spread between the flats and may compromise the stay-put strategy.
- **Flat entrance, refuse storage/post box and stair fire doors:** Assuming that these are the same as the tested fire door in the Shakespeare Tower, they do not achieve the required 60 minutes fire rating. The failure to maintain fire separation between the flat, lift lobby and

single stair may compromise the stay-put strategy and the use of the stair for means of escape and firefighting.

- **Separation with neighbouring buildings:** There is adequate separation distances to adjacent properties to minimise the risk of external fire spread between buildings.
- **Façade system:** There appears to be no combustible materials in the façade system, based on the information provided.
- **Lift lobby:** The lift lobby also acts as a firefighting lobby with a manually operated smoke ventilation system.
- **Firefighting lift:** The existing firefighting lift and other lifts have been identified with a programming issue which will not allow it to ground upon detection of a fire. The firefighting lift will only ground upon arrival of the fire service when they manually activate the lift to ground. This is not in line with the current guidance.
- **Wet riser main:** All the inlet points are within 18 m of the fire service vehicle access routes. A wet riser outlet is located within each level of the firefighting shaft and within 45 m of coverage of the hose length.

Recommendation for remedial actions

Recommendations for remedial actions are provided throughout the report (in green boxes) to mitigate the identified life safety risks due to the gaps in the existing fire safety precautions. A summary of the known gaps and the associated recommendations is provided in Table 1. The table will be reviewed and revised accordingly when further information becomes available e.g. emergency lighting system, exit signage.

Interim measures

The recommendations may take some time to be fully implemented. Constraints on site may affect the feasibility of some of the solutions and further option development may occur. However, there are existing features in Cromwell Tower that present unacceptable risks to the life safety of the building occupants. Some immediate actions are recommended to address these risks.

These immediate actions are temporary measures to address the risks, while permanent solutions are being developed and implemented. These interim measures are not meant to replace the need for permanent solution. The aim of the interim measures is to reduce hazards that may affect the use of the single stair in the event of a fire, so that occupants can safely evacuate from the Tower. The recommended interim measures are:

- Preparing a Personal Emergency Evacuation Plan (PEEP), so that the evacuation arrangement in the event of a fire is clear to each PRM occupant;
- Remove all storage and rubbish within riser spaces that opens into the stair (note: the External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018 states that discarded trade materials and general waste were identified in riser cupboards).
- Consider providing a fire detector within the electrical riser above L37, so that BE receives early warning of a potential fire in the electrical riser. If necessary, evacuation can then be initiated before the stair is affected.

Next Steps

In addition to implementing the interim measures, it is recommended for BE to review the feasibility or implementation of the permanent remedial actions.

Once this has been completed, it is recommended for the CoL District Surveyor and the London Fire Brigade to be consulted, to seek their early agreement in principle.

Table 1: Identified gaps and recommended actions

Identified Gaps	Recommended Action	Benefits of the recommendation	Implementation constraints as defined by BE
No internal hallway in the flats Extended travel distance (for single direction of escape) Duplex and triplex layout with open internal stair	• Provide early warning to occupants within the flat by installing a minimum Grade D1 Category LD1 within the flats; • Review the internal layout of the duplex and triplex in terms of alternative egress and internal hallway against the current guidance;	• Early warning through automatic detection and alarm system will serve to alert occupants of a fire in their flat during the early stages of the fire and initiate evacuation before conditions in the flat becomes untenable. • Occupants will be made aware of the escape routes and procedures in the event of a fire, minimising time to evacuate the building.	
Sprinkler protection	For a high-rise single stair building that adopt a stay-put strategy, it is recommended to maintain the fire compartmentation across the building. The condition of the compartmentation is unknown. There are extended travel distances within in the flats and there is a relatively high percentage of PRM occupants in the building. As such, this presents a risk to the life safety of occupants and the installation of a sprinkler system in the building is strongly recommended .	Provision of sprinklers will enhance the overall fire safety of the building, limiting the fire growth and enhance both life safety and property protection of the building.	

L1 – L6 Wing A flats provided with a single means of escape	For Wing A flats from L1 to L6, it is recommended to provide one of the following options:
	• Retain the existing arrangement of escaping via neighbour's flat from Wing A, provided that there are regular inspection in place to check that the means of escape route via the adjacent flat (Wing B) is available, including checking the keys are in place and the escape paths within the flats are available, or
	• Providing compartmentation to kitchen area as this is the high risk area, or
	• Provision of a protected internal hallway.
	The provision of sprinkler system will also address the risk of the single means of escape from the flat being compromised by the fire.
		• Provision of one of the recommendations will enhance the current arrangement due to the following:
		  • Regular inspection to enforce and to check that the escape paths through neighbouring flats remain available. This option presents the least change to the flat, but will increase staff responsibility on regular inspections.
		  • Enclosing the kitchen in fire rated construction or providing protected internal hallway will reduce the risk of the single escape route being compromised by a fire in the flat (likely to be within the kitchen).
		  • Limit fire growth by provision of sprinklers	

Evacuation of PRMs/ smoke control	• Preparation of Personal Emergency Evacuation Plan (PEEP) for PRMs. • Replacing existing manually operated ventilation system to automatic ventilation system in the lift lobbies. • Provision of Emergency Voice Communication (EVC) system to all of the lift lobbies.	• PRMs are well informed about their evacuation arrangement in the event of a fire. • Automatic smoke ventilation to all lift lobbies will create a safe refuge for PRMs to wait for assistance. • The detection system in the lift lobby will operate the automatic smoke ventilation system and raise an alarm to alert BE staff to investigate the incident.	
Exit signage	A survey is recommended to inspect and replace existing exit signage to comply with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report	Correct signage will serve to identify the stair discharge level and the route out of the building.	
Emergency lighting	A survey is recommended to inspect and replace existing emergency lighting to comply with BS 5266-1.	Emergency lighting will allow occupants to evacuate safely, especially when traversing up/down the stairs.	
Compartmentation – structural alterations made to the building between flats and risers.	It is recommended to carry out a sitewide survey to inspect breach in compartmentation, and to undertake works to maintain the compartmentation in accordance with BS 9991.	This will maintain the stay-put strategy and minimise the risk of the single stair being compromised by a fire in the building.	

Connection between small lobby, ventilation shaft and electrical riser.	It is recommended to provide one of the following: • Provide fire separation between the small lobby and the ventilation shaft (removing all the vents) and remove the fire door between the small lobby and the lift lobby on L37 and above, or • Provide a fire and smoke damper at each vent to maintain fire separation and to only vent the floor of fire incident. Also provide a wall to separate the smoke shaft and the electrical riser from L38 and above.	Either of the recommendations will adequately separate the small lobby from the electrical riser. This will reduce the risk of smoke and fire spread from the electrical risers.	
Fire doors at flat entrance, lift lobbies, firefighting stairs and refuse storage/post box.	• It is recommended to replace all the fire doors to the stair, small lobby, flat entrances and the refuse storage/post box. • Doors to all the risers to be inspected and repaired/replaced to maintain fire separation from the stair or lift lobbies. • Keep records of inspection and testing of fire doors in the future, at not less than three-monthly intervals to ensure that all fire doors are in working order.	• This will serve to maintain the availability of the stair for means of escape and firefighting activities. • Maintaining the stay put evacuation regime.	
Kitchen extract shunt duct system	Replace the existing extract hoods with recirculation type hoods, and implemented one of the followings: • Smoke and fire damper at the shunt duct riser activated by the fire alarm/detectors within the flat (this maintains the use of the riser for normal ventilation of the flat); or • To block off the shunt ducts and provide a fan on the external wall to draw out air from the flat into the balconies. Maintain the existing extract hoods and shunt duct arrangement by increasing the reliability of the main extract fan. This will require an additional duty standby fan (the fans to be rated at 400 ˚C for 90 minutes in accordance with BS EN 13501-4), with secondary power supply. The fans need to be adequately maintained to keep the main riser under negative pressure;	• The provision of fire and smoke damper or blocking off the shunt ducts will serve to significantly reduce the risk of fire spread between compartments through the kitchen shunt ducts. • Maintaining the stay-put evacuation regime. • The option of increasing the reliability of the main extract fan allows the day-to-day ventilation within the flat can be maintained.	

1 Introduction

1.1 Appointment and scope

Arup have been appointed by Barbican Estate (herein referred to as BE) to provide a fire engineering review of Cromwell Tower, an existing building which is part of the Barbican Residential Development, located in the City of London.

This report provides a fire strategy for the existing building and captures the current fire safety measures and strategy as Arup understand it from recent reviews of documents, discussions with the BE management team and through a non-intrusive site visit undertaken on 20/08/2021.

Although Cromwell Tower is an existing building, there is limited documentation available to explain the current fire safety information for the building. There is currently no fire strategy report for the building nor documentation which provides a cohesive record of the fire safety measures in the building. As such this fire strategy has been developed to act as a cohesive and detailed record of the current fire safety provisions (and can act as a benchmark for future building work).

1.2 Purpose of this report

Having a single documented fire safety strategy for Cromwell Tower provides the required information to understand the fire safety principles and fire safety measures within the existing building.

It should also be noted that this fire strategy covers the residential floors, Street level (L01) and storage/plant areas (L02-L03) of Cromwell Tower. This report does not cover the services subway (L04).

This report will assist the BE when they wish to undertake future improvement and alterations to the building. It will also act as a benchmark in recording the fire safety strategy and enables anyone undertaking works on the building to understand what implications these may have in terms of fire safety.

Furthermore, this report documents any potential shortfalls in fire safety measures and enables BE to address these where necessary and document them in their Fire Risk Assessment (FRA) for the building where required.

The purpose of the report is to provide the following:

- Identify any tests that should be undertaken to create evidence of building operation where that is missing;
- Identify potential remediation measures, where current fire safety systems do not provide adequate fire safety for occupants;
- A retrospective fire strategy report and associated fire safety drawings and recommended remediation measures.

These goals are identified to be provided for four different typologies of buildings to give an overall fire strategy for all 22 buildings within the Barbican Residential Development.

Areas that require more information/ confirmation is required from BE are identified by brown text throughout this report.

1.3 Barbican Residential Development

The buildings in the Barbican Residential Development were constructed from 1960 to 1982. There are 22 buildings in total as shown in Figure 1. There is a distinctive design feature across the Barbican Residential Development, which is the provision of a podium. It was constructed with an intention of providing a liveable urban environment for pedestrians and acts as ground level for the buildings[1].

In terms of fire safety design, the podium level throughout the Barbican Residential Development is considered as an access level for all of the buildings. Access level is defined in BS 9991 as ‘level used for normal access to the building that either incorporates, or leads directly to, a place of ultimate safety’. Therefore, the podium is considered a place of ultimate safety, serving as the exit discharge level for the stairs.

Figure 1: Overview of the Barbican Residential Development (Image courtesy Barbican Living)

Arup in conjunction with BE have identified four different block typologies which are common across the residential development. The typologies are as follows:

[1] Barbican Estate, *Barbican Living*, *https://www.barbicanliving.co.uk/*, *(accessed 16 March 2021)*

- High rise tower – Cromwell Tower;
- Terrace block type 1 – Andrewes House;
- Terrace block type 2 – Ben Jonson House;
- Terrace block type 3 – Mountjoy House.

Flats across Cromwell Tower are generally privately owned by leaseholders with a small portion of the flats being owned by the BE and let out to tenants.

2 Fire Safety Goals

2.1 Statutory and policy goals

The legislation, regulations and relevant standards contained within the following sub-sections have been referenced as part of Arup's review of the existing building. These are the requirements that are applicable to the existing building.

2.1.1 Regulatory Reform (Fire Safety) Order 2005

The Regulatory Reform (Fire Safety) Order 2005 (RR(FS)O) places a general duty of fire safety care on employers, occupiers and owners of almost all premises and requires them to take such fire precautions as may be reasonably required to ensure that premises are safe for the occupants and those in the immediate vicinity.

The responsible person has a duty to carry out a fire risk assessment which must focus on the safety in case of fire of all 'relevant persons'. The risk assessment should pay particular attention to those at special risk, such as the disabled and those with special needs, and must include consideration of any dangerous substance likely to be on the premises.

A fire risk assessment (FRA) was undertaken in January 2018 by Frankham Risk Management Services. A number of risks have been identified and need to be resolved in order to comply with RR(FS)O. Reference to these items has been included in the relevant sections of the fire strategy.

2.1.2 Building Regulations 2010 (as amended)

The fire safety review is undertaken to establish compliance against the functional requirements of Part B of the Building Regulations 2010 (as amended), using the recommendations in BS 9991:2015 (see Section 2.1.3) as the basis of the review. Where applicable, BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice and the Approved Document B Volume 1: Dwellings 2019 Edition Incorporating 2020 Amendments – For use in England, which has been updated recently to reflect the latest requirements for residential buildings has also been referenced.

2.1.3 BS 9991:2015

The existing building has been assessed against BS 9991:2015 - Fire safety in the design management and use of residential buildings – Code of practice. A guidance document which provides a means of demonstrating compliance with the life safety requirements of Part B of the Building Regulations 2010 (as amended) (herein referred to as "BS 9991"). This is used as the benchmark in developing the fire strategy for the building.

2.1.4 Barbican Estate fire safety goals

Through meetings with the BE, Arup has identified that the main objective of this fire safety review is the life safety of the building occupants. Arup is not aware of any additional requirements for property protection, either from BE or their insurer. This is to be confirmed by BE.

2.2 Proposed methodology

The existing fire safety precautions of Cromwell Tower are compared with the current recommendations in BS 9991. Where the provisions and recommendations align, no further action is required, and the existing provisions are recorded in this report to form the building fire strategy.

Where the provisions are not deemed to comply with the recommendations of BS 9991, a qualitative risk assessment will be carried out to identify the life safety risks to the building occupants due to those non-compliances or gaps in the fire safety precautions. The outcomes of the assessment will result in one of the following:

1. Where considered acceptable to remain as existing, recommend retaining the current provisions; or
2. Recommendations on possible options for enhancements/upgrades where the current fire safety provisions are considered inadequate.

It should be noted that as the building is existing, it is not feasible for all provisions to be in line with current fire safety standards. Where appropriate, the relevant guidance documents at the time of construction of the building have been used as reference.

2.3 Referenced documentation

The following information has been used to inform the Andrewes House fire strategy and fire safety systems provisions:

- Meetings between Arup Fire and BE between August 2021 to February 2022;
- Barbican Living website;
- Various email correspondence between Arup Fire and BE between August /2021 to February 2022;
- Referenced documents and drawings listed in Table 2;
- Visual non-intrusive site visit undertaken on 20/08/2021;
- Visual non-intrusive site visit undertaken on 17/01/2022.

Table 2: Referenced documents and drawings

Document title	Produced by	Date	Revision
Cromwell Tower External Fire Risk Assessment	Frankham Risk Management Services	Jan 2018	-
CP 114:1957 *British Code of Practice, The Structural Use of Reinforced Concrete in Buildings*	British Standards Institution	1957	-
CP 3: 1962 *British Code of Practice Chapter IV Precautions against fire Part 1. Fire precautions in flats and maisonettes over 80 ft in height*	British Standards Institution	1962	-
BS EN 1992-1-2-2004: Eurocode 2 *Design of Concrete Structure Part 1-2: General rules – Structural fire design*	British Standards Institution	2004	-

Document title	Produced by	Date	Revision
The fire resistance performance of a single leaf single acting door set with side screen and over panel, when tested in accordance with BS 476:Part 20/22: 1987	Exova Warringtonfire	23rd Oct 2018	-
Drawing no. 33 517 Block Three Wall elevations Levels 77' – 95'	Ove Arup & Partners	May 1964	Rev D
Drawing no. 33 550 Block Three	Ove Arup & Partners	Feb 1968	Rev H
Drawing no. 33 F12 Block Three Plan of Floor 39 finishes	Ove Arup & Partners	July 1968	Rev A
Drawing no. 33 F9 Block Three Plan of Floor 36 finishes	Ove Arup & Partners	July 1968	-
Drawing no. 33 507 Block Three 95' level plan	Ove Arup & Partners	May 1964	Rev E
Abridged results from the test of 86 Thomas More House (double leaf door and single leaf door)	CTO S.A	2020	Issue

2.4 Limitations and assumptions

2.4.1 Limitations of report

This document summarises the findings of our work carried out to date. It does not attempt to quantify actual elements of fire performance, such as fire resistance periods, across the building in its existing state as physical intrusive works would be required to do this. It is Arup's understanding that intrusive investigations into the building is not planned to be carried out.

There are no architectural layouts of the building. Structural plans of Cromwell Tower have been obtained through Arup Archive and used to better understand the building layout. However, this is not a complete set covering the building and are limited to some levels of the building only. The fire strategy drawings provided as part of this report are based on those published in the Barbican Living website. In using these documents, it is assumed that the layouts remain representative of the current arrangement in Cromwell Tower.

BE should undertake the necessary tests/inspections to confirm that the fire safety systems will operate as intended in a fire event.

The information documented in this fire strategy is limited to the amount of information covered through the following:

- Desktop review;
- Consultation with the BE;
- Visual non-intrusive site visit undertaken on 20/08/2021, where the areas visited included outside and inside of Cromwell Tower
  - Street (L01) and Podium level;
  - Common area (lift lobby, stairs) on some of the Residential levels (L1 – L39);
  - Common corridors including a few storage and plant rooms (L02 – L03);
  - Car park (L02);
  - Shakespeare Tower - Internal flat layout for Wing C

The fire strategy does not represent the condition for the entire building.

2.4.2 Summary of key assumptions

The following key assumptions have been made to form a basis of the fire strategy for Cromwell Tower. BE should confirm if these assumptions are suitable for the project.

- Any current or future building works and their impact on the fire strategy are outside the scope of this document;
- No further inspection/survey is planned such as intrusive investigation on the building;
- The building is not undergoing any changes at all, with no change in occupancy nor material alterations;
- The fire strategy drawings within the report are in line with the current building layout;
- Structural drawings are only available for apartment levels L36 and L39. It is assumed that all other levels have a layout that is in line with the two levels and follow the same fire safety principles throughout the building;
- The information from the document 'The fire resistance performance of a single leaf single acting door set with side screen and over panel, when tested in accordance with BS 476 Part 20/22:1987' on the doors from Shakespeare are assumed to be the same as the ones from Cromwell Tower. E – 30mins achieved, I – 24mins;
- All elements shown in the structural drawings are assumed to be elements of structure and therefore loadbearing;
- The thickness of structural elements (i.e. slab depth or wall thickness) are assumed to be the same throughout the building;
- All structural elements are reinforced concrete;
- The concrete covers over the reinforcement bars meet the values stated in the relevant guidance at the time of construction (CP114); there is no information on the depth of the existing concrete covers for this aspect to be assessed;
- Floor slabs are simply supported one-way slabs throughout the building;
- No structural calculations are available and therefore the utilisation factor of the structural members is unknown. When checking against the requirements of Eurocode 2 (Section 4.3.1) a utilisation factor of 0.7 has been assumed for conservatism;
- The fire resistance requirements given in CP114 cover loadbearing capacity, integrity and insulation;
- There is no fire stopping register for the building. The condition of the fire stopping at penetrations on fire rated construction is unknown. It is assumed that fire stopping remediation actions will be undertaken as part of ongoing maintenance;
- Boundary distances have been taken to the middle of Beech Street and Silk Street as there is no site boundary information available;
- The single enclosed stair that connects Podium level to L39 is a firefighting stair;
- The layout of the flats in Cromwell Tower is identical to the flats in Shakespeare Tower.

3 Cromwell Tower

Cromwell Tower was completed in January 1973. It is a high-rise residential tower which sites between Ben Jonson House and Frobisher Crescent. The building contains 108 flats and 3 penthouse maisonettes[1].

The building consists of a single stair where the stair is connected to the lift lobby containing three lifts with one being the firefighting lift (installed in accordance with BS 5588-5:1986 as confirmed by Steve Clarke on 08/04/2021 via email correspondence). As the stair is fully enclosed and considering the height of the building being over 30 m, it is likely to be a firefighting stair and therefore, it is known as such in the report.

There are two internal stairs (referred to as '1 down stair' or '2 down stair') in the building that connects between the balcony and the lift lobby in the lower levels. One example of 1 down stair is shown in Figure 4.

The flats in the building have access to the following:

- All levels - Main flat entrance connected to the lift lobby with access to the firefighting stair and lifts;
- L6 – L39 - Balcony which leads directly to stair (either the firefighting stair, 1 down stair or 2 down stair depending on the wing type/location) – See Figure 3;

The building consists of 41 floors with a building height of 108 m (assuming floor to floor height of 2.7 m, drawing number 33 550) measured from ground to the bottom of the topmost occupied storey. The *Grenfell Tower Inquiry: Phase 1 report* defines high-rise buildings as buildings over 18 m in height and hence Cromwell Tower is considered a high-rise building.

The building comprises of the following:

- Roof level;
- L40 – L41: ventilation plant (L40) and lift machine room (L41);
- L1 – L39: Residential flats (3 flats in each level) and duplex or triplex at the top level of each wing:
  - Duplex on L39 and L40;
  - Triplex on L37 – L39;
  - Triplex on L35 – L37.
- Podium level: Circulation space;
- L01 (Street level): reception and main entrance;
- L02 – L03: Plant/storage area in addition to a car park;
- L04 Subway level.

The roof level is only accessible to BE staff via the external helical stair extended from the firefighting stair.

L04 which is known as the 'subway' is connected to Cromwell Tower via one of the plant rooms in L03. It contains services and extends throughout the Barbican Estate. The area is excluded from the scope of this document.

The building comprises three wings (Wing A, B and C) with a single flat in each of the wings on every floor above L1. There are three balconies in the tower, one for each of the wings that are connected to one of the three stairs (one firefighting stair, 1 down stair or 2 down stair). Each of the stairs are connected as follows:

- Firefighting stair: runs through all of the residential floors (L1 – L39) and provides a final exit at Podium level;
- 1 down stair (stair between Wing A and B): connects the Wing B balcony with the lift lobby one level below, for L7 – L39;
- 2 down stair (stair between Wing A and C): connects Wing A balcony with the lift lobby two levels below, for L7 – L39;
- From L6 to L01, the protected stair is the only available stair;
- The exit via dining room leads to adjacent flat's balcony to enter either the firefighting stair or one of the 1 down stair or 2 down stair(L7 – L39).

As there is one stair (firefighting stair) which runs through the residential floors of the tower, the building is considered to be a single stair building.

The main entrance which is used by the occupants on a day-to-day basis, can be accessed from Beech Street. It also acts as the main firefighting access point into the building. It should however be noted that whilst fire service access to the building is considered to be at Street Level, the firefighting shafts can only be accessed at podium level. Therefore, fire service will enter the building at Beech Street level via the reception, walk up the internal open stair (which is separated from the residential levels above) and transfer to the firefighting stair at podium level. This is shown in Figure 2.

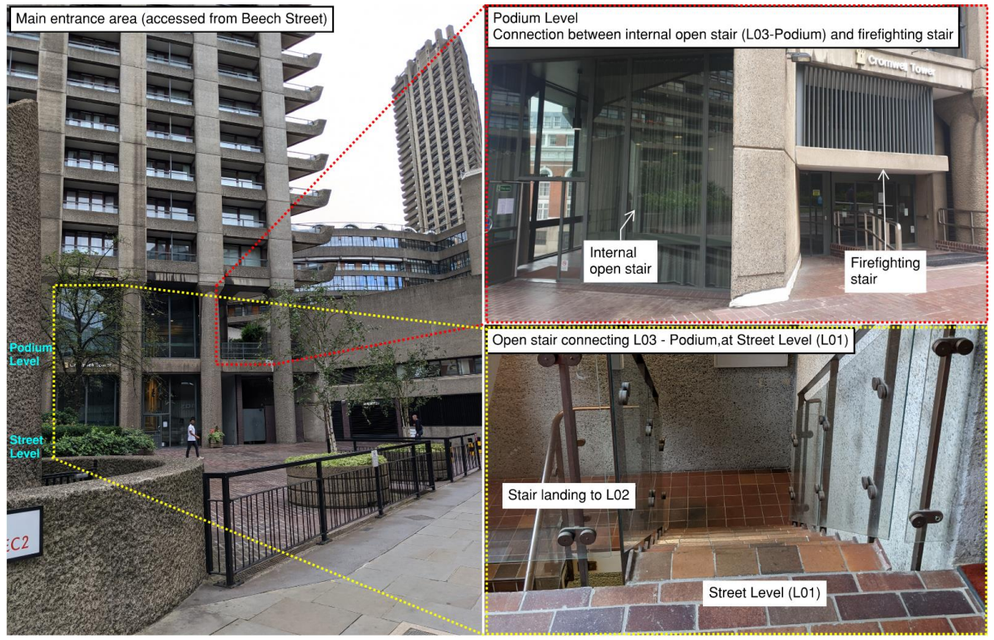


Figure 2: Access to Cromwell Tower from Street Level and Podium Level

The layout of residential floors (L1 – L39) of Cromwell Tower is as shown in Figure 3 and section of part of Cromwell Tower in Figure 4.

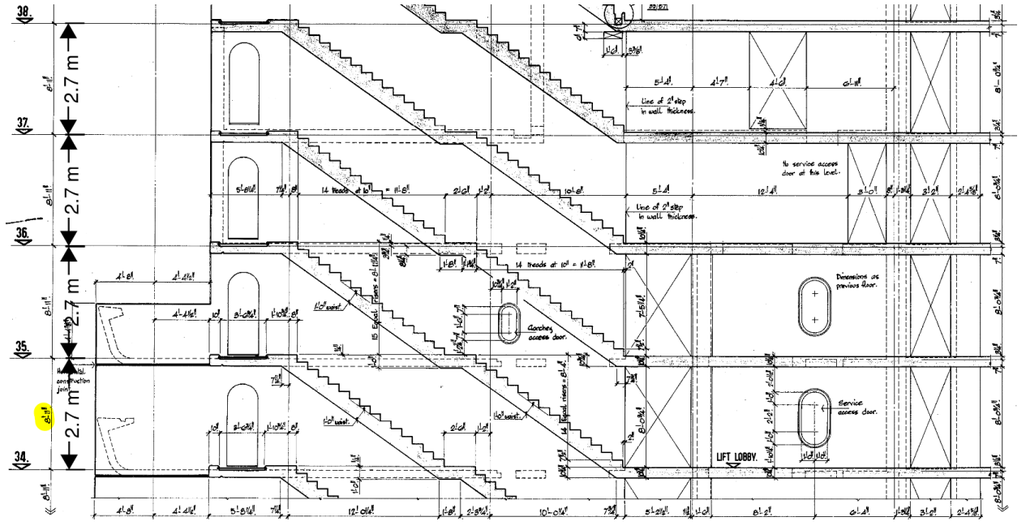


Figure 4: Section of Cromwell Tower from L34 to L38

Figure 3: Layout of Cromwell Tower

4 Fire Strategy Summary

This section of the report provides an overview of the fire strategy of Cromwell Tower. It provides the following:

- The recommendations of current guidance;
- The current provisions in Cromwell Tower;
- Identification of non-compliances against the current provisions;
- If there are non-compliances identified, three possible solutions through a risk assessment:
    1. The non-compliance is considered to present life safety risk and requires remediation. Recommendations are made to improve the current provisions to comply with the Building Regulations on an as near as reasonably practicable basis;
    2. The non-compliance is not considered to be high risk to require additional safety measures to the existing system. It is considered acceptable to be retained; OR
    3. More information/confirmation is required from BE (brown text)

Where a non-compliance has been identified and a recommendation has been made after a risk assessment, these have been highlighted in green box.

4.1 Means of warning and escape

4.1.1 Evacuation strategy

Cromwell Tower operates under a defend in place/stay put strategy where only the occupants in the flat of the fire origin evacuate the building. The rest of the building occupants will remain in place. The defend in place strategy is a common strategy for residential buildings in the UK.

It is recommended that information is given to residents regarding the meaning of the stay put strategy and the arrangements for means of escape is available to them if a fire were to affect their flat. It is noted from the Frankham's FRA that fire action notices are not definitive enough in communal areas. It is recommended for signage to be replaced with clear instructions to residents, explaining their fire actions, including the stay put policy and their nearest escape routes.

Whilst the above approach is compliant with the recommendation of BS 9991, the *Grenfell Tower Inquiry: Phase 1 report* recommends that all high-rise residential buildings, existing and new, are provided with facilities to allow the fire and rescue service to simultaneously evacuate the building. This is recommended to be implemented for Cromwell Tower considering the height and the single stair serving the building. Refer to Section 4.1.9 for additional details on the fire detection and alarm system.

4.1.2 Means of escape within flats

From BS 9991, flats having an entrance on the same level as the flats should have all habitable rooms to be accessible from an internal hallway and have an alternative exit from the flat. There are no maximum travel distance recommendations in this arrangement.

As shown in Figure 5, the original intention of the flat layout was to provide an internal hallway to separate all habitable rooms from the internal corridor. However, it has been confirmed by BE that most of the flats no longer have the door separating the internal hallway from habitable rooms which is a non-compliance to the current recommendations.

For able-bodied occupants (refer to Section 4.1.6 for evacuation of Persons with Reduced Mobility, PRM), this is considered acceptable if automatic fire detection and alarm system of Grade D1 Category LD1 is installed within the flats (refer to Section 4.1.9 for further details on the recommended fire detection and alarm system) and under the basis that the flats are provided with alternative escape routes as follows:

- Through the balcony which is accessible through all habitable rooms;
- Through the dining room to enter neighbour's balcony.

Figure 5: Available egress routes for a typical flat layout

The current layout of duplex and triplex layouts is different to the typical residential levels with three flats in each level. The layout shows that some habitable rooms open directly into the open stair leading to the living room; the open stair, which is the escape route, could be compromised by a fire in the living room. It is therefore recommended to review the internal

layouts of the duplex and triplex in terms of exit provisions and travel distances against the current regulations.

Recommendations:

- Provide automatic detection and alarm system of Grade D1 Category LD1 within the flats – refer to Section 4.1.9 for further details.
- Review the internal layout of the duplex and triplex in terms of exit provisions and travel distances.

4.1.3 Means of escape in common areas

BS 9991 recommends that for a building with a lobby approach, either of the following should be adopted:

- The travel distance between the exit doors from the dwellings and a smoke free area should be limited to 7.5 m, and the amount of smoke and other combustion products in the internal lobby kept to a minimum by providing either cross corridor fire doors and ventilation, or a mechanical smoke ventilation system, or
- An independent alternative escape route should be provided from each dwelling either by way of a corridor at another level or through an external common balcony meeting the following recommendations:
  - Structure including the floor is to be protected to achieve 30 minutes fire rating.
  - Walking surface should be imperforate.
  - The balcony to be open-sided and the opening to achieve at least 50% of the vertical plan.

Lobby approach: L7 – L39

The horizontal means of escape from each flat consist of the flat main entrance leading to the passenger lift lobby and into the firefighting stair as the primary means of escape. Alternatively, there is a route via the balconies to access one of the three stairs provided in the building (where only one is a firefighting stair). The escape routes are as follows:

- **Flat entrance –** There are three stairs (one firefighting stair, 1 down stair and 2 down stair) connected to the lift lobby, where each of the flat entrances directly open into. From the lift lobby, occupants can use the firefighting stair through the small lobby to evacuate the building.
- **Balcony exit –** All habitable rooms have a door which leads directly to the balcony. Once on the balcony, occupants can escape to one of the stairs connected to the balcony
  - Firefighting stair: occupants can use the stair to exit the building (Wing C);
  - 1 down stair and 2 down stair: occupants will reach the lift lobby either one or two levels below the flats, where they can then pass through the lift lobby to reach the firefighting stair to reach the final exit (Wing A & B).
- **Dining room exit** – All flats have a door in the dining room which leads to the adjacent wing's balcony where they can use the stair connected in an identical way as the balcony exit.
  - Firefighting stair: as above in Balcony exit (Wing B);
  - 1 down stair and 2 down stair: as above in Balcony exit (Wing A & C).

As shown in the travel distance within the unventilated lobby is greater than 7.5 m and exceeds the recommended travel distance.

Figure 6: Travel distance in the unvented lift lobby to the firefighting stair

The width of the balconies is 830 mm. It was identified during the site visit, that furniture is located along the balcony in certain levels of the tower as shown in . These should be removed so that the escape route remains unobstructed.

Figure 7: Furniture along the balcony

However, all of the flats are provided with balconies as an alternative escape route and therefore is not restricted by maximum travel distance of 7.5 m. Based on the photo of the balcony in and structural drawings, the balcony achieves the following:

- The floor slab of the balcony achieves a nominal fire rating of 120 minutes – refer to Section 4.3.1 for further details);
- The walking surfaces are solid concrete pavers and imperforated;
- The balconies appear to achieve the opening to be at least 50% of the vertical plane and uniformly spread across the surface.

And therefore, meets the recommendations of BS 9991.

Lobby approach: L1 – L6

From L1 to L6, there are no 1 down stair and 2 down stair that leads to the lift lobby in the lower levels. For Wing A, the only means of escape is from the flat entrance, through the lift lobby and the small lobby to the firefighting stair. Wing B and C have an alternative escape route where they can use the balcony to enter the firefighting stair directly either from the dining room exit (Wing B) or the balcony (Wing C).

The current evacuation procedure includes an escape route from Wing A to escape via the dining room to enter Wing B where they can use the provided key to enter Wing B to access the firefighting stair.

In order to ensure safe egress route is provide in all flats in L1 to L6, there are following options recommended:

- Retain the existing arrangement of escaping via neighbour's flat from Wing A, provided that there is regular inspection in place to check that the means of escape route via the adjacent flat (Wing B) is available, including checking the keys are in place. The inspection should include both the provisions in the common areas and maintaining the escape paths within the flats, or
- Providing compartmentation to kitchen area as this is the highest risk, or
- Provision of a protected internal hallway.

As the existing means of escape strategy for Wing A occupants between L1 to L6 to evacuate from their flat to neighbouring flat is unconventional, if the existing strategy is to be retained, it is required to be maintained otherwise travel distances are excessive, unless other recommendations listed above are provided to the flats.

The provision of sprinkler system will also address the risk of the single means of escape from the flat being compromised by the fire.

Podium and Street level (L01)

Both Podium and Street level (L01) have direct exit to outside. Podium level to L02 is connected by an internal open stair (950 mm in width).

This complies with the current guidance as there are direct exits to outside on both levels where occupants can use an alternative exit if one is discounted.

During the site visit, it has been confirmed that the lift lobby on Podium level is currently not being used. The facility management team should ensure that there are no stored goods within these areas as it may increase the risk of fire starting in the area and lead to smoke/fire spread to the lift shafts.

Below Street level (L02 – L03)

Both L02 and L03 are provided with two escape routes as follows:

- Internal open stair adjacent to the lift lobby which can be separated from occupied areas by a manually operated fire shutter. The internal open stair leads to the reception on L01 Street level and on to the final exit;
- Helical stairs (750 mm in width) located on the far end of the storage/plant corridor as an alternative means of escape in the event of the shutters close due a fire in the vicinity.

This complies with the current guidance as there is always an alternative means of escape from L02 and L03.

Plant area (L40 – L41)

The ventilation plant (L40) and the lift machine room (L41) both have two means of egress from the room to reach the firefighting stair and is considered compliant.

Recommendations:

- A management procedure should be put in place to keep the balconies clear of any obstacles at all times. This is to provide a clear escape route for occupants to evacuate in an emergency.
- A management procedure should be put in place to keep the lift lobbies clear of any stored goods at all times. This is to ensure the area is kept as a low risk area to prevent fire from starting.
- It is recommended to for L1 – L6 to be provided with one of the following options:
  - Retain the existing arrangement of escaping via neighbour's flat from Wing A, provided that there is regular inspection in place to check that the means of escape route via the adjacent flat (Wing B) is available, including checking the keys are in place. The inspection should include both the provisions in the common areas and maintaining the escape paths within the flats, or
  - Providing compartmentation to kitchen area as this is the highest risk, or
  - Provision of a protected internal hallway.
- Provision of sprinkler system will also address the risk of the single means of escape from the flat being compromised by the fire.
- Refer to Section 4.1.6 for additional recommendations for single means of escape.

4.1.4 Vertical means of escape (stairs)

Minimum width

1 down stair and 2 down stair are required by BS 9991 to be no less than 750 mm, measured between the walls and/or balustrade (if protruding less than 100 mm from the walls). A minimum 2 m clear height shall be maintained. BS 9991 also states firefighting stairs should have an unobstructed width of 1100 mm.

Cromwell Tower is provided with the following stairs across different levels:

- L7 – L39: Three stairs where one is a firefighting stair, and additional 1 down stair and 2 down stair. The width of the firefighting stair is 1000 mm and the two other stairs have been measured (during the site visit) as 760 mm;
- L1 – L6: Only the firefighting stair is provided;
- L02 – L03: Three helical stairs (width of 750 mm) to Street Level (L01)
- L03 – Podium Level: An internal open stair (width of 950 mm) connecting basement levels to Reception on Street level and on to Podium level.

Refer to 4.5.3.1 for details of the firefighting stairs.

Protected lobby

Each apartment opens directly into the protected lift lobby which is connected to the 1 down stair and 2 down stair. The firefighting stair is provided with an additional lobby between the lift lobby and the firefighting stair as shown in Figure 5.

Ventilation to lift lobby

There are currently manually openable vents in the lift lobby. There are two different types of vents across different levels of Cromwell Tower which are as follows:

- L1 – L6: There are two vents (in the same location where the 1 down stair and 2 down stair are located in the upper floors) within the lift lobby which have manually openable louvres, operated by winding handles at the bottom of both sloped shafts as shown in Figure 8;
- L7 – L39: There are 1 down stair and 2 down stair doors (which open to the flat balconies) as shown in Figure 9 that can be opened by striking off heads of cast securing bolts.

The current arrangement is not considered acceptable in terms evacuation of PRMs. Refer to Section 4.1.6 for further details and recommended actions.

Figure 8: L1 - L6 sloped ventilation shaft

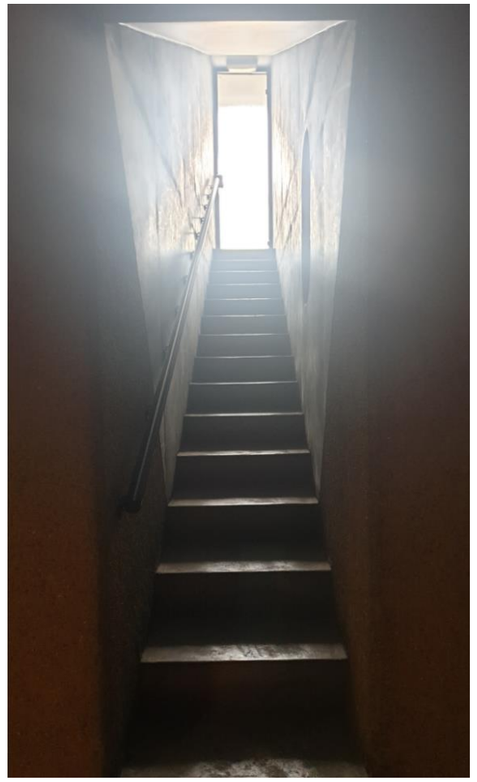


Figure 9: L7 - L39 1 down stair and 2 down stair

4.1.5 Final exits

Level of discharge

Final exits are available on both Podium and Street (L01) levels. All residential levels will exit via the Podium level using the firefighting stair.

In accordance with BS 9991, discharge from final exits should meet the following recommendations:

- Protected stairs should discharge directly to a final exit;
- Final exits should discharge directly to a walkway or open space that allows for the rapid dispersal of persons away from the vicinity of the building, which is achieved by the Podium and Street level;
- Final exits should have a level threshold;
- Final exits should be sited such that they are clear of any risk from fire or smoke

It has been confirmed during the site visit that both the Podium and Street level is levelled and an open public walkway, mainly of non-combustible construction and with very low fire load

content. The reception in the Street level (L01) should be managed as a low fire load area as it forms part of an escape route.

Place of ultimate safety

The Podium level is an external walkway which runs along Cromwell Tower and connects to other buildings in the Barbican Residential Development and adjacent developments. The Street level main entrance is open to pedestrian accessway on Beech Street. The Podium and Street level final exits act as a place of ultimate safety (a place where there is no immediate or future danger from fire). The area in front of the main entrance acts as a point of access for fire service.

The internal open stair, which is not part of the firefighting stair, connects the Podium to Street level as shown in Figure 10. The occupants from above Podium level must exit the firefighting stair to outside of Podium level. The occupants from below Podium level can exit the building on L01 Street level. Both final exits on each level allows for the dispersal of occupants away from Cromwell Tower in the event of a fire.

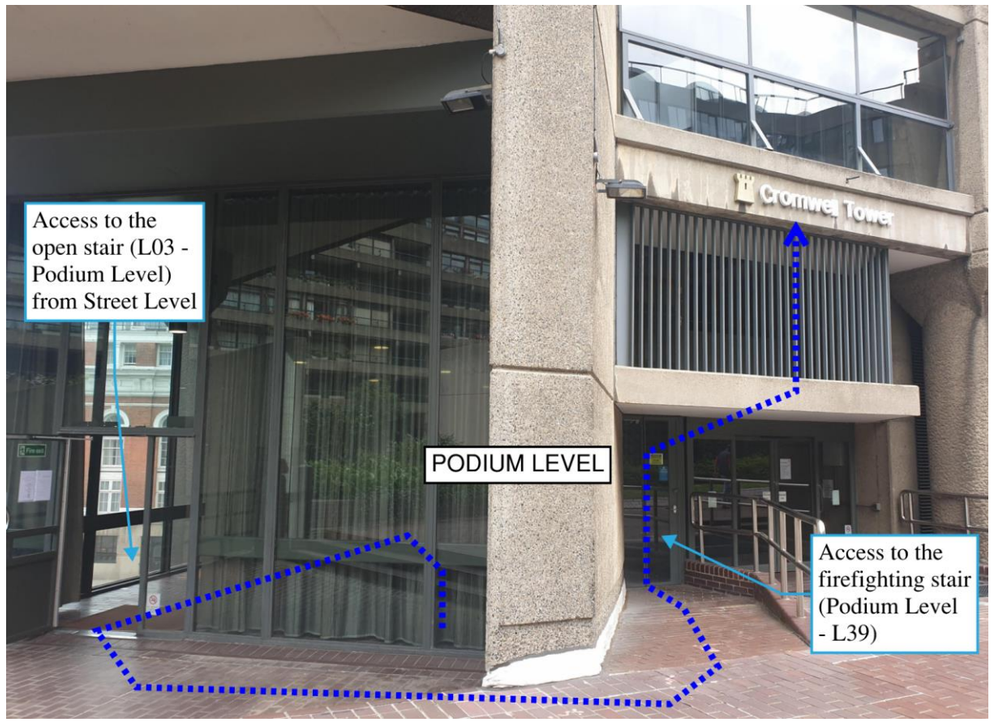


Figure 10: Access to Cromwell Tower on Podium level

Recommendations:

- BE should ensure the reception area is kept as a low fire load area at all times as it forms part of an escape route for occupants from L02-L03.

4.1.6 Evacuation of PRMs

Cromwell Tower currently does not have an evacuation strategy or Personal Emergency Evacuation Plan (PEEP) for PRMs. In this report, the term PRM is used to mainly refer to occupants who are wheelchair bound, but the term is applicable to occupants with varying levels of mobility.

As discussed in Section 4.1.3, each flat in the residential levels between L7 to L39 has alternative escape routes including access to balconies. However, there is a small change in level between the flats and the balconies. As such, the balconies will not be accessible to PRMs. In addition to this, the only route from the balconies to the lift lobby is via the 1 down stair and 2 down stair which is not step free. Therefore, for PRMs there is only a single means of escape using the flat entrance.

Existing provisions

Extended travel distance

BS 9991 recommends maximum travel distance of 9 m for single means of escape within flats protected by automatic detection system.

As there is only a single means of escape for PRMs, the travel distances within the flat should be limited to 9 m from the furthest point in the flat. As the flats do not have a common internal corridor serving all rooms, the current travel distance within the flats to the entrance door ranges between 14.9 m to 18.2 m which exceeds the recommendations of BS 999, as shown in Figure 11 below.

Figure 11: Extended travel distance for single means of escape for PRMs

Lack of safe refuge

All flats open directly into the lift lobby. Smoke from a fire in the incident flat could spread into the lift lobby during evacuation when the entrance door to the lobby is opened. There is no automatic smoke ventilation in the lift lobby nor emergency voice communication (EVC) system in the building.

The firefighting stair could serve as the safe refuge as it is separated from the lift lobby by a small lobby. However, the small lobby (floor area of 1.6 m^2) is very restricted in space with two consecutive doors that must be opened to enter the firefighting stair. It may not be possible for PRMs to reach the safe refuge in the stair. It is also challenging for PRMs to be assisted down the stair from a building of such height.

The lack of automatic smoke ventilation within the lift lobby, potentially causing the lobby to be smoke logged in addition to the difficulty of PRMs to access the firefighting stair (potential space for safe refuge) presents a life safety risk to the building occupants.

Lifts grounding system

The current lift mechanism and whether they ground upon activation of detectors within the lift shafts is unknown. There are currently no evacuation lifts in the building and hence the only area where PRMs can wait for assistance to evacuate is the lift lobby.

Doors to firefighting stair

BS 9999 recommends the total door width should be not less than 850 mm where unassisted wheelchair access is necessary.

During the site visit, it was confirmed that the doors to the firefighting stair were 760 mm.

Proposed improvements

There are a number of non-compliances in the existing arrangement which poses additional risk for PRMs means of escape provision. It is therefore recommended to provide the following:

- Automatic ventilation system within the lift lobby to prevent smoke logging to allow PRMs to wait in a safe area.
- To install EVC system in the lift lobby for PRMs to notify the security or the fire service that there is fire and for them to be assisted to evacuate the building.
- Personal Emergency Evacuation Plan (PEEP) for each PRM resident should be prepared so that they are clear about their evacuation arrangement in the event of a fire. This should be done as a first priority.

Refer to Section 4.3.3 for further details and recommendations on fire doors.

Recommendations:

- Provide an emergency voice communication (EVC) system on each lift lobby, for the PRMs to call for assistance.
- Provide an automatic fire detection and alarm system for each flat (Section 4.1.9 for details).
- BE to put in place management plan and evacuation strategy for the evacuation of occupants, in particular for PRMs which includes preparing PEEP as an immediate action.
- Clear briefing to all occupants of Cromwell Tower on available escape routes.
- Clear briefing to PRMs on the evacuation procedures and the use of emergency voice communication system to call for assistance.
- Replace the manually operated smoke vents to automatically openable vents upon activation of a detection system

4.1.7 Exit signage

BS 9991 recommends exit signage to be in accordance with BS 5499-4 and BS ISO 3864-1. In particular, for stairs that serve storeys both above and below the point of final exit, the final exit should be immediately apparent by the provision of additional signage.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that in all high-rise residential buildings, floor numbers are clearly marked on each landing within the stairways and in a prominent place in the lobbies such that they can be seen in normal conditions and in low lighting and smoky conditions.

Existing provisions

BE confirmed emergency exit signage are unlit in Cromwell Tower.

BE advised that there is a sitewide inspection (currently paused) to examine the condition of existing signage and to replace them where necessary.

Proposed Improvements

All exit signage provided in Cromwell Tower is recommended to be in line with BS 5499-4, BS ISO 3864-1 and the additional recommendations from Grenfell Tower Inquiry Phase 1 report.

Recommendations:

- BE to carry out a sitewide inspection and provide exit signage in accordance with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report.

4.1.8 Emergency lighting

In accordance with BS 9991, emergency lighting should be provided in accordance with BS 5266-1.

Existing provision

Cromwell Tower is provided with an emergency lighting system with battery back-up. During the site visit, it was not possible to determine the light fittings that are part of the emergency lighting system.

Proposed Improvements

A full survey on emergency lighting is recommended and to remediate any of the non-compliances throughout the building for emergency lighting to be in line with BS 5266-1.

Recommendations:

- BE to carry out a sitewide survey and provide emergency lighting in accordance with BS 5266-1.

4.1.9 Fire detection and alarm

BS 9991 recommends that flats in multi-storey buildings shall be provided with an alarm and detection system in line with BS 5839-6. The recommended system for an existing flat with no alternative means of escape is Grade D1 Category LD1, where Grade D1 is a provision of one or more mains powered detection system each with a sealed in standby supply consisting of a battery and Category LD1 system is where full coverage is provided giving earliest practicable warning of fire to occupants, wherever ignition occurs.

In addition to the recommendations of BS 9991, the Grenfell Tower Inquiry: Phase 1 report recommends that all high-rise residential buildings, existing and new, are provided with facilities to allow the fire and rescue service to simultaneously evacuate the building. High-rise buildings are defined as buildings over 18 m in height and hence Cromwell Tower is considered a high-rise building.

Existing provisions

The External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018 states that different flats have different levels of fire alarm and detection varying from Grade D Category LD2 to having no means of providing detection and alarm.

During the site visit it was confirmed that the flats and common areas are not provided with a fire detection and alarm system. The storage and plant areas in L02 and L03, lift shafts and the upper floor plant rooms (L40 ventilation plant, L41 lift machine room) are provided with Category LD3 detection and alarm system.

In the case of privately owned flats, it is the responsibility of the owners to install an alarm and detection system. It should be noted that this is only a recommendation by BE as the freeholder, and not compulsory. BE has no record of the flats that are equipped with such system within the flats.

Proposed improvements

A Grade D1 Category LD1 system in line with BS 5839-6 is recommended for all the flats and in the lift lobbies in Cromwell Tower, due to the following reasons:

- An improvement to the flats with extended travel distances due to the lack of an internal hallway within the flat. The system provides an early warning to occupants so that they quickly evacuate from their flat.
- An improvement to evacuation of PRMs, with a single means of escape and requiring assistance to evacuate to the place of ultimate safety.
- Due to the potential risk of fire/smoke spread via the kitchen extract shunt duct arrangement (see Section 4.3.6), the detection and alarm system provides improvement by providing early warning in case of breach of compartmentation.
- BS 5839-6 gives recommendations to the new and existing premises separately. There are specific systems identified for existing premises which shows the importance of providing adequate fire detection and alarm system for existing buildings and not just for new builds.
- Provision of detection system in the lift lobby will allow activation of automatic ventilation systems within the lift lobby to allow PRMs to wait in without smoke logging in the lift lobby.

Recommendations:

- Provide a Grade D1 Category LD1 system in line with BS 5839-6 is recommended for all the flats in Cromwell Tower
- Provide detection in the lifts lobbies to automatically active the ventilation systems within the lift lobbies.
- The facility to simultaneously evacuate the Tower should be considered in conjunction with the recommendations above, as the additional infrastructure or cost to implement such facility may be minimal.

4.1.10 Fire suppression

Based on BS 9991, sprinkler protection is required for buildings with a floor higher than 30 m above ground level. However, the recent revision of ADB Volume 1: 2020 amendment states that the threshold building height (for residential buildings) for the provision of sprinklers has been reduced from 30 m to 11 m.

Existing provisions

Cromwell Tower is not provided with sprinkler protection, with the floor to floor height being 2.7 m, the building height from ground to the topmost occupied storey is 108 m. (drawing number 33 550).

Proposed Improvements

British Standard Code of Practice CP3: Chapter IV (1962) which was the relevant code at the time Cromwell Tower was built (1973) does not require any sprinkler protection to high-rise residential buildings. There is no requirement in the Building Regulations for existing buildings to comply with the current guidance, except where building works have taken place.

Sprinklers were not required at the time of construction.

However, the building adopts a stay-put policy, which relies on maintaining compartmentation between each flat and between the flat and the common areas. From the findings in the External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018, it has been identified that unauthorised structural alterations have been undertaken by/on behalf of the residents in several instances, causing breach in compartmentation between the flats.

In addition, this is a high-rise building with a single stair, extended travel distances within the flat and some of the residents have mobility impairment.

Due to these factors, it is recommended that a sprinkler system is provided.

BE have confirmed that insurers (from their consultation on the 23/07/2021) have no requirement to install sprinklers anywhere within the Barbican Residential.

Recommendations:

- Install sprinklers, as a solution to mitigate multiple risks including compartmentation, single means of egress etc.

4.1.11 Smoke control

BS 9991 recommends one of the following to be provided as a smoke control system for buildings with a floor level over 11 m above ground level served by a single stair:

- AOVs to the exterior of the building with a minimum free area of 1.5 m^2 fitted in the common corridor or lobby directly adjacent to the stair and an AOV on top storey of the stairway with a minimum free area of 1.0 m^2 both located as high a level as is practicable;
- A smoke shaft that is fitted in the protected lobby and an AOV that is sited on top storey of the stairway with a minimum free area of 1.0 m^2 located as high a level as is practicable;
- A mechanical smoke ventilation system that is fitted in the protected lobby directly adjacent to the stair enclosure, and an AOV that is sited on top storey of the stairway with a minimum free area of 1.0 m^2 located as high a level as is practicable;
- A pressure differential system.

Existing provisions

Cromwell Tower comprises of two lobbies between the flats and the firefighting stair. The lift lobby which is open to flats and a small lobby between the lift lobby and the firefighting stair. The current smoke control system in each lobby is as follows:

- Lift lobby (approximate area of 34 m^2):
  - L1 – L6: Two vents with a dimension of 1.95 m x 0.46 m each, within the lift lobby which have openable louvres by winding handles at bottom of both sloped shafts
  - L7 – L39: Two doors with a dimension of 2.34 m x 0.66 m each, to the 1 down stair and 2 down stair (in the same location where the two vents are in the lower floors) opened by striking off heads of cast securing bolts.
- Small lobby (approximate area of 1.6 m^2): BE confirmed there is an electrical riser/ventilation shaft adjacent to the small lobby and connected by louvres (approximate area of 0.76 m^2) as shown in Figure 12 below.
- Electrical riser: There is a concrete floor on each level of the riser from L37 and below. Fire stopping around cables penetrating the concrete floor appear to be missing. Above L37, the electrical riser is connected to the ventilation shaft, which is opened to the small lobby.

Figure 12: Louvre connecting the small lobby and the electrical riser

The current arrangement of small lobby, firefighting stair, ventilation shaft and electrical riser is as shown in Figure 13.

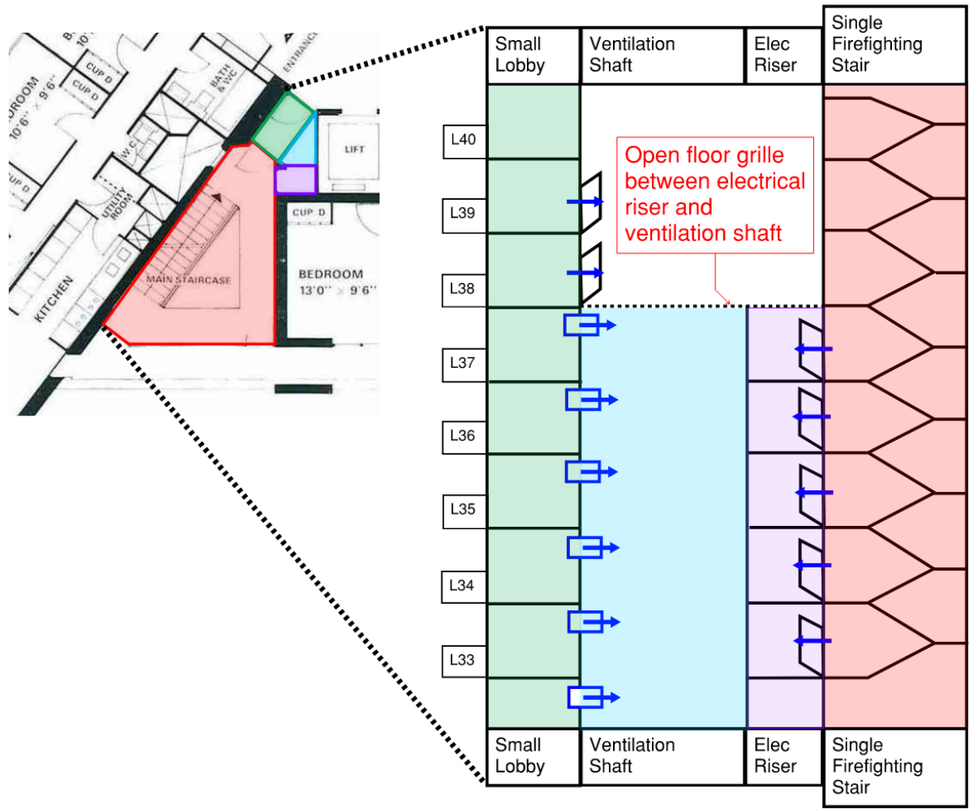


Figure 13: Current arrangement of small lobby, ventilation shaft, electrical riser and firefighting stair

As shown Figure 13, the small lobby is connected to the ventilation shaft on each floor, which is connected to the electrical riser on L37 and above. This is a risk as a fire in the electrical

riser could result in smoke spread to the small lobby and the single stair. This will affect the availability of the stair for means of escape and firefighting access.

Proposed Improvements

In order to ensure the escape route is protected from risk of smoke and fire spread from other areas, the following is recommended:

- Provide fire separation between the small lobby and the ventilation shaft (removing all the vents) and remove the fire door between the small lobby and the lift lobby on L37 and above, or
- Provide a fire and smoke damper at each vent to maintain fire separation and to only vent the floor of fire incident. Also provide a wall to separate the smoke shaft and the electrical riser from L38 and above.

Recommendations:

- Provide fire separation between the small lobby and the ventilation shaft (removing all the vents) and remove the fire door between the small lobby and the lift lobby on L37 and above, or
- Provide a fire and smoke damper at each vent to maintain fire separation and to only vent the floor of fire incident. Also provide a wall to separate the smoke shaft and the electrical riser from L38 and above.

4.1.12 Refuse storage cupboard and post box

BS 9991 recommends refuse rooms provided for the storage of refuse should be separated from other parts of the building and should not be located within or accessed directly from the lift lobby. Rooms provided for the storage of refuse should be approached only by way of a protected lobby having not less than 0.2 m^2 of permanent ventilation or a suitable mechanical alternative.

There is no recommendation in BS 9991 for post box. Considering the fire load content such as parcels, even though not to the same scale as refuse, it is recommended to not locate the post box within the lift lobby.

Existing provisions

Every flat in Cromwell Tower is provided with a refuse storage cupboard and a post box adjacent to the flat entrance door, for the use of the flat occupants only. The refuse storage and post box are accessible from both the lift lobby outside the flat and within the flat for Wing A and C, and only accessible from the lift lobby outside for Type B. BE confirmed the material build-up of the cupboards are mostly wood with asbestos backing as shown in Figure 14.

There is no ventilated lobby provided and no other mitigation measures provided in Cromwell Tower for refuse storage areas.

Proposed Improvements

The current arrangement does not comply with the recommendations of BS 9991. Refuse storage is considered a high fire hazard area and the location within the lift lobby poses a risk to the occupants. A fire involving the refuse can cause fire and smoke to affect the use of the lift lobby and compromise the stay-put strategy. As the lift lobby is not ventilated, smoke may spread into the small lobby and then the stair, affecting the single means of escape from the building. It is therefore recommended for the door separating the refuse storage and post box from the lift lobby to be fire rated door.

As a recommendation to this non-compliance, the doors to the refuse storage from the lift lobby should be fire rated to 60 minutes with smoke seals. Although this does not fully meet the current recommendations of BS 9991, this is considered an improvement to the current arrangement. The recommended additional detection and alarm system in each flat will serve to provide early warning in the in the event of a fire in the flat. The new fire rated door separating the refuse storage and post box from the lift lobby will serve to limit fire and smoke spread, maintaining the use of the lift lobby for means of escape and protected refuge area.

Figure 14: Refuse storage cupboards in the lift lobby

Recommendations:

- The fire doors to refuse storage and post box cupboard should be inspected and reviewed. If not able to provide fire separation, it is recommended for new fire doors (FD60S) to be provided.

4.1.13 L02 – L03 Storage/ plant area

BS 9991 states no storeroom should open directly to a stair. Instead, there should be a ventilated lobby between the storeroom and the stair.

BS 9999 states storage areas greater than 1 m^2 in area but not greater than 450 m^2 (other than refuse storage areas) need to be separated from other parts of the building with a minimum standard of fire resistance of 30 minutes.

Existing provisions

There are storage and plant areas on L02 and L03 of Cromwell Tower, they are located below the footprint the flats in the residential levels. Each of the large storerooms is provided with a corridor which provides access to smaller storage rooms which are also further subdivided into smaller rooms/cupboards which are designated to each of the flats. There is fire separation between the storage/plant rooms and the corridors serving the rooms. The corridors lead to the internal open stair and are separated by fire shutters which activate via a fusible link. [Note: the internal open stair is not the only egress route for L02 and L03 and there is an additional stair on the opposite end of the storage areas].

There are three additional escape stairs (stair width of 750 mm) at the end of each of the storage corridors which all directly discharge to outside on Street Level (L01).

There is exit signage and Category LD3 automatic detection and alarms within the storage areas. It has been confirmed by BE that there is no emergency lighting within the storage levels.

Both L02 and L03 is connected to the car park space which are separated by fire shutters.

In L03, the area is shared between storage areas and plant rooms. One of the plant rooms in L03 is connected to the L04 Subway level via a fixed ladder.

Proposed Improvements

Refer to Section 4.1.8 for recommendation on emergency lighting.

4.1.14 Back-up power supplies

BS 9991 states life safety systems are to be provided with a secondary power supply. The primary power source should generally be taken from the public electricity supply, with secondary power being supplied from an alternative utility supply from another substation, a generator or uninterruptable power supply (UPS) or batteries.

Where practicable, power supplies should be provided via two separate intakes into the building from the same external substation or via a single intake and a standby generator.

Existing provisions

Cromwell Tower is provided with a number of life safety systems including emergency lighting, firefighting stair ventilation and firefighting lifts. Secondary power supply to the life safety systems is provided and have been identified by BE as follows:

- Emergency lighting – UPS and generator (in good working order)
- Firefighting lifts – generator (in good working order)
- Emergency exit signage – currently, the exit signage is unlit in Cromwell Tower

Proposed improvements

Refer to Section 4.5.3.3 for recommendation on firefighting lifts.

Recommendations:

- The secondary power supply systems are to be maintained in good operation condition and in accordance with the relevant standards. It is recommended for BE to establish the compliance of the secondary power supply provisions against the relevant standards.

4.2 Internal fire spread (linings)

BS 9991 recommends the following for wall and ceiling linings:

- Circulation spaces / common corridors – Class 0 in line with BS 476-7 (national class) or Class B-s3, d2 or better in line with BS EN 13501-1 (European class);
- Within apartments – Class 1 in line with BS 476-7 (national class) or Class C-s3, d2 or better in line with BS EN 13501-1 (European class).

Existing provisions

There is no information on the wall and ceiling linings across the common areas of Cromwell Tower as well as within the flats. Based on the site visit, the walls appear to be concrete for the common areas including the firefighting stair and the 1 down stair and 2 down stair and have been confirmed by BE.

As concrete finish is expected to achieve Class A1, it meets the recommendations of BS 9991. However, this is based on the assumption that wall and ceiling linings are concrete finishes throughout all areas of the building. If there are areas within the building where the above requirements are not likely to be achieved, they will need to be discussed and addressed separately.

4.3 Internal fire spread (structure)

4.3.1 Structural fire resistance

Under the BS 9991 guidance, buildings over 30 m in height needs to be provided with sprinkler protection as well as 120 minutes fire resisting construction for load bearing capacity. Elements of structure supporting the firefighting shafts are required to achieve 120 minutes.

Elements of structure are required to achieve a loadbearing capacity (R) only, however when certain elements also act as separating elements (i.e. walls) integrity (E) and insulation (I) are also required.

Existing provisions

Information on the existing building structure is based on the structural drawings in the Arup Archive. It has been assumed that all elements (i.e. walls, slabs, etc.) shown in the structure drawings are elements of structure and therefore loadbearing.

Based on the structural drawings (drawing numbers 33 F9 & 33 F12) the following information on structural elements was obtained:

- Wall separating flats from the lift lobby: 305 mm

- Walls separating flats from firefighting stair: 305 mm
- Walls separating flats from 1 down stair and 2 down stair: 305 mm
- Floor slab thickness (excludes balcony slabs): 178 mm

The wall and slab thickness varies from one location in the building to another; the above dimensions represent the smallest (and therefore most conservative) of those observed from the drawings reviewed. The above dimensions have not been verified through site inspections.

The following guidance documents have been used to assess the potential fire rating offered by the dimensions of the walls and slabs:

- BS EN 1992-1-2-2004: Eurocode 2 Design of Concrete Structure Part 1-2: General rules – Structural fire design (Eurocode 2), which is the current guidance; and
- CP 114:1957 British Code of Practice, The Structural Use of Reinforced Concrete in Buildings, which is the relevant code at the time of construction.

In assessing the potential fire rating, the following assumptions are made:

- The thickness of structural elements stated above apply throughout the building;
- All structural elements are reinforced concrete;
- The concrete covers over the reinforcement bars meet the values stated in the relevant guidance at the time of construction (CP 114); there is no information on the depth of the existing concrete covers for this aspect to be assessed;
- Floor slabs are simply supported one-way slabs throughout the building;
- No structural calculations are available and therefore the utilisation factor of the structural members is unknown. When checking against the requirements of Eurocode 2 a utilisation factor of 0.7 has been taken as conservatism;
- The fire resistance requirements given in CP 114 cover loadbearing capacity, integrity and insulations;
- Structural drawings for all levels of Cromwell Tower are not available and only L36 and L39 structural drawings and section drawings were used as referenced in Table 2.

The table below compares the existing dimensions of the structural elements with the requirements from the two guidance documents.

Table 3: Summary of structural element thickness against code requirements

Existing structural element	Existing element thickness	Eurocode 2 requirements	CP 114 requirements	BS 9991 requirements	Comments
1 down stair and 2 down stair wall	305 mm	140 mm (REI 60) 220 REI120	70.6 mm (REI 60) 101.6 REI120	R 120	Achieving both the Eurocode 2 and CP 114 for REI 60 rating
Walls between flats	305 mm	140 mm (REI 60)	70.6 mm (REI 60)	R 60	Achieving both the Eurocode 2 and CP 114 for REI 60 rating
Firefighting shaft wall	305 mm	160 mm (REI 120)	101.6 mm (REI 120)	R 120	Achieving both the Eurocode 2 and CP 114 for REI 120 rating
Floor slab	178 mm	120 mm (REI 120)	127 mm (REI 120)	R 120	Achieving both the Eurocode 2 and CP 114 for REI 120 rating
Lift riser wall	200 mm	160 mm (REI 120)	101.6 mm (REI 120)	R 120	Achieving both the Eurocode 2 and CP 114 for REI 120 rating

The thickness of the structural elements to meet the required fire ratings appear to meet both the current guidance and the relevant guidance at the time of construction.

4.3.2 Fire compartmentation

Fire compartmentation is required to limit fire spread within the same building and protect means of escape. BS 9991 recommends the following fire ratings:

- Compartment walls between flats: 60 REI
- Compartment floor:120 REI;
- Passenger lift shaft: 120 REI;
- Firefighting shafts:120 REI;
- Any risers penetrating compartment floors: 120 REI;
- Fire stopping – same level of fire resistance as the compartment wall it passes.

Note: Load bearing capacity (R) only required for load bearing elements.

Existing provisions

There is currently no drawing or information available on the material of the riser construction in Cromwell Tower (kitchen risers, bathroom risers). BE confirmed there are mixture of concrete and asbestos panels that form riser walls and that there is no additional information available on the risers within the lift lobbies and the firefighting stair.

Based on the External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018, it has been identified that unauthorised structural alterations have been undertaken by/on behalf of the residents in several instances. This has resulted in compromised standards of compartmentation between individual flats and the communal risers. This has been confirmed by BE during the site visit.

Recommendations:

- BE to carry out a building wide survey to inspect breach in compartmentation, and to undertake works to maintain compartmentation to the areas in accordance with BS 9991.

4.3.3 Fire doors

BS 9991 recommends the specification, installation and maintenance of hinged or pivoted pedestrian fire doors to be based on BS 8214. This standard recommends fire rating of doors to be tested in accordance with either BS 476-22 or BS EN 1634-1.

The following fire rating requirements are based on Table 12 of BS 9991:

- Fire door separating firefighting stair and firefighting lobby: FD30S;
- Passenger/firefighting lift landing door: FD30S;
- Fire door separating a flat from a space in common use; FD60S*;
- Enclosing a protected shaft forming a lift well or service shaft: FD60S.

*Note: BS 9991 requires that the fire door separating a flat from a space for common use is to be FD30S. In the case of Cromwell Tower, this has been upgraded to FD60S to enhance protection of the lift lobby to create a safe refuge for PRMs.

In addition, the Grenfell Tower Inquiry: Phase 1 – report recommends that all residential building containing separate dwellings (whether or not they are high-rise buildings) to:

- Carry out an urgent inspection of all fire doors to ensure they comply with applicable legislative standards; and
- To be required by law to carry out checks at not less than three-monthly intervals to ensure that all fire doors are fitted with effective self0closing devices in working order.

Existing provisions

There is currently no information on the existing doors for Cromwell Tower. However, based on the information provided on the document ‘The fire resistance performance of a single leaf single acting door set with side screen and over panel, when tested in accordance with BS 476: Part 20/22: 1987’ issued by Exova Warringtonfire on 02/06/2018, the fire doors in Shakespeare Tower have not satisfied the requirements for 30 minutes (EI30) class door.

Although the test was not carried out specifically for the fire doors in Cromwell Tower, it is assumed that Shakespeare Tower and Cromwell Tower have identical fire doors as they are part of the Barbican Residential Development as agreed by BE.

There are currently multiple doors connecting different risers onto either the lift lobby or the firefighting stair as shown in Figure 16. There is no information on the fire rating of the doors to the risers within the lift lobbies and firefighting stairs. During the site visit, it was noted by Andrew Woods (CoL District Surveyor) that some risers have compartmentation issues as a result of the asbestos firestopping having been removed and not replaced and is therefore a fire risk.

During the site visit, the following issues were observed:

- The doors to the risers within the lift lobby and firefighting stairs were not labelled ‘fire door’ nor they appeared to be provided with smoke seals;
- It was unclear if the doors were being maintained to provide fire separation between the riser and the lobby/firefighting stair as shown in Figure 15.

As Cromwell tower is provided with a single stair, it is recommended to ensure adequate compartmentation is provided to the stair. This is to ensure occupants can evacuate via the stair as well as fire service to use the stairs to enter the building.

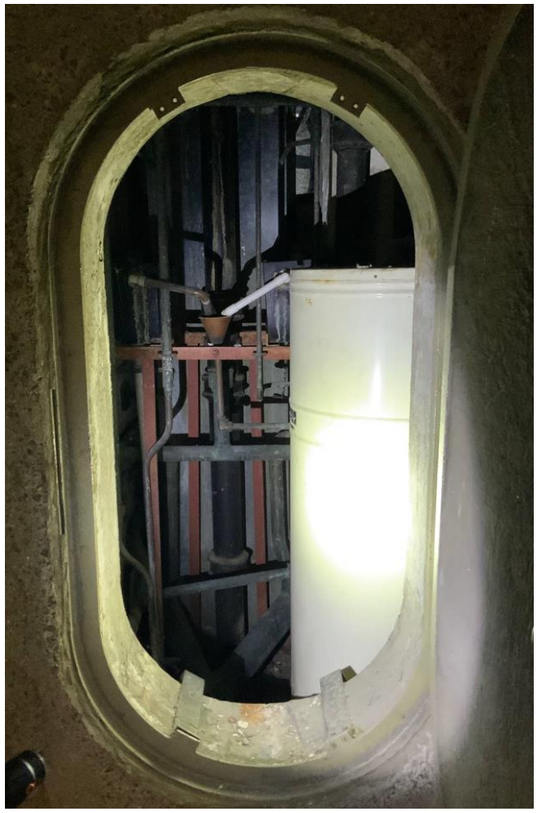


Figure 15: Risers within the lift lobbies

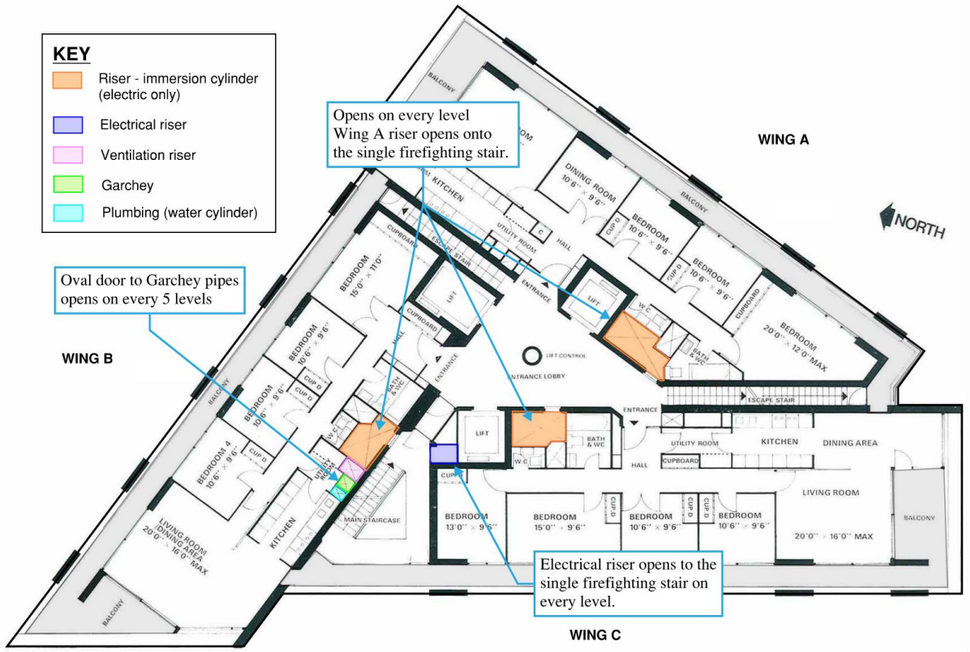


Figure 16: Risers opening onto the firefighting stair and lift lobby

Recommendations:

- It is recommended to replace all the fire doors to the stair, small lobby, flat entrances and the refuse storage/post box.
- Doors to all the risers to be inspected and repaired/replaced to maintain fire separation from the stair or lift lobbies.
- Keep records of inspection and testing of fire doors in the future, at not less than three monthly intervals to ensure that all fire doors are in working order.

4.3.4 Cavity barriers

Clause 33.1. of BS 9999 recommends that cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should be provided at the junction between an external cavity wall and every compartment floor and compartment wall. It also needs to be provided at the junction between an internal cavity wall and every compartment floor, compartment wall or other wall or door assembly which forms a fire resisting barrier.

Existing provisions

BE have confirmed that there are no cavity barriers in Cromwell Tower due to the build-up of the walls not having any cavities (identical to Andrewes House).

There is no information on any other cavities across Cromwell Tower. BE to advise.

4.3.5 Fire stopping

BS 9991 (Clause 24.4 and Figure 24) recommends where a building service passes through a compartment wall or floor it shall be adequately fire stopped in line with the compartment fire resistance.

Existing provisions

There is currently no information on the provision of fire stopping for Cromwell Tower. Based on the External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018, fire stopping registers are not in place.

Recommendations:

- BE to carry out a sitewide inspection of fire stopping and undertake fixing of the fire stopping to ensure fire compartmentation is maintained.

4.3.6 Kitchen and toilet shunt duct risers

In accordance with BS 9991, vertical ventilation ducts should be enclosed throughout their height with fire resisting construction. Where a horizontal ventilation duct penetrates the fire resisting construction, BS 9999 recommends four different methods of maintaining the fire separation at the penetration:

- Method 1: thermally actuated fire dampers;
- Method 2: fire resisting enclosures e.g. fire rated plasterboards;
- Method 3: protection using fire-resisting ductwork;
- Method 4: automatically actuated fire and smoke dampers triggered by smoke detectors.

BS 9999 Section 32.5.2.2 also states that Methods 1 and 4 should not be used for extract ductwork servicing kitchens and this is due to the likely build-up of grease within the duct which can adversely affect the effectiveness of any dampers.

In the Barbican Residential Development, it is understood that a common approach to maintain fire separation between flats is to use shunt duct arrangement for the kitchen and toilet extract ventilation ducts. The purpose of shunt duct is to avoid the need for fire protection using the Methods described above. A shunt duct arrangement comprises of branch ductwork (‘s’ or inverted ‘s’ shaped) that are connected to the main extract ductwork as shown as Figure 17. In addition to the downward bend of the shunt duct, a fan at the top of the main extract ductwork maintains a negative pressure that stops smoke from spreading out of the ductwork.

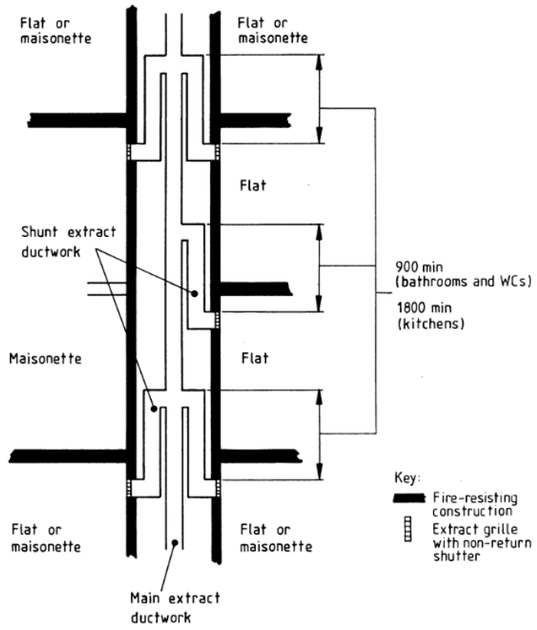


Figure 17: Layout of shunt duct system (BS 5588 Part 9)

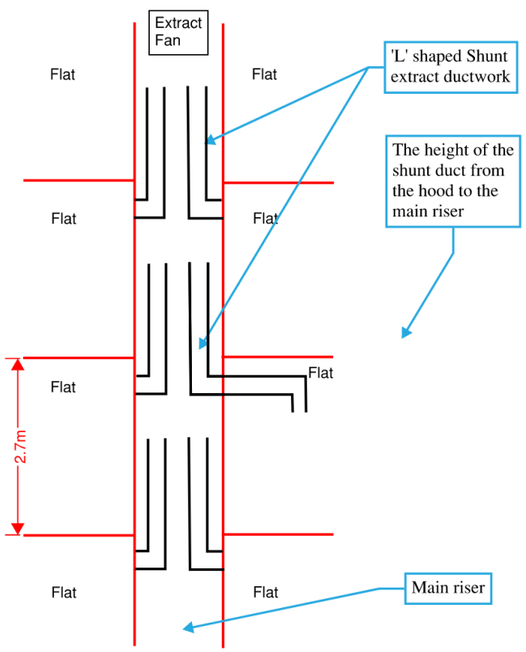


Figure 18: Existing layout of shunt duct system in Cromwell Tower

Shunt duct arrangement is a recognised approach in BS 5588-9:1999 – *Fire precautions in the design, construction and use of buildings Part 9: Code of practice for ventilation and air conditioning ductwork*, for extract ductworks serving toilets. However, it is not normally acceptable for use in kitchen extraction because of the fire risk inherent in kitchens. The guidance mentioned that if shunt duct is used for kitchen extraction, careful consideration should be given to possible pressure differentials within the system to avoid the transfer of smoke and other products of combustion from one dwelling to another by means of the ductwork system. This guidance has been withdrawn and is no longer referenced in other current standards including the Approved Document B.

Existing provisions

BE confirmed during the site visit that Cromwell Tower uses shunt ducts for both kitchen and bathrooms each provided with a separate main extract ductwork.

BE confirmed the shunt ducts in Cromwell Tower have the same arrangement and material as Andrewes House. However, the dimensions of the shunt ducts are currently unknown.

In Cromwell Tower, it is understood that the main kitchen extract riser and the shunt ducts are of concrete construction. Dimensions of the concrete construction are unknown, but likely to have some inherent fire rating. The kitchen extract riser is located within the kitchen and serves all the flats on the same vertical stack. The extract fan is located at the top of the main riser and on continuous operation (BE confirmed the capacity of the current fans are 10 cbm/s). BE also confirmed that the shunt ducts are 'L' shaped as shown in Figure 18 instead of the more common 'S' shaped as shown in Figure 17. The frequency of maintenance and cleaning, and the internal grease builds up within the vertical portion of the shunt ducts and within the main extract risers are unknown.

The toilet extract riser is located within the toilet of each flat and serves all the flats on the same vertical stack. The side backing on to the toilet wall contains asbestos and the rest of the walls are concrete.

Proposed Improvements

Whilst the use of shunt duct in lieu of other forms of fire protection is no longer in line with current UK guidance, their use for toilet extract risers is still allowed in other countries (Australia – AS 1688.1; USA – International Building Code). Considering the low risk nature of toilets and provided that the installations are in line with the details of the guidance, the use of shunt duct for toilet extract riser is considered acceptable provided improvement is made to increase the reliability on the extract fan.

However, it is not recommended to use shunt duct for kitchen extract riser. The presence of grease in the duct may affect the effectiveness of the shunt system in maintaining fire and smoke separation. Failure of compartmentation between the flats presents a life safety risk to the occupants, especially as the kitchen extract riser is located opposite the flat entrance, which is the only means of escape for the PRMs and flats below the Podium level.

Provision of fire detection and alarm system is one of the improvements, providing early warning before the single escape route via the flat entrance is compromised. In addition, the risk of fire spread via the shunt duct can be reduced by replacing the existing extract hoods with recirculation type extract hoods and maintaining the compartmentation between the flats.

BE confirmed that the kitchen shunt duct is also used as a day-to-day ventilation system and an alternative way to ventilate the area will be required if the current kitchen extract is closed off.

Recommendations:

Replace the existing extract hoods with recirculation type hoods, and implemented one of the followings:

- Smoke and fire damper at the shunt duct riser activated by the fire alarm/detectors within the flat (this maintains the use of the riser for normal ventilation of the flat); or
- To block off the shunt ducts and provide a fan on the external wall to draw out air from the flat into the balconies.

Maintain the existing extract hoods and shunt duct arrangement by increasing the reliability of the main extract fan. This will require an additional duty standby fan (the fans to be rated at 400 ˚C for 90 minutes in accordance with BS EN 13501-4), with secondary power supply. The fans need to be adequately maintained to keep the main riser under negative pressure.

4.4 External fire spread

4.4.1 Fire spread to neighbouring buildings

Buildings must maintain the minimum separation distance from the site boundary to protect itself and adjacent buildings against external fire spread. A building that is located less than the required separation distance from the site boundary will be required to be provided with mitigation measures to prevent fire spread such as fire rated external walls. In accordance with BS 9991, there are four methods used to determine the maximum permissible amount of unprotected façade. In this case, the most appropriate method is the enclosing rectangle in line with BR 187.

Existing arrangement

There is no information available on the location of the site boundary in relation to Cromwell Tower. If there are no site layout available, the building boundaries or the relevant boundaries will be measured using Google Maps as shown in Figure 19 and as follows:

- North: 21 m (to the middle of Beech Street);
- East: 7.2 m (to the middle of Silk Street);
- West: 10.5 m (mid-way between Cromwell Tower and Frobisher Crescent).

An external fire spread calculation has been undertaken for a single flat using the above assumed boundary distances and Figure 19. The enclosing rectangle method in line with BR 187 was carried out. The results show that no protection is required to the facades. Please refer to Appendix B for the calculation.

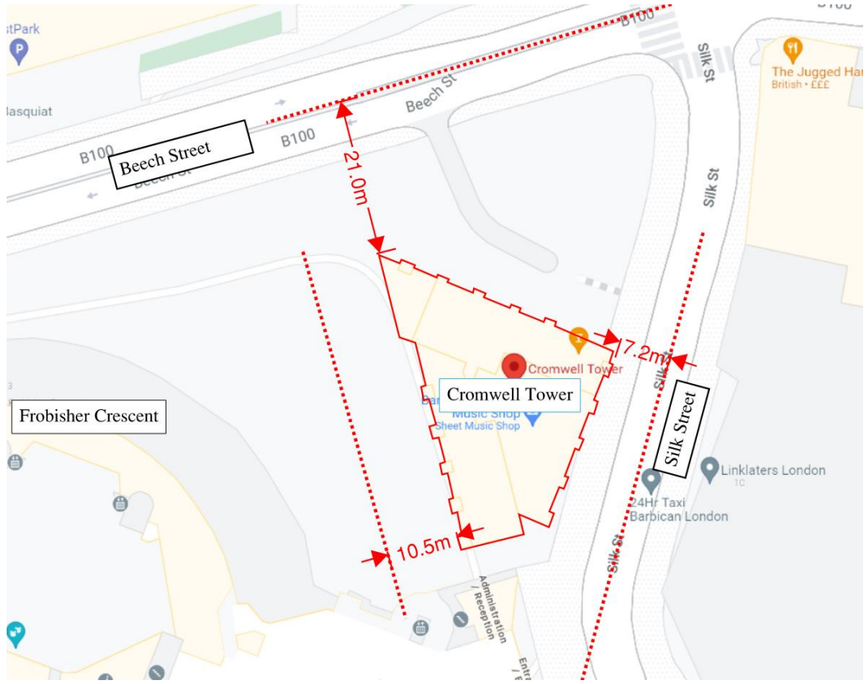


Figure 19: Existing arrangement for Cromwell Tower and adjacent buildings

4.4.2 Façade material

BS 9991 recommends the following material classifications for external areas of the façade of buildings greater than 18 m in height:

- Areas < 1 m from the boundary – Class 0 (National class) or Class B-s3, d2 or better (European class);
- Areas > 1 m from the boundary and > 18 m in height – Class 0 (National class) or Class B-s3, d2 or better (European class).

The Building Regulations also require materials which become part of an external wall (i.e. cladding material, insulation product, filler material – not including gaskets, sealants and similar) and specified attachment (e.g. balcony) of a residential building with a storey at least 18 m above ground level to achieve European classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled ‘Fire classification of construction products and building elements. Classification using the test data from reaction to fire tests’.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that the owner and manager of every high-rise residential building be required by law to provide their local fire and rescue service with information about the design of its external walls together with details of the materials of which they are constructed and to inform the fire and rescue service of any material changes made to them.

Existing provisions

BE confirmed all elevations of Cromwell Tower are provided with solid concrete construction.

The concrete panel is considered to achieve Class A1, and therefore it meets the recommendations of BS 9991.

In the case of balconies, BE confirmed the build-up consists of concrete paving slabs sitting on top of a felt membrane. The felt is a membrane and therefore under Regulation 7(3) of Approvement Document B, is exempt from having to meet the requirements for a European Classification of A2-s1, d0 or better.

It is also recommended to provide information about the design of external walls and details of the materials in the Fire notice box for the fire and rescue service to be able to have access to the information when they arrive on site.

Recommendations:

- Include information about the design and materials of the external walls in the Fire Notice Box, to be located by internal open stair landing on Street Level reception area.

4.4.3 Roof materials

BS 9991 recommends buildings where the roof is at least 6 m away from any point on the relevant boundary needs to be provided with a roof covering designation of minimum AD or BD in line with BS 476-3 (equivalent to $E_{roof}(t4)$ classification in line with BS EN 13501-5 European classifications)

Existing provisions

The roof of Cromwell Tower consists of either felt with insulation or a liquid membrane as advised by BE. The material specification of the roof material has not been defined. BE to confirm to carry out further review on the roof material.

4.5 Access and facilities for the fire service

4.5.1 Fire main inlet

BS 9991 recommends buildings fitted with wet fire mains should have fire appliance access:

- within 18 m of, and within sight of, a suitable entrance giving access to the wet fire main; and;
- within sight of the inlet for the emergency replenishment of the suction tank for the wet fire main.

Existing provisions

Cromwell Tower is provided with one wet riser main with outlets that can be accessed from the following locations:

- Street level (L01) to L39: within the lift lobby and adjacent to the front door of the Type B flats as shown in Figure 20;
- L02 – L03: adjacent to the lift lobby.

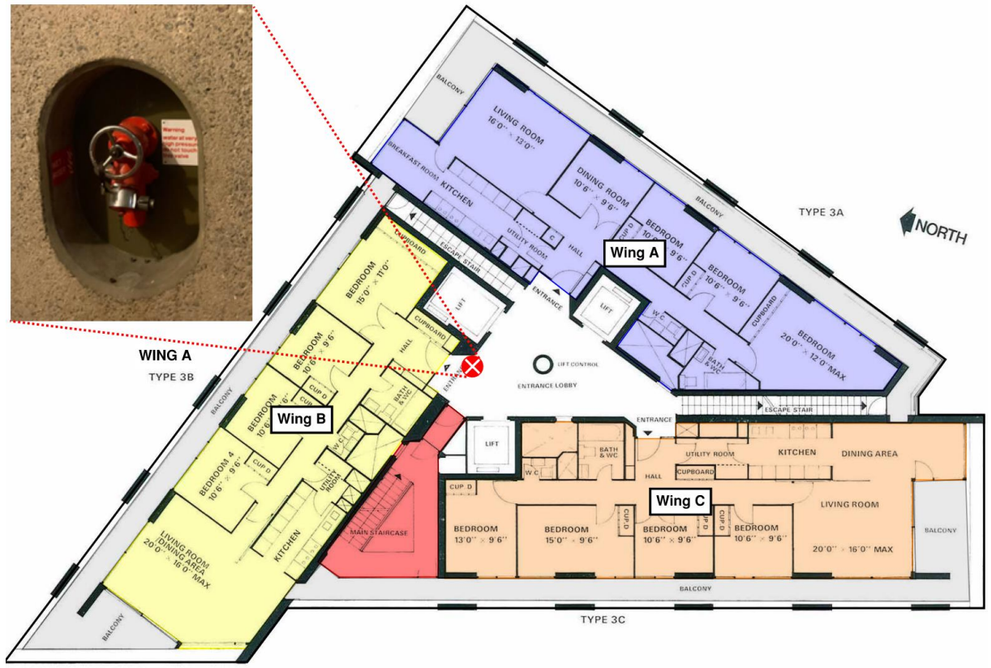


Figure 20: Wet riser outlet within the lift lobby for residential levels

4.5.2 Fire service access

BS 9999 recommends that the distance between the fire vehicle parking location to the firefighting entry point of the building to not exceed 18 m in length. In addition, the entry of the firefighting access shaft at rescue service access (vehicle access level) level should be directly from open air or by way of a protected corridor not exceeding 18 m in length.

Existing arrangement

Firefighting access into the building is directly from the main entrance of Cromwell Tower on Street level (L01) accessed via Beech Street where the firefighting vehicle has space to park in front of Cromwell Tower as shown in Figure 21.

Figure 21: Open area in front of the main entrance to Cromwell Tower

For the firefighting personnel to access the residential levels, they must use the internal open stairs on Street level (L01) to travel to the Podium level (refer to Figure 10 above), then exit the tower in order to enter the firefighting stair of Cromwell Tower (connecting Podium level to Roof level). There is no direct firefighting vehicle access on to the Podium level and the travel distance from the fire service access point to the entrance of the firefighting shaft on Podium level exceeds 18 m. However, this is considered acceptable due to the following:

- The firefighting lift is accessible from Street level (L01) and is within 18 m of the fire vehicle parking location. The lift lobby at ground can be used as a muster point for service before travelling to the floor of fire origin. However, there is no connection between the firefighting stair and the lift lobby on the ground floor;
- Alternatively, firefighters can use the internal open stairs to travel from Street level to access the firefighting stair from the Podium level.

For the firefighting personnel to access the lower storage/plant levels (L02 – L03), they can travel through the internal open stair as shown in Figure 22.

Recommendations:

- Engagement with London Fire Brigade to ensure the access arrangement is clear.

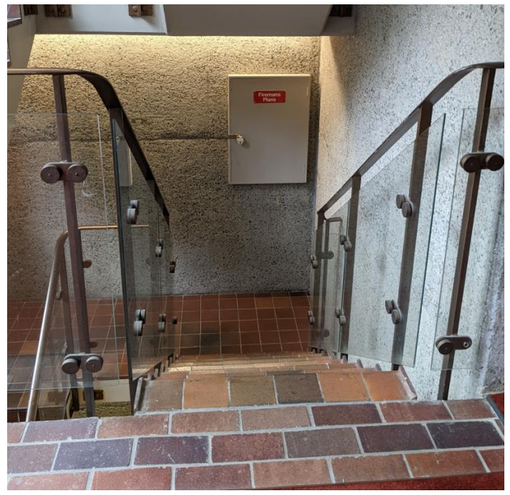


Figure 22: Internal open stair (L03 - Podium level) on Street level

4.5.3 Facilities for the fire service

BS 9991 recommends buildings with a floor higher than 18 m above fire and rescue service access level should be provided with firefighting shaft(s) containing firefighting lifts. A sufficient number of firefighting shafts should be provided to meet the maximum hose distance of 60 m to cover all parts of the building.

Firefighting shafts should be constructed in accordance with the recommendations given in BS 9999.

Cromwell Tower is provided with one firefighting shaft with a firefighting stair, wet riser, firefighting lift and firefighting lobby.

4.5.3.1 Firefighting stairs

BS 9999 recommends a firefighting stair should have an unobstructed width (measured between the walls and / or balustrades) of 1.1 m. the width should be kept clear for a vertical distance of 2.0 m.

BS 9999 also recommends only services associated with the firefighting shaft should pass through or be contained within the firefighting shaft.

Existing provisions

The firefighting stair in Cromwell Tower connects Podium level to Roof level with a width of 1000 mm. From L39, the firefighting stair extends to the Roof level (plant space only) as a helical stair as shown in Figure 23 below.

There are no firefighting stairs in the lower levels (L01 to L03) of Cromwell Tower.

There are risers directly opening onto the firefighting stairs. Refer to recommendations in Section 4.3.3 for management procedures when there are works being done on the riser, refer to Table 4.

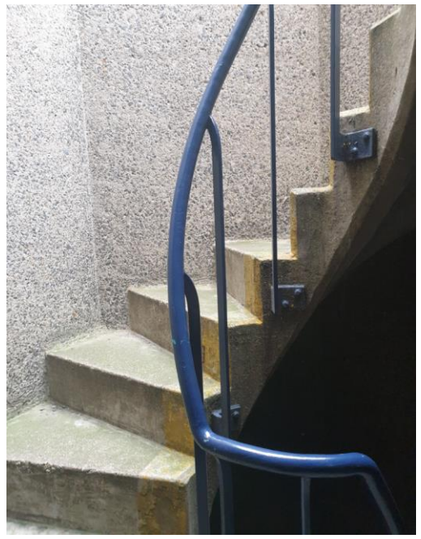


Figure 23: Helical stairs extending from the firefighting stairs to Roof level

Recommendations:

- Engagement with London Fire Brigade to discuss the firefighting access routes and the reduced stair width.

4.5.3.2 Firefighting lobby

BS 9999 recommends firefighting lobby to have a clear floor area of not less than 5 m^2 and not exceed 20 m^2 for lobby serving up to four lifts. All principal dimensions should not be less than 1.5 m. The purpose of not allowing large lobby area (exceeding 20m^2) is to avoid the lobby being used for storage.

There are risers directly opening onto the lift lobby. Refer to recommendations in Section 4.3.3.

Existing provisions

There are currently two lobbies separating the flats from the firefighting stair. The lift lobby has approximate area of 34.2 m^2 and the small lobby has an approximate area of 1.6 m^2.

Although the lift lobbies exceed the recommended protected lobby area of 20 m^2, it is considered acceptable due to the following reasons:

- During the site visit, it was observed that the lift lobbies (only those inspected during the visit) are generally not used for storage;
- The lift lobby only contains the lift control at its centre with no other furniture;
- The lift lobby connects all flats and lifts and therefore is very frequently used by residents. It is unlikely for residents to store goods in a shared area;
- Adequate management of the area will prevent lobbies from being used for storage.

There are risers directly opening onto the firefighting stairs. Refer to recommendations in Section 4.3.3.

Recommendations:

- Inspection of the lift lobbies should be carried out at regular intervals to prevent residents from using the lift lobby as storage area.

4.5.3.3 Firefighting lifts

In line with BS 9991 and BS 9999, new firefighting lifts installations should be in accordance with BS EN 81-72:2020.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that the owner and manager of every high-rise residential building be required by law to carry out:

- Regular inspections of any lifts that are designed to be used by firefighters in an emergency and to report the results of such inspections to their local fire and rescue service at monthly intervals;
- Regular tests of the mechanism which allows firefighters to take control of the lifts and to inform their local fire and rescue service at monthly intervals that they have done so.

Existing provisions

It has been confirmed by the lift consultant via email correspondence on 08/04/2021 that the firefighting lift in Cromwell Tower was installed to BS 5588-5:1986.

During the site visit, it has been confirmed that the lift control system is on Street level (L01), but there is no connection to the stair at this level.

The lift consultant ‘Butler & Young’ have notified that the lifts are unable to operate correctly under generator power. In the event of a fire and if there is a mains supply failure, the building will not have an effective firefighting lift working on secondary supply.

The lifts can operate on mains power. However, there is an issue with the sequential control which is when the lifts need to ground one at a time upon activation of the secondary power supply. This is due to the age of the equipment as they are no longer fully supported as they have been manufactured and installed by Otis over 20 years ago.

Recommendations:

- The current sequential control system should be upgraded for the lifts to be able to ground upon detection of fire within the lift shafts and also for the firefighting lift to operate under secondary power supply for firefighting purposes.
- Carry out inspections of the firefighting lift at monthly intervals to report the results of every inspection to the local fire and rescues service.

4.5.3.4 Smoke control for firefighting lobby and stair

BS 9991 recommends that all firefighting shafts should be provided with smoke ventilation system – and recommends only natural smoke shafts or mechanical pressure differential

systems are suitable for buildings over 30 m in height. For buildings with a floor level over 11 m above ground served by a single stair, the smoke control system should have one of the following:

- AOVs to the exterior of the building with a minimum free area of 1.5 m^2, fitted in the common corridor or lobby directly adjacent to the stair at as high a level as is practicable, and an AOV that is sited at as high a level as is practicable on the top storey of the stairway, having a minimum free area of 1 m^2, or
- A smoke shaft fitted in the protected lobby and an AOV that is sited at as high a level as is practicable on the top storey of the stairway, having a minimum free area of 1 m^2, or
- A pressure differential system.

Existing provisions

The firefighting stair has two louvred doors (approximate total area of louvres are 3.52 m^2) on L39 as indicated as Door 1 and Door 2 in Figure 24. It was not possible to determine the free area of the louvre from visual inspection. The firefighting stair leads to an open helical stair to the Roof level.

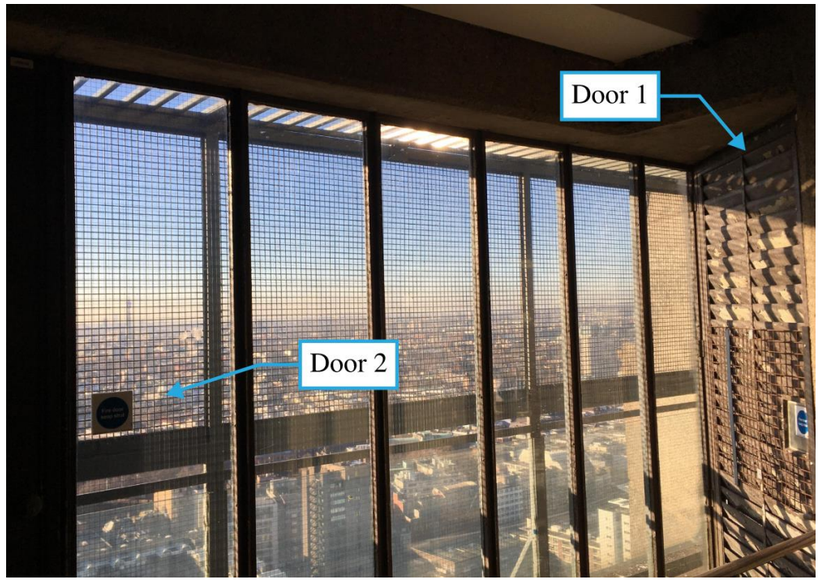


Figure 24: Louvred door at the top of the firefighting stair on L39

The current AOV provided by the louvred door is considered acceptable as fire service can open the door to increase ventilation to the staircase. Opening of the doors will require keys and BE should ensure that the keys are made available upon arrival of the fire service.

There is a permanently open grill at the bottom of the firefighting stair as shown in Figure 25 to provide make up air.

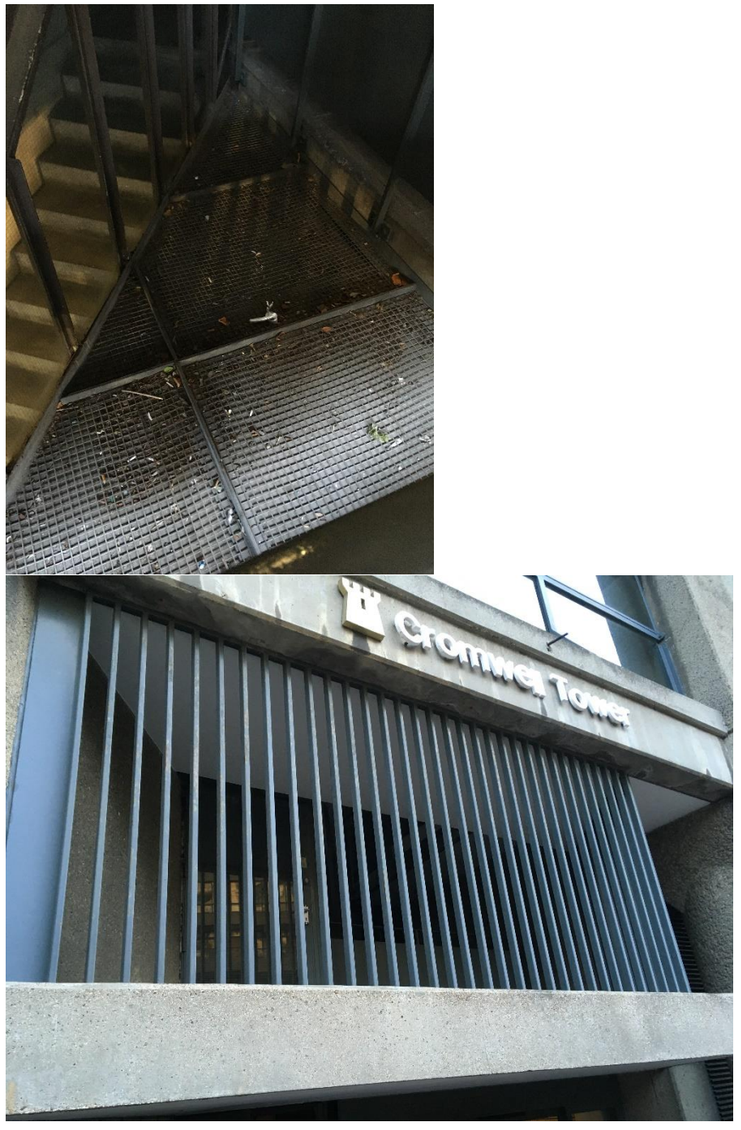


Figure 25: Permanent opening at the bottom of the firefighting stair at Podium Level

There is no ventilation available in the small lobby and the lift lobby is provided with manually openable vents in all levels that can be opened by firefighters upon arrival.

The lift lobby is provided with manually openable ventilation by either of the following:

- L1 – L6: There are two vents (1.95 x 0.46 m = 0.90 m^2 each) - in the same location where the 1 down stair and 2 down stair are located in the upper floors, within the lift lobby which have openable louvres by winding handles at bottom of both sloped shafts;

- L7 – L39: There are 1 down stair and 2 down stair doors (2.34 x 0.66 m = 1.54 m^2 each) - which open to the flat balconies, that can be opened by striking off heads of cast securing bolts.

The existing vents meet the minimum required free area of 1.5 m^2 (area of 1.8 m^2 for L1 – L6 and 3.08 m^2 for L7 – L39). However, these vents are only manually operated vents and can only be operated upon arrival of firefighters.

Recommendations:

- Engagement with London Fire Brigade to ensure their familiarity with the ventilation arrangement to the firefighting lobby.
- Include a notice to open the ventilation louvres on L1-L06 and to open the 1 down stair and 2 down stair doors L7-L39 in the Fire Notice Box.

4.5.4 Wet riser and hose coverage

BS 9991 recommends buildings greater than 50 m in height should be provided with a wet riser system. In the case of unsprinklered building, no part of a storey should be more than 45 m from a riser outlet located in the firefighting shaft.

Existing provisions

There is a wet riser outlet located within the lift lobby as shown in Figure 26 from Street level (L01) to L39. For L02 – L03, the outlet is located adjacent to the lift lobby within the internal open stair landing. All areas of the tower are within 45 m limit of hose coverage.

BE confirmed the building is provided with 2 x 10,000-gallon cross linked tanks on L03.

Figure 26: Hose coverage in Cromwell Tower

4.5.5 Water supply for firefighting operations

The location of an external hydrant is to be confirmed by BE.

4.6 Fire safety management

In addition to the active and passive fire safety precautions described in the previous sections, robust fire safety management plan and procedures are important for maintaining the fire safety of a building in a holistic manner. In preparing a fire safety management plan (Arup is not aware of an existing plan), the relevant items to be included in the plan are listed and described in Table 4 below. These are based on the recommendations in BS 9991.

Table 4: Fire safety management

Item	Proposed Design
RR(FS)O	Under the Regulatory Reform (Fire Safety) Order legislation, the owner of the building (BE) is fully responsible for fire safety. This includes on-going fire risk assessment, appropriate maintenance of fire safety systems and training of staff. Although not required by fire safety guidance, it is recommended for the fire risk assessment to include the internal areas of the apartments (for example a spot check of vacant apartments). This will serve to mitigate the risk of any amendments to the building which may have an adverse impact on the fire strategy safety (e.g. breaches in compartmentation).
Fire awareness of residents	Due to the nature of residential premises whereby it is difficult to enforce fire safety management within the apartments, there is risk of the residents' actions affecting the implementation of the fire strategy – e.g. by covering smoke detectors or creating penetrations in compartment walls. To minimise the risk of occupants affecting the performance of the fire safety features in the building, all residents must be made aware of their responsibilities in regard to fire safety at the beginning of their residence. It is recommended for all relevant fire safety information should be provided in a tenant handbook. It is the responsibility of the building operators to inform the residents of the defend-in-place evacuation strategy. Residents should also be informed that they are always provided with the option to leave and that they do not have to stay in place in the event of a fire.
Evacuation of PRMs	The evacuation of PRMs will need to be carried out by the BE staff or the fire and rescue service. The responsible person for fire safety (as defined under the RR(FS)O) will need to ensure that each PRM has a personal emergency evacuation procedure (PEEP), and where required, sufficient training and equipment are provided to staff to assist with the evacuation. The EVC (Emergency Voice Communication) system in the lift lobbies should be regularly maintained to ensure they are in working order.
Staff training	Sufficient number of BE staff should be adequately trained in fire prevention, fire protection and evacuation procedures including evacuation of PRMs.
Maintenance and testing	An accurate record of fire precautions, and procedures for operating and maintaining any fire protection measures within the building, are necessary to enable the owner or end user to plan, document and implement control processes for maintenance and testing of fire safety systems to ensure that they operate effectively in the event of a fire. The External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018 states that maintenance records have not been recorded up to date and requires to be updated. This includes systems such as: • Firefighting lifts; • Fire alarm and fire detection system; • Fire doors; • Emergency lighting and signage; • Fire stopping registers; • Records of fire brigade attendance.
Control of work on site	The means to control work on site should be determined (e.g. repairs to structure, hot work, cleaning of ductwork). A work control system should include clear lines of responsibility communicated to contractors. **Work within the single stair** When work is being carried out in the single stair (e.g. works associated with services in the risers), staff working in the area must be trained to ensure evacuation down the stair is still allowed in case of emergency and that it does not block the stair.
Emergency planning	A good relationship with the fire and rescue service has benefits as it ensure that the fire and rescue service is able to have an appropriate pre-determined response strategy for Cromwell Tower and enables the owner to seek advice where appropriate. Any changes affecting the layouts, fire safety systems, fire growth characteristics, and other relevant factors should be communicated to the fire service.
Fire safety documentation	Fire safety information that sets out the basis on which the fire safety design was planned (i.e. this Fire Strategy Report), the fire safety management plan, the staff responsibilities etc. should be kept up to date and stored in a document management system that allows the information to be easily retrieved in the future.
General housekeeping	The External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018 states that discarded trade materials and general waste were identified in riser cupboards.

	Good housekeeping is essential to reduce the likelihood of a fire starting or developing, and escape routes being blocked. This includes: • Maintaining all escape routes free from obstruction/ or combustibles; • Fire doors to perform as intended; • Arrangement for waste control and disposal or accumulation of waste; • Floor surface of escape routes to be maintainable, even and slip-resistant. The Fire Risk Assessment also states that fire extinguishers should be removed from the building as it could be mishandled by the residents who are not trained. The management team sure ensure there are no fire extinguishers in the common areas of the building.

5 Conclusion

The purpose of the fire safety review on Cromwell Tower is to determine the existing intent of the fire safety design and to record the findings in a fire strategy report (this document).

This report describes the existing fire safety precautions in the building and compare them with the requirements in the Building Regulations 2010 (as amended) The current standards BS 9991 and BS 9999, and where applicable the latest update of the Approved Document B Volume 1, have been used as the benchmark for the review.

Where the fire safety precautions comply with the current standards, no further action is proposed and the fire information forms part of the building fire strategy. Where the precautions are not deemed to comply with the current standards, qualitative risk assessments have been carried out to identify the life safety risks to the building occupants due to those non-compliances. The outcomes of the assessment will result in one of the following:

- Where considered acceptable to remain as existing, recommend retaining the current provisions as long as the provisions are being maintained in good operation conditions; or
- Recommendations on possible options for enhancements/upgrades where the current fire safety provisions are considered inadequate.

Refer to Table 1 for the full list of recommendations and the reasons/benefits behind those recommendations.

Interim measures

From our review, it is found that there are existing features in Cromwell Tower that present considerable risks to the life safety of the building occupants. Some immediate actions are strongly recommended to address these risks.

These are temporary measures, while permanent solutions (as recommended on Table 1) are being developed and implemented. These interim measures are not meant to replace the need for permanent solution. The aim of the interim measures are to reduce hazards that may affect the use of the single stair in the event of a fire, so that occupants can safely evacuate from the Tower. The recommended interim measures are:

- Preparing a Personal Emergency Evacuation Plan (PEEP), so that the evacuation arrangement in the event of a fire is clear to each PRM occupant;
- Remove all storage and rubbish within riser spaces that opens into the stair (note: the External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018 states that discarded trade materials and general waste were identified in riser cupboards).
- Consider providing a fire detector within the electrical riser above L37, so that BE receives early warning of a potential fire in the electrical riser. If necessary, evacuation can be initiated before the stair is affected.

These measures are to be implemented as soon as possible to maintain the life safety of the building occupants.

Appendix A

Fire strategy mark-ups

A1 Means of warning and escape

Note:
The drawings used for the above assessments are:
Structural plan:
Ove Arup & Partners Consulting structural engineers - Drawing number. 33/507
Floor plan layout:
Barbican living - https://www.barbicanliving.co.uk/blocks/cromwell-tower/cromwell-tower-flat-plans/

A2 Firefighting access

Note:
The drawings used for the above assessments are:
Structural plan:
Ove Arup & Partners Consulting structural engineers - Drawing number. 33/507
Floor plan layout:
Barbican living - https://www.barbicanliving.co.uk/blocks/cromwell-tower/cromwell-tower-flat-plans/

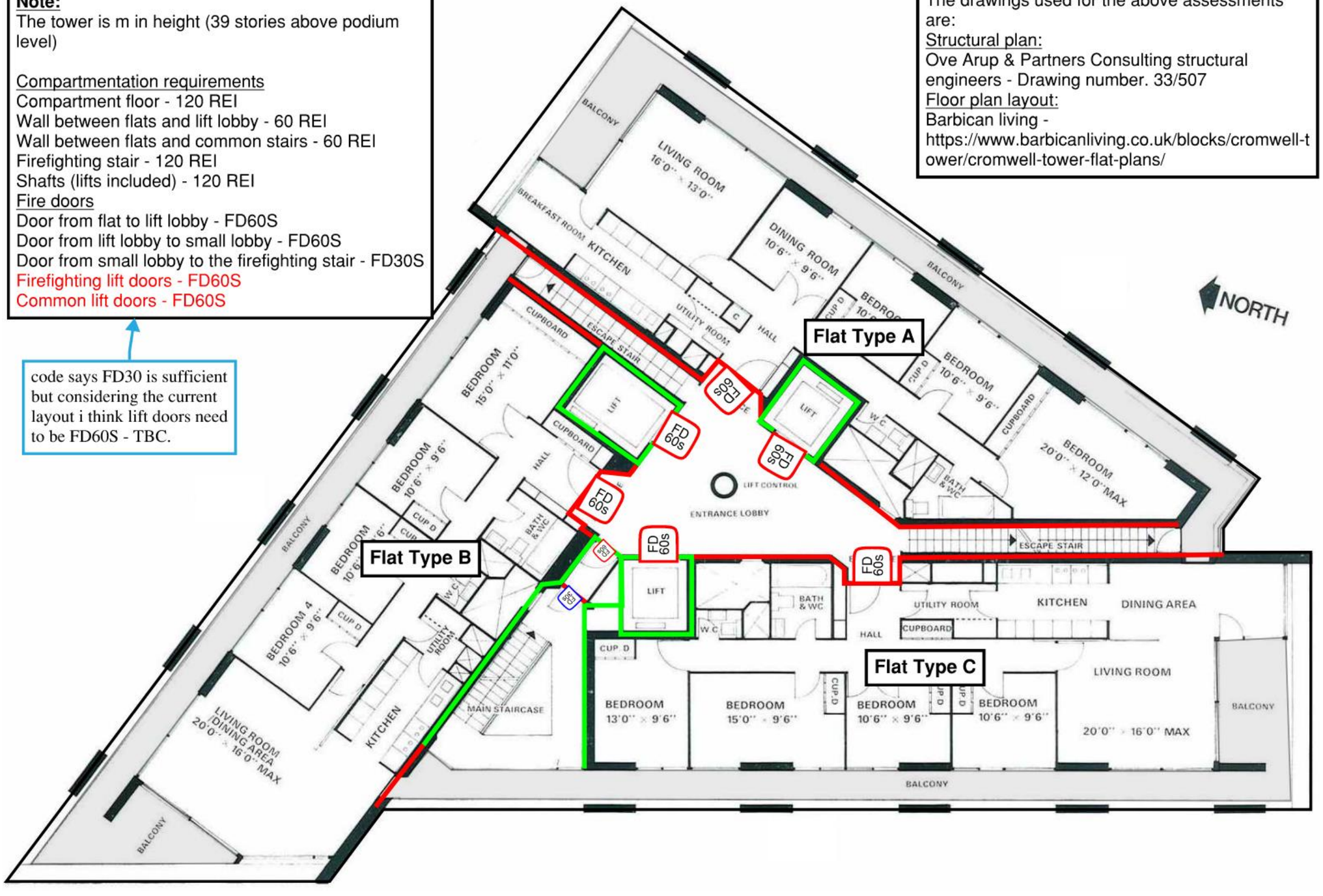
A3 Compartmentation

Note:
The tower is m in height (39 stories above podium level)

Compartmentation requirements
Compartment floor - 120 REI
Wall between flats and lift lobby - 60 REI
Wall between flats and common stairs - 60 REI
Firefighting stair - 120 REI
Shafts (lifts included) - 120 REI
Fire doors
Door from flat to lift lobby - FD60S
Door from lift lobby to small lobby - FD60S
Door from small lobby to the firefighting stair - FD30S
Firefighting lift doors - FD60S
Common lift doors - FD60S

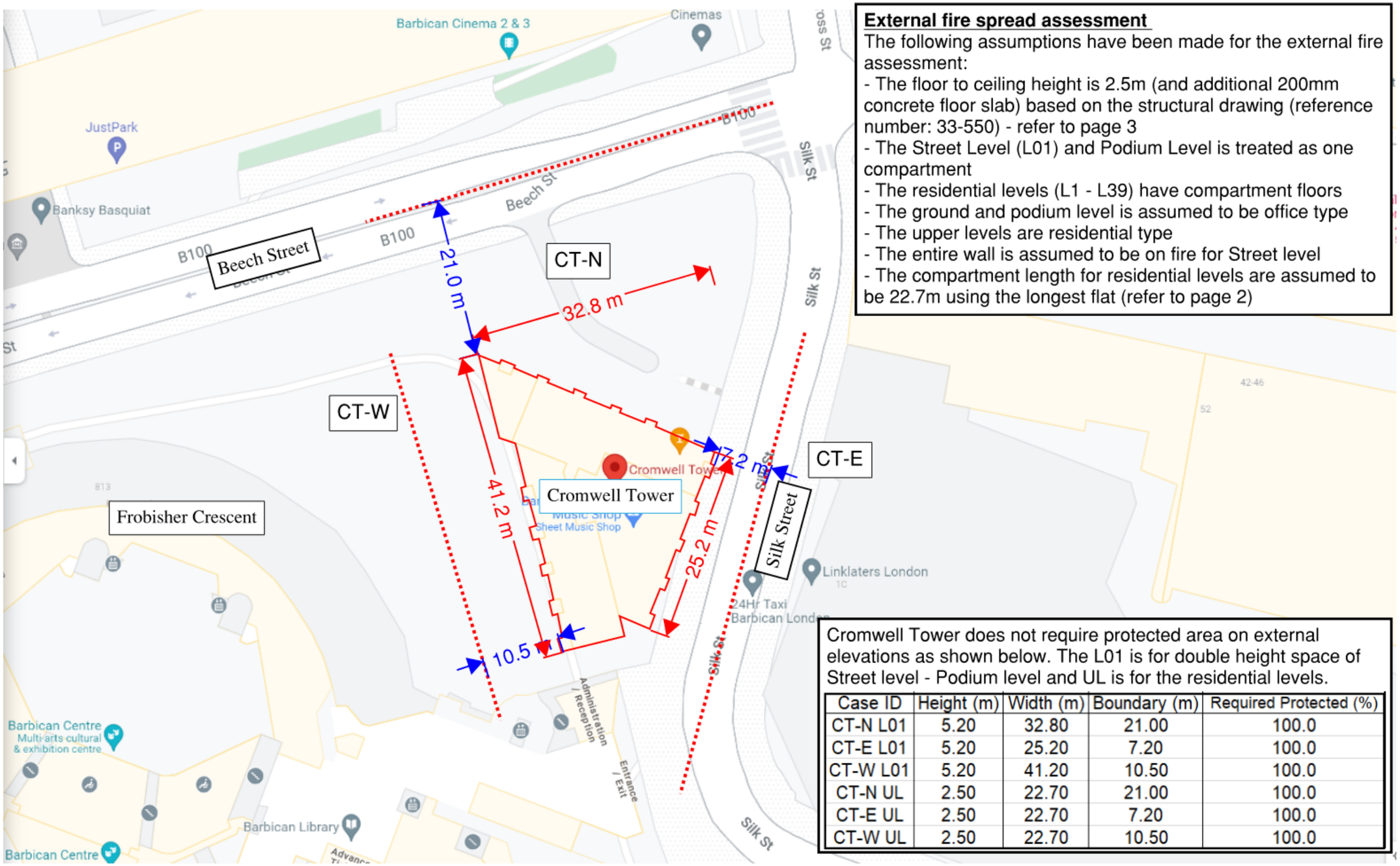
code says FD30 is sufficient but considering the current layout i think lift doors need to be FD60S - TBC.

The drawings used for the above assessments are:
Structural plan:
Ove Arup & Partners Consulting structural engineers - Drawing number. 33/507
Floor plan layout:
Barbican living - https://www.barbicanliving.co.uk/blocks/cromwell-tower/cromwell-tower-flat-plans/



Appendix B

External Fire Spread



External fire spread assessment

The following assumptions have been made for the external fire assessment:

- The floor to ceiling height is 2.5m (and additional 200mm concrete floor slab) based on the structural drawing (reference number: 33-550) - refer to page 3
- The Street Level (L01) and Podium Level is treated as one compartment
- The residential levels (L1 - L39) have compartment floors
- The ground and podium level is assumed to be office type
- The upper levels are residential type
- The entire wall is assumed to be on fire for Street level
- The compartment length for residential levels are assumed to be 22.7m using the longest flat (refer to page 2)

Cromwell Tower does not require protected area on external elevations as shown below. The L01 is for double height space of Street level - Podium level and UL is for the residential levels.

Case ID	Height (m)	Width (m)	Boundary (m)	Required Protected (%)
CT-N L01	5.20	32.80	21.00	100.0
CT-E L01	5.20	25.20	7.20	100.0
CT-W L01	5.20	41.20	10.50	100.0
CT-N UL	2.50	22.70	21.00	100.0
CT-E UL	2.50	22.70	7.20	100.0
CT-W UL	2.50	22.70	10.50	100.0

Barbican Estate

Barbican Residential Blocks

Andrewes House - Fire Strategy Report

Rev A | 11 June 2021

Job number 279095-00

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Document verification

ARUP

Job title		Barbican Residential Blocks			**Job number** 279095-00
Document title		Andrewes House - Fire Strategy Report			**File reference**
Document ref					
Revision	**Date**	**Filename**	Andrewes House Fire Strategy Report_Issue.docx		
Issue	01 April 2021	**Description**	For comment		
			Prepared by	Checked by	Approved by
		Name	Tony Park/ Victoria Callaghan	Valerie Chan	Tony Lovell
		Signature			
Rev A	11 June 2021	**Filename**	Andrewes House Fire Strategy Report Rev A.docx		
		Description	Revised report after site visit and client review		
			Prepared by	Checked by	Approved by
		Name	Tony Park/ Victoria Callaghan	Valerie Chan	Tony Lovell
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
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			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document verification with document	☑

Contents

Appendices

Executive Summary

Arup have been appointed by the Barbican Estate (BE) to undertake a fire safety review of Andrewes House, an existing building which is part of the Barbican Residential development, located in the City of London. The purpose of the review is to determine the existing intent of the fire safety design and to document this intent in a fire strategy document (this report). The purpose of this report is as follows:

- To provide a single document that describes the fire safety precautions for Andrewes House, including the fire safety principles and fire safety measures within the existing building;
- To compare the existing fire safety precautions with the requirements in Building Regulations 2010 (as amended) by benchmarking against the current standards including BS 9991 and BS 9999;
- To consider the recommended improvements to existing residential buildings in Phase 1 of the Grenfell Tower Inquiry Report by Sir Marin Moore-Bick;
- Where the there are gaps in the existing fire safety precautions against the current standards and if those gaps present a risk to the life safety of the occupants, recommend fire safety improvements to remediate the risk on an as nearly as reasonably practicable basis; and
- Where the gaps in the existing fire safety precautions present a low/negligible risk to life safety, the existing precautions are proposed to be retained (on the assumption that they are maintained in good operational order).

Andrewes House was constructed in 1969 and contains 192 flats. The building consists of 12 stairs, three of which are firefighting stairs with firefighting lobby, firemen's lift and dry riser. The remaining nine stairs are common stairs with passenger lifts. The building consists of 11 floors with a building height of 27 m measured from street level to the bottom of the topmost occupied story.

An open Podium level which is located two storeys above street level serves as the final discharge location. The carpark level (L03) located one storey below street level is used as the firefighting access level for two firefighting shafts, while the Podium level is used as the firefighting access level for the remaining firefighting shaft. Due to the presence of the open balconies serving the flats above the Podium and not the flats below the Podium, there are some differences in the means of escape and firefighting access strategies between the floors above and below the Podium. These are described in subsequent sections in the report.

Existing Fire Safety Precautions – Overview

The key elements of the existing fire safety precautions for the Andrewes House can be summarised as:

- Stay put strategy: The building adopts a stay put evacuation strategy. In the event of a fire, only the occupants in the flat of fire origin evacuate the building. The rest of the building occupants will remain in place. This is proposed to be retained.
- Podium: The Podium is considered a place of ultimate safety for discharge of escape stairs.
- Horizontal exit (above Podium): Each flat is served by 3no. escape routes – (1) common stair via the flat entrance, (2) north balcony, (3) south balcony. The widths of these balconies (460m – 690mm) are narrower than the minimum requirement for an escape route, although the common stairs that they lead to i compliant in width. From the open-sided balcony, occupants can access any of the 3no. firefighting stairs that discharge at street or Podium level.
- Horizontal exit (below Podium): Flats on L02 and four flats on L01 have access to two escape routes – (1) common stair via the flat entrance, (2) outside via gardens through to Willoughby carpark. The other flats on L01 have only a single means of escape via the flat entrance – there is no balcony (note: means of escape via the neighbouring flat or using the ladder to the garden are not considered an acceptable escape route). The common stairs discharge at the Podium level above.
- Escape stairs: The width of the stairs (1000 mm) is adequate for the expected low number of occupants. However, a protected lobby is missing between the stair and each apartment, which presents a risk to life safety as the use of the stair for escape may be compromised.
- Evacuation of Persons with Reduced Mobility (PRM): There is currently no procedure in place to evacuate PRMs if a fire were to occur in their flat. There are also inadequate provisions for safe evacuation of the PRMs. These present an unacceptable risk to the life safety of the occupants.
- Exit signage and emergency lighting: There are existing provisions however, these are not compliant with current standards.
- Fire detection and alarm system: There is no provision in the building, except for the flats owned by BE. Considering the gaps in the existing fire safety precautions compared to current norms, the lack of detection and alarm in the flat presents a life safety risk.
- Fire suppression system: The building is not sprinkler protected. The building insurers should be consulted to establish any requirements with respect to property protection.
- Structural fire protection: The existing protection nominally meets the required fire rating in the current standard, based on a desk-top review. Intrusive surveys have not been performed.
- Fire compartmentation: Each flat, services riser, stair, lift shaft and storage area form separate fire compartments. The existing construction nominally meets the required fire rating in the current standard, based on a desk-top review.
- Shunt duct arrangement: It is considered an acceptable solution for the toilet extract riser. However, it presents risk of fire/smoke spread between compartments at the kitchen extract riser.
- Flat entrance and refuse storage/post box fire doors: Assuming that these are the same as the tested fire door in the Thomas More building, they do not achieve the required 60 minutes fire rating. The failure to maintain fire separation between the stair and each flat, refuse storage and post box will compromise the availability of the stair for means of escape.
- Separation with neighbouring buildings: There is adequate separation distances to adjacent properties to minimise the risk of external fire spread between buildings. Fire rated construction separate Andrewes House from the adjacent Gilbert House and Willoughby House.

- Façade system: There appears to be no combustible materials in the façade system, based on the information provided.
- Firefighting shafts: The access to SC49 meets the guidance in the current standard. However, SC38 and SC44 are accessed via the carpark level which is a basement level and not directly accessed from open air. However, this is considered acceptable due to the large openings (to the atmosphere) provided throughout the carpark level.
- Firefighting stairs, lobby and north balcony: The width of the stair (1000 mm) and balcony (690 mm) are narrower than the 1100 mm width based on current standard. The smoke ventilation to the lobby is inadequate in area, which can be addressed by fire service opening the balcony door before undertaking firefighting activities. We understand that this is the current operational procedure to address the under sized lobby ventilation.
- Firemen's lift: The existing lift is not served by secondary power supply.
- Dry rising mains: All the inlet points are within 18 m of the fire service vehicle access routes. A dry riser outlet is located within each level of the firefighting shaft. However, some areas of the building are outside the 45 m coverage of the hose length.

Recommended for Remedial Actions

Recommendations for remedial actions are provided throughout the report (in green boxes) to mitigate the identified life safety risks due to the gaps in the existing fire safety precautions. A summary of the known gaps and the associated recommendations is provided in Table 1.

The table will be reviewed and revised accordingly when further information becomes available e.g. emergency lighting system, exit signage.

Table 1: Identified gaps and recommended actions

Identified Gaps	Recommended Action
Narrow escape routes along the balconies Extended travel distances in flats with single direction of egress and flats without hallway Lack of protected lobby between each flat and the escape stair	It is important to upgrade the fire protection and the availability of the escape stair for fire evacuation. The following improvements are recommended to achieve this: • Provide early warning to occupants by installing a Grade D1 Category LD2 detection and alarm system in all the flats; • Provide smoke ventilation to all the escape stairs; and • Clear briefing to all occupants of Andrewes House on the available escape routes.
Evacuation of PRMs	The following improvements to provisions for PRM evacuation are recommended: • Provide an emergency voice communication system on each stair landing, for the PRMs to call for assistance; • Barbican Estate to put in place a management plan and evacuation strategy for the evacuation of occupants, in particular for PRMs; and • Clear briefing to PRMs on the evacuation procedures and the use of the emergency voice communication system to call for assistance.
Exit signage	A survey is recommended to inspect and replace existing exit signage to comply with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report
Emergency lighting	A survey is recommended to inspect and replace existing emergency lighting to comply with BS 5266-1.
Storage areas in L03 Carpark level	The storage areas on L03 of Andrewes House are recommended to be provided with the following: • Minimum L2 automatic fire detection and alarm system in accordance with BS 5839-1; • Provide adequate exit signage and emergency lighting within the area; • Provide 120 minutes fire resisting construction, including FD60S doors, to separate storage areas from the fire fighting stairs (SC38, 44 and 49) • Provide 60 minutes fire resisting construction, including FD30S doors, to separate storage areas from the common stairs
Fire doors at flat entrance, refuse storage/post box and service risers within stairs	It is recommended to replace all the fire doors to all the escape stair and firefighting shaft enclosures and service risers within the stairs, to maintain the fire and smoke integrity of the stair Keep records of inspection and testing of fire doors in the future, at not less than three-monthly intervals to ensure that all fire doors are in working order.
Kitchen extract shunt duct system	In order to mitigate the risk of fire/smoke spread across compartments. It is recommended to close the connection from the current kitchen extracts with fire resisting construction and replace the existing extract hoods with recirculation type hoods
Firefighting stairs (SC38 and SC44) at L04	Services running through and along the firefighting stairs SC38 and 44 at L04 should be enclosed in a fire rated box to separate them from the firefighting stairs or re-routed.
Firefighting access distance, width of access routes, firemen's lift, lobby smoke ventilation and extended hose coverage	BE advised that London Fire Brigade is familiar with the configuration of Andrewes House. It is recommended to address the gaps in firefighting access and facilities through consultation and agreement with the London Fire Brigade. • Discuss and record firefighting procedures that are specific to Andrewes House in this document. • Carry out inspections of the three firemen's lifts (including lift control system) at monthly intervals to report the results of every inspection to the local fire and rescue service • Update the Fire Notice Box to include information about the design and materials of the external walls, extended hose coverage, and any relevant information following the consultation.
Others	• It is recommended to establish the compliance of the back-up power supply provisions against the relevant standards. • Consult with the insurers regarding any additional requirements for property protection.

Identified Gaps	Recommended Action
	• The sitewide inspection of exit signage (by others) to take into consideration to recommendations in this document.

Next Steps

It is recommended for BE and Arup to explore the feasibility or implementation of the recommended remedial actions.

Once this has been completed, it is recommended for the CoL District Surveyor and the London Fire Brigade to be consulted, to seek their early agreement in principle.

1 Introduction

1.1 Appointment and scope

Arup have been appointed by Barbican Estate (herein referred to as BE) to a provide fire engineering review of Andrewes House, an existing building which is part of the Barbican Residential Development, located in the City of London.

This report provides a fire strategy for the existing building and captures the current fire safety measures and strategy as Arup understand it from recent reviews of documents, discussions with the BE management team and through a non-intrusive site visit undertaken on 10/05/2021.

Although Andrewes House is an existing building, there is limited documentation available to explain the current fire safety information for the building. There is currently no fire strategy report for the building nor documentation which provides a cohesive record of the fire safety measures in the building. As such this fire strategy has been developed to act as a cohesive and detailed record of the current fire safety provisions (and can act as a benchmark for future building work).

1.2 Purpose of this report

Having a single documented fire safety strategy for Andrewes House provides the required information to understand the fire safety principles and fire safety measures within the existing building.

It should also be noted that this fire strategy covers the residential floors of Andrewes House and L03 residential storage units. This report does not cover the carpark (L03) or the services subway (L04).

This report will assist the BE when they wish to undertake any future improvements and alterations to the building. It will also act as a benchmark in recording the fire safety strategy and enables anyone undertaking works on the building to understand what implications these may have in terms of fire safety.

Furthermore, this report documents any potential shortfalls in fire safety measures and enables BE to address these where necessary and document them in their Fire Risk Assessment (FRA) for the building where required.

The purpose of the report is to provide the following:

- Identify any tests that should be undertaken to create evidence of building operation where that is missing;
- Identify potential remediation measures, where current fire safety systems do not provide adequate fire safety for occupants;
- A retrospective fire strategy report and associated fire safety drawings and recommended remediation measures.

These goals are identified to be provided for four different typologies of buildings to give an overall fire strategy for all 22 buildings within the Barbican Residential Development.

1.3 Barbican Residential Development

The buildings in the Barbican Residential Development were constructed from 1960 to 1982. There are 22 buildings in total as shown in Figure 1. There is a distinctive design feature across the Barbican Residential Development, which is the provision of a podium. It was constructed with an intention of providing a liveable urban environment for pedestrians and acts as ground level for the buildings[1].

In terms of fire safety design, the podium level throughout the Barbican Residential Development is considered as an access level for all of the buildings. Access level is defined in BS 9991 as ‘level used for normal access to the building that either incorporates, or leads directly to, a place of ultimate safety’. Therefore, the podium is considered a place of ultimate safety, serving as the exit discharge level for the stairs.

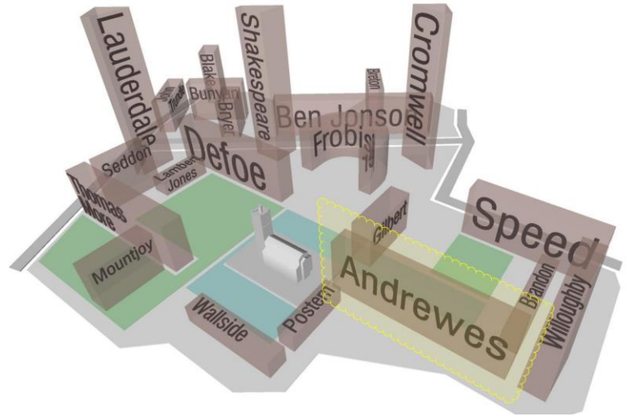

Figure 1: Overview of the Barbican Residential Development (Image courtesy Barbican Living)

Arup in conjunction with BE have identified four different block typologies which are common across the residential development. The typologies are as follows:

- High rise Tower – Cromwell Tower;
- Terrace Block type 1 – Andrewes House;
- Terrace Block type 2 - TBC;
- Terrace Block type 3 - TBC.

Andrewes House and Cromwell Tower have been confirmed as two of the four blocks which will be used as a base for the fire strategy for each block typology. The other two are to be confirmed in due course.

Flats across Andrewes House are generally owned by BE (i.e. the freeholder) however, a proportion of the flats are privately owned by leaseholders with a small portion of the flats being owned by the BE and let out to tenants.

[1] Barbican Estate, *Barbican Living*, *http://www.barbicanliving.co.uk/*, *(accessed 16 March 2021).*

2 Fire Safety Goals

2.1 Statutory and policy goals

The legislation, regulations and relevant standards contained within the following sub-sections have been referenced as part of Arup's review of the existing building. These are the requirements that are applicable to the existing building.

2.1.1 Regulatory Reform (Fire Safety) Order 2005

The Regulatory Reform (Fire Safety) Order 2005 (RR(FS)O) places a general duty of fire safety care on employers, occupiers and owners of almost all premises and requires them to take such fire precautions as may be reasonably required to ensure that premises are safe for the occupants and those in the immediate vicinity.

The responsible person has a duty to carry out a fire risk assessment which must focus on the safety in case of fire of all 'relevant persons'. The risk assessment should pay particular attention to those at special risk, such as the disabled and those with special needs, and must include consideration of any dangerous substance likely to be on the premises.

A fire risk assessment (FRA) was undertaken in March 2018 by Frankham Risk Management Services. A number of risks have been identified and need to be resolved in order to comply with RR(FS)O. Reference to these items has been included in the relevant sections of the fire strategy.

2.1.2 Building Regulations 2010 (as amended)

The fire safety review is undertaken to establish compliance against the functional requirements of Part B of the Building Regulations 2010 (as amended), using the recommendations in BS 9991:2015 (see Section 2.1.3) and BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice. Where applicable, Approved Document B Volume 1: Dwellings 2019 Edition Incorporating 2020 Amendments – For use in England, which has been updated recently to reflect the latest requirements for residential buildings has also been referenced.

2.1.3 BS 9991:2015

The existing building has been assessed against BS 9991:2015 - Fire safety in the design management and use of residential buildings – Code of practice. A guidance document which provides a means of demonstrating compliance with the life safety requirements of Part B of the Building Regulations 2010 (as amended) (herein referred to as "BS 9991"). This is used as the benchmark in developing the fire strategy for the building.

2.1.4 Barbican Estate fire safety goals

Through meetings with the BE, Arup has identified that the main objective of this fire safety review is the life safety of the building occupants. Arup is not aware of any additional requirements for property protection, either from BE or their insurer. This is to be confirmed by BE.

2.2 Proposed methodology

The existing fire safety precautions of Andrewes House are compared with the current recommendations in BS 9991. Where the provisions and recommendations align, no further action is required, and the existing provisions are recorded in this report to form the building fire strategy.

Where the provisions are not deemed to comply with the recommendations of BS 9991, a qualitative risk assessment will be carried out to identify the life safety risks to the building occupants due to those non-compliances or gaps in the fire safety precautions. The outcomes of the assessment will result in one of the following:

1. Where considered acceptable to remain as existing, recommend retaining the current provisions; or
2. Recommendations on possible options for enhancements/upgrades where the current fire safety provisions are considered inadequate.

It should be noted that as the building is existing, it is not feasible for all provisions to be in line with current fire safety standards. Where appropriate, the relevant guidance documents at the time of construction of the building have been used as reference.

2.3 Referenced documentation

The following information has been used to inform the Andrewes House fire strategy and fire safety systems provisions:

- Fortnightly progress review meetings between Arup Fire and BE between 12/01/21 to 09/03/21;
- Barbican Living website;
- Various email correspondence between Arup Fire and BE between 12/01/21 to 10/03/2021;
- Referenced documents and drawings listed in Table 2;
- Visual non-intrusive site visit undertaken on 10/05/2021.

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Table 2: Referenced documents and drawings

Document title	Produced by	Date	Revision
Andrewes House External Fire Risk Assessment	Frankham Risk Management Services	March 2018	Issue
CP 114:1957 *British Code of Practice, The Structural Use of Reinforced Concrete in Buildings*	British Standards Institution	1957	-
CP 3: 1962 *British Code of Practice Chapter IV Precautions against fire Part 1. Fire precautions in flats and maisonettes over 80 ft in height*	British Standards Institution	1962	-
BS EN 1992 – 1 -2 – 2004: Eurocode 2 *Design of Concrete Structure Part 1-2: General rules – Structural fire design*	British Standards Institution	2004	-
Abridged results from the test of 86 Thomas More House (double leaf door and single leaf door)	CTO S.A	2020	Issue
Grenfell Tower Inquiry: Phase 1 report overview	UK Government	October 2019	-
Form EWS1: External wall fire review – Andrewes House	City of London Corporation	December 2020	Issue
Post clean report for cleaning of kitchen extract ventilation system	HMAC Ventilation Services LLP	February 2021	Issue
Blocks VIII & IX Plan Level 50.30 Electrical distribution	Lee Beesley & co Ltd electrical engineers	Feb 1969	-
Drawing no. 37 527 Phase 3 Block VIII Section at 2467E looking west	Ove Arup & Partners	Apr 1965	-
Drawings 37 523 Block VIII Layout plan at 83.91	Ove Arup & Partners	Apr 1964	Rev C
Drawings 37 518 Block VIII 68.17 layout	Ove Arup & Partners	Mar 1964	Rev E
Drawing no. 37 517 Block VIII Floor layout at 69.17 level	Ove Arup & Partners	Feb 1964	Rev G
Drawing no. 37 516 Block VIII Floor layout at 59.08 level	Ove Arup & Partners	Feb 1964	Rev F
Drawing No. 37 515 Block VIII Layout plan at 59.08 level	Ove Arup & Partners	Mar 1964	Rev C
Drawing number 37/1807 Blocks VIII & IX Plan level 50.30 Electrical distribution	G.H. Buckle & Partners Consulting Engineers	Feb 1969	-

2.4 Limitations and assumptions

2.4.1 Limitations of report

This document summarises the findings of our work carried out to date. It does not attempt to quantify actual elements of fire performance, such as fire resistance periods, across the building in its existing state as physical intrusive works would be required to do this. It is Arup's understanding that intrusive investigations into the building is not planned to be carried out.

There are no architectural layouts of the building. Structural plans of Andrews House have been obtained through Arup Archive and used to better understand the building layout. The structural plans do not include the entire building and are limited to some levels of the building only. The fire strategy drawings provided as part of this report are based on floors 1 to 6 above Podium level. There are no plan layouts showing below Podium level nor floor 7.

BE should undertake the necessary tests/inspections to confirm that the fire safety systems will operate as intended in a fire event.

The information documented in this fire strategy is limited to the amount of information covered through the following:

- Desktop review;
- Consultation with the BE;
- Visual non-intrusive site visit undertaken on 10/05/2021, where the areas visited included outside and inside of Andrewes House (L03 – Floor 7) and one empty flat (on Level 2 above the podium).

The fire strategy does not represent the condition for the entire building.

2.4.2 Summary of key assumptions

The following key assumptions have been made to form a basis of the fire strategy for Andrewes House. BE should confirm if these assumptions are suitable for the project.

- Any current or future building works and their impact on the fire strategy are outside the scope of this documents;
- No further inspection/survey is planned such as intrusive investigation on the building;
- The building is not undergoing any changes at all, with no change in occupancy nor material alterations;
- The fire strategy drawings within the report are in line with the current building layout;
- Structural drawings are only available for apartment levels above Podium (Floor 1 to 6). There are no information/drawings for levels below the Podium (L01-L02) or Floor 7. Below Podium level floors (L01 to L02) and Floor 7 are assumed to have a layout that is in line with Floors 1 to 6 (with little variation) and follow the same fire safety principles throughout the building;
- Flat 19H is assumed to be a mirror image of flat 19. There are currently no layouts available.
- All flats other than flat types 19 and 19H are assumed to have an internal hallway which is connected to all habitable rooms.
- Fire and rescue service will use the North facing balcony (bedroom side) to enter the flat on fire. It is assumed the South facing balcony (living room side) may not provide enough width due to the privacy screens for fire and rescue service to travel with the necessary firefighting equipment.

- The doors from Thomas More (which have undergone fire testing) are assumed to be the same as the ones from Andrewes House.
- All elements shown in the structural drawings are assumed to be elements of structure and therefore loadbearing.
- The thickness of structural elements (i.e. slab depth or wall thickness) are assumed to be the same throughout the building;
- All structural elements are reinforced concrete;
- The concrete covers over the reinforcement bars meet the values stated in the relevant guidance at the time of construction (CP114); there is no information on the depth of the existing concrete covers for this aspect to be assessed;
- Floor slabs are simply supported one-way slabs throughout the building.
- No structural calculations are available and therefore the utilisation factor of the structural members is unknown. When checking against the requirements of Eurocode 2 (Section 4.3.1) a utilisation factor of 0.7 has been assumed for conservatism.
- The fire resistance requirements given in CP114 cover loadbearing capacity, integrity and insulation.
- There is no fire stopping register for the building. The condition of the fire stopping at penetrations on fire rated construction is unknown. It is assumed that fire stopping remediation actions will be undertaken as part of ongoing maintenance.
- Boundary distances have been taken to the middle of Fore Street and the middle of the Barbican Water Gardens as there is no site boundary information available.

3 Andrewes House

Andrewes House was completed in 1969. It is a terrace block which sits between Gilbert House and Willoughby House. The building contains 192 flats in total[1].

The building consists of 12 stairs (Staircase 38 to Staircase 49) where three of the stairs are firefighting stairs, each with a firefighting lobby and firemen's lift. The other remaining nine are common stairs with a passenger lift. All flats in the building are served by a stair and a lift from the main flat entrance door.

The building consists of 11 floors with a building height of 27 m measured from ground to the bottom of the topmost occupied storey. The *Grenfell Tower Inquiry: Phase 1 report* defines high-rise buildings as buildings over 18 m in height and hence Andrewes House is considered a high-rise building. There are three floors below podium level (L01 and L02 contain flats whilst L03 contains the carpark and residential storage areas) and seven residential floors above podium level (1-7) with a roof above that. The roof level is only accessible to BE staff via the top of each of the fire fighting shafts.

L04 which is known as the 'subway' is below L03. It contains services and extend throughout the Barbican Estate. The carpark at L03 extends beyond Andrewes House, connecting with the carparks of adjacent buildings. As such, these areas are excluded from the scope of this document.

There are balconies on two sides of the building – South facing (living room side) and North facing (bedroom side) balcony that is connected to three firefighting shafts across the building. These balconies serve each residential floor above the podium only, but not the levels below the podium.

There are three main firefighting access points into the firefighting shafts serving the building. For firefighting shaft 38 and 44, the main access is from the L03 carpark, either via the vehicle ramp on Fore Street or the external stair on Moor Lane. For firefighting shaft 49, the access is via St. Giles Terrace.

On a day to day basis, occupants from street level (L02) must take the passenger lift or stairs up to the podium and then use the respective stair or passenger lift to access their flats.

The layout and the section of Andrewes House is as shown in Figure 2 and Figure 3.

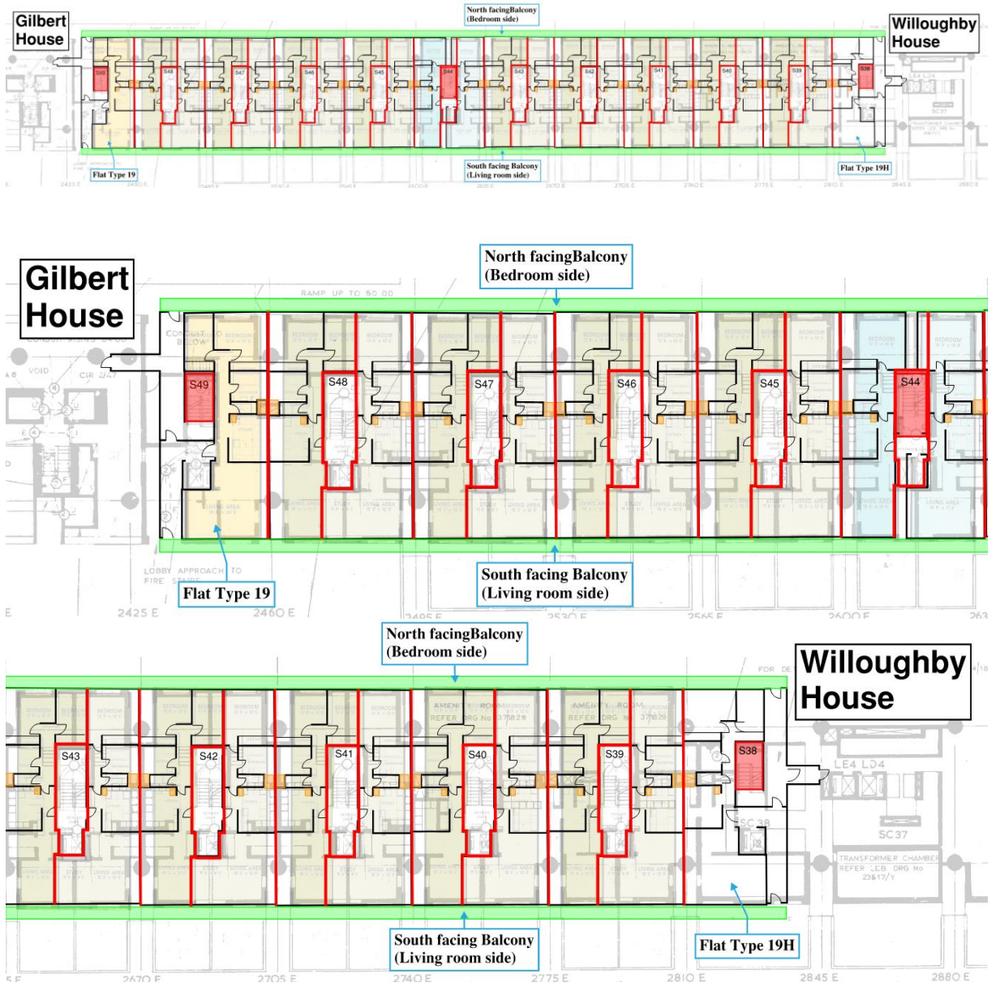


Figure 2: Layout of Andrewes House (Above Podium level: 1-6)

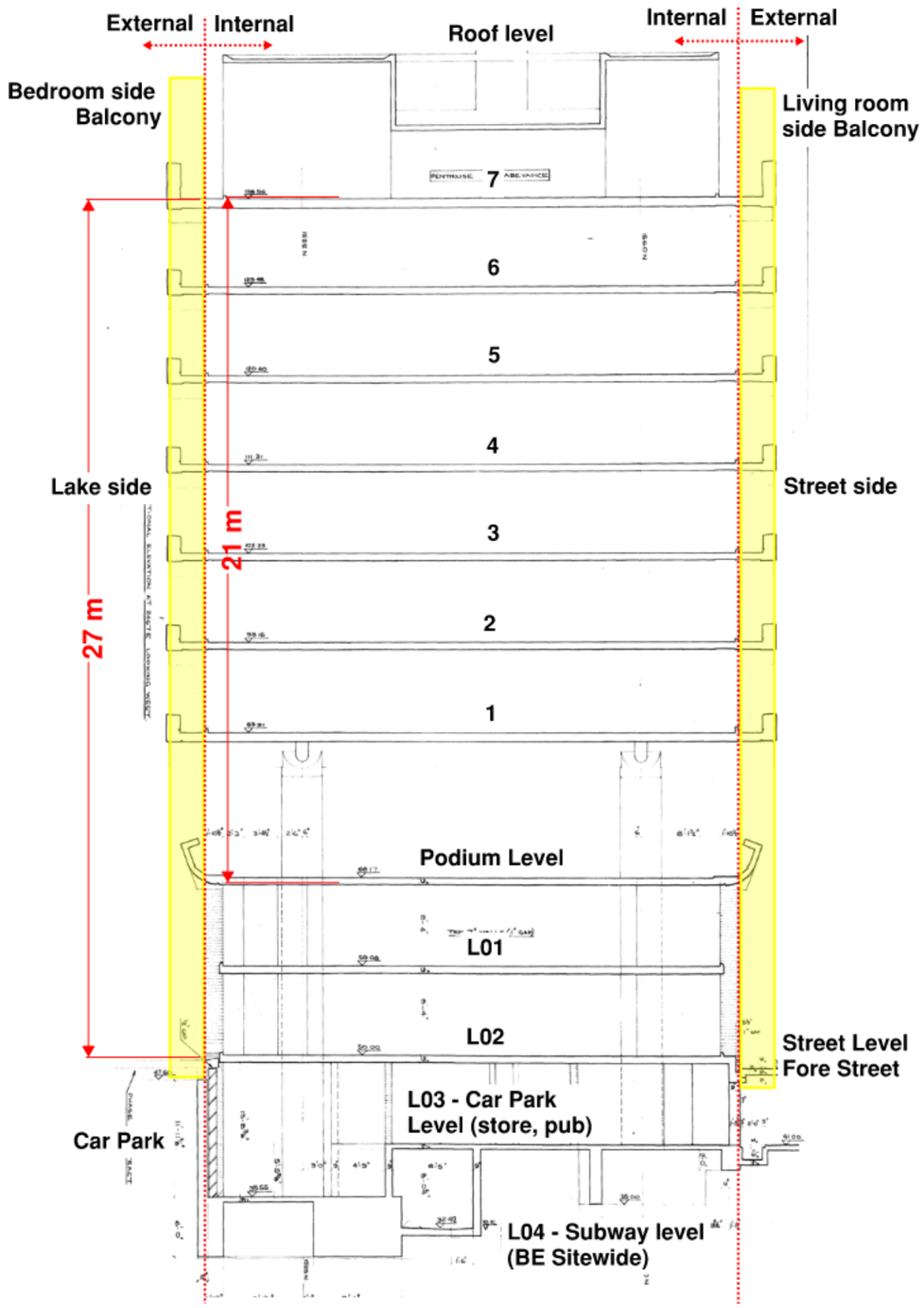


Figure 3: Section of Andrewes House and Level naming convention

4 Fire Strategy Summary

This section of the report provides an overview of the fire strategy of Andrewes House. It provides the following:

- The recommendations of current guidance;
- The current provisions in Andrewes House;
- Identification of non-compliances against the current provisions;
- If there are non-compliances identified, three possible solutions through a risk assessment:
    1. The non-compliance is considered to present life safety risk and requires remediation. Recommendations are made to improve the current provisions to comply with the Building Regulations on an as near as reasonably practicable basis;
    2. The non-compliance is not considered to be high risk to require additional safety measures to the existing system. It is considered acceptable to be retained; OR
    3. More information/confirmation is required from BE (brown text).

Where a non-compliance has been identified and a recommendation has been made after a risk assessment, these have been highlighted in green box.

4.1 Means of warning and escape

4.1.1 Evacuation strategy

Andrewes House operates with a defend in place/stay put strategy where only the occupants in the flat of the fire origin evacuate the building. The rest of the building occupants will remain in place. The defend in place strategy is a common strategy for residential buildings in the UK and this is recommended to be retained for Andrewes House.

It is important that information is given to residents regarding the meaning of the stay put strategy and the arrangements for means of escape is available to them if a fire affects their flat. It is note from the Frankham's FRA that fire action notices are inconsistently displayed in communal areas and the guidance is ambiguous in respect of a stay put evacuation strategy. It is recommended for signage to be replaced with clear instructions to residents, explaining their fire actions, including the stay out policy and their nearest escape routes.

If deemed necessary by the fire brigade, the building may undergo simultaneous evacuation where all of the occupants in the building will evacuate. Presently, the fire brigade and/or BE staff will have to notify each occupant by knocking on each flat door. There is no formal procedure for carrying out a simultaneous evacuation.

Whilst the above approach is compliant with the recommendation of BS 9991, the *Grenfell Tower Inquiry: Phase 1 report* recommends that all high-rise residential buildings, existing and new, are provided with facilities to allow the fire and rescue service to simultaneously evacuate the building. Please refer to Section 4.1.9 for additional details on the fire detection and alarm system.

4.1.2 Travel distance within flats

From BS 9991, there is no limitation on travel distance within flats where all habitable rooms are accessible from an internal hallway (not fire rated construction) and have an alternative exit from the habitable rooms. Where a flat is not provided with a protected corridor or alternative exits, travel distances from anywhere within the flat to the flat entrance door should be limited to 9 m.

For occupants who are able-bodied (refer to Section 4.1.6 for evacuation of Persons with Reduced Mobility, PRM) and above the Podium, the flats are provided with three escape routes; via the South facing balcony, North facing balcony and the flat entrance.

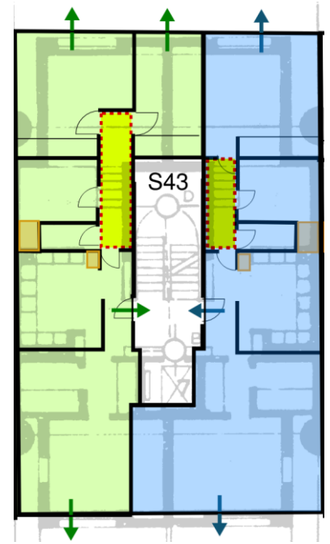


Figure 4: Available egress routes and internal hallway for typical flat layout

All flats, with exception of the end flats (flat type 19 and 19H) as indicated in Figure 2 have an internal hallway where all habitable rooms are accessible from. As such, these flats do not have a travel distance limit and meet the BS 9991 guidance.

BE advised that flat types 19 and 19H whilst provided with alternative exits, are not currently provided with an internal hallway. In addition, the flats below the Podium level are only served by the stair as means of escape, creating an extended travel distance. These are therefore non-compliances against the recommendations of BS 9991.

The omission of an internal hallway in flats 19 and 19H and the extended travel distances in flats below the Podium level are considered acceptable based on the following:

- The travel distances from the furthest away point in the flat to the flat front door is ~10.1 m. The travel distance extension of 1.1 m above the recommendations unlikely to negatively impact the evacuation time.
- For flats above the Podium level, they are provided with alternative means of escape which result in travel distances to a place of relative safety (i.e. balconies) of less than 9 m.

- At the same time, due to other non-compliances in fire safety precautions, an automatic fire detection and alarm system (see Section 4.1.9) is recommended for all the flats. This will provide early warning to the occupants within the flat and an improvement to the current provision.

It is Arup's understanding that only Flat type 19 and 19H are not provided with an internal hallway. If there are other flat types without an internal hallway, the assessment and recommendations above will apply to those flats.

4.1.3 Horizontal means of escape

This section describes the horizontal means of escape provisions for able-bodied occupants. PRM evacuation is further detailed in Section 4.1.6.

Balcony approach – L1 to L7

There are no specific recommendations in BS 9991 on minimum exit widths. BS 9999 recommends 800 mm minimum width for doors regardless of risk profile.

Andrewes House is a multi-stair building with balcony approach on Level 1 to 7. The horizontal means of escape from each flat consists of the two balconies (North and South) and the flat entrance, leading to a stairwell. The escape routes are as follows:

- **South facing balcony (living room side) exit** – The living room has a large sliding door which leads directly to the balcony. Once on the balcony, occupants can choose to escape in two directions and use one of the firefighting stairs to reach the final exit.

  Due to privacy screens, the width of the South balcony varies between 460 mm to 510 mm with the privacy screens in the open position. These are narrow compared to the minimum width recommended by BS9991. However, considering the limited number of occupants and the alternative exit routes (the wider balcony and the stair), the balcony width is recommended to be retained.

  In addition to the above, it was identified during the site visit, that furniture is located along the South balcony as shown in Figure 5 below. These should be removed so that the escape route remains unobstructed.

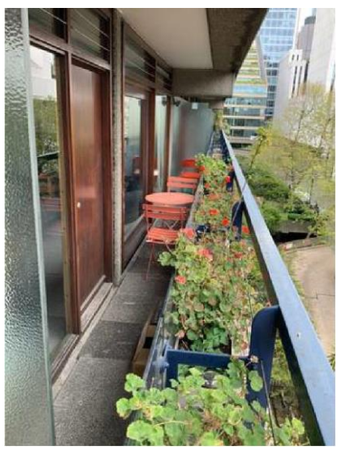


Figure 5: Furniture along the South balcony

- **North facing balcony (bedroom side) exit –** The master bedroom has a sliding door and the second bedroom has a large sliding window to enter the balcony. The sliding window is approximately 800 mm in height, where the occupants will have to climb over in order to access the balcony. Alternatively, the occupants from the second bedroom can escape via the internal hallway to the master bedroom. Once on the balcony, occupants can escape in two directions, and use one of the firefighting stairs to reach the final exit.

  The width of the North facing balcony is 690 mm. Similar to the South facing balcony, this is recommended to be retained.

- **Flat entrance** – There are 12 stairs across the building and every flat entrance leads directly onto the stair landing. From there, occupants can use the stairs to evacuate the building. During the site visit, it was been confirmed that the flat entrance door (on the inspected flat) has a width of 880 mm.

BS 9991 recommends that for multi-stair building with balcony approach, the balconies should meet the following recommendations:

- Structure including the floor is to be protected to achieve 30mins fire rating. Based on the available structural drawings, the floor slab of the balcony achieves a nominal fire rating of 120 minutes – refer to Section 4.3.2 for further details.
- Walking surface should be imperforate. Based on the photos of the balconies (refer to and Figure 12) the walking surfaces are solid concrete pavers and imperforated.
- The balcony be open-sided and the opening to achieve at least 50% of the vertical plan. From the photo evidence, this criteria appears to be achieved but further confirmation on the height of the opening will be required. Refer to Section 4.1.11 for further details

Below Podium levels – L01 and L02

Below the Podium level (L01 and L02), the horizontal means of escape from the flats are as follows:

- Flat entrance – onto the same stair serving Level 1 to 7 above.
- Willoughby carpark via the gardens – all L02 flats each have a garden that is open to adjacent gardens. Occupants can evacuate through the gardens and travel to the Willoughby carpark to reach the final exit.
- There are also four L01 flats (SC49 end of Andrewes House) with external ladders leading down to L02 (refer to Figure 6). BS 9991 states that ladders should not form part of a means of escape route from any dwelling. Therefore, the ladder that connects L01 to L02 cannot be considered as an alternative means of escape.

Figure 6: Ladder from L01 to L02 leading to Willoughby Carpark through L02 garden.

The door that leads to the Willoughby carpark from the gardens is currently locked and can only be opened by a key. The lock should be changed so that it can be opened without the use of a key or other devices.

The horizontal means of escape for the remainder of the L01 flats is only via the flat entrance door (i.e. single means of escape). It is understood that means of escape to the neighbouring flat was part of the original provisions; however, this is not considered appropriate as there may be cases where:

- Furniture may be blocking the door to adjacent flat;
- Neighbouring flat may not be occupied/empty and the front door may not be openable from the inside;
- Change in door locks or new locks to the door by the tenants, blocking the means of escape route.

Recommendations:

- A management procedure should be put in place to keep the balconies (North and South) clear of any obstacles at all times. This is to provide a clear escape route for occupants to evacuate in an emergency.
- The door which leads from L02 gardens to Willoughby carpark should be openable by occupants without the use of a key or other devices.
- Refer to Section 4.1.6 for additional recommendations for single means of escape.

4.1.4 Vertical means of escape (stairs)

Minimum width

Common stairs are required by BS 9991 to be no less than 750 mm, measured between the walls and/or balustrades (if protruding less than 100 mm from the walls). A minimum 2 m clear height shall be maintained.

Andrewes House is provided with 12 stairs evenly spaced along the building (SC 38 to 49 – see Figure 7). Three of these stairs are part of the firefighting shafts (SC38, 44 and 49). The widths of all the stairs have been measured (during site visit) as 1000 mm each, although it is currently not known how much the handrails protrude into the stairs. Due to the stay-put policy and the low number of occupants served by each stair, the vertical exit capacity provided by the stair is considered to be sufficient.

Refer to Section 4.5.3 for details of the firefighting stairs.

Figure 7: Typical stair in between two flats, viewed from the passenger lift

Protected lobby

Except for the firefighting stairs, the other common stairs do not have protected lobby. Each apartment opens directly into the stair. This is not an issue for able-bodied occupants in flats above the Podium level due to the multiple escape routes via the balconies. However, the lack of protected lobby presents a risk to flats below the Podium level and PRMs anywhere in the building. Refer to Section 4.1.6 below describing the potential risk caused by the lack of protected lobby to PRMs and the mitigation measures.

Ventilation to common stairs

There is currently no means for smoke ventilation in the common stairs (SC 39 to 43 and SC 45 to 48). Due to the common stair being the single means of escape and firefighting access for the flats below the Podium level and the use of the stair as protected refuge for PRMs (refer to Section 4.1.6), it is recommended to provide means for smoke ventilation to the common stairs. This could be in the form of automatically openable vents/doors to outside or a mechanical smoke ventilation system.

4.1.5 Final exits

Level of discharge

All stairs, with exception of SC49, discharge at Podium level. Occupants in flats above the Podium level will evacuate down to the Podium, while occupants in flats below the Podium level will evacuate in the upward direction.

In the case of SC49, discharge is available at both Podium level and street level, adjacent to fire service vehicle access point. Refer to Figure 8 below.

Figure 8: Final exit for firefighting shaft SC49 at St Giles Terrace

Final exit requirements

In accordance with BS 9991, discharge from common stairs and final exits should meet the following recommendations:

- Protected stairs should discharge directly to a final exit – all the stairs at Andrewes House discharge to a final exit either at Podium level of street level (for SC49).
- Final exits should discharge directly to a walkway or open space that allows for the rapid dispersal of persons away from the vicinity of the building, which is achieved by the Podium.
- Final exits should have a level threshold. It has been confirmed during the site visit that the Podium level is levelled/step free. The final discharge from the garden (at Level 02) to the Willoughby carpark and exit via the vehicle ramp are also step free (the gradient of the ramp has not been assessment for compliance with BS 9999 nor Approved Document M).
- Final exits should be sited such that they are clear of any risk from fire or smoke – the Podium is an open public walkway, mainly of non-combustible construction and with very low fire load content. The final exit of the stairs discharge onto the Podium, which is a low fire risk area. Refer to Figure 9 for the condition of the podium.

Place of ultimate safety

The Podium level (ground + 2 storeys – see Figure 9) is an external walkway which runs along the length and beneath Andrewes House and also connects to other buildings in the Barbican Residential Development and adjacent developments. The Podium acts as a place of ultimate safety (a place where there is no immediate or future danger from fire) and it is also used as the point of access for fire brigade.

The nearest stair linking the Podium to street level for Andrewes House is an external stair adjacent to The Postern building on St Giles Terrace (see Figure 10). There are other stairs/lifts serving the Podium from street level across the Estate. This will allow for the dispersal of occupants away from Andrewes House in the event of a fire.

Figure 9: Podium underneath Andrewes House

Figure 10: Stair down to St Giles Terrace, across a pedestrian bridge

4.1.6 Evacuation of PRMs

Andrewes House currently does not have an evacuation strategy for PRMs.

As discussed in Section 4.1.3, each flat above the Podium level has a number of means of escape including access to the balconies. However, there is a step up and down (about 10mm) from the flat to both balconies. In addition, the balcony widths (410 mm to 690 mm) do not provide enough width for wheelchair access which has an average width of 700 mm. Therefore, there is only a single means of escape for PRMs in Andrewes House.

Lack of protected lobby and refuge

As there is only a single means of escape for PRMs in Andrewes House, BS 9991 recommends that a protected lobby for single stair buildings with a floor level more than 11 m above ground.

Apart from the three firefighting stairs, the remaining nine common stairs are not provided with a protected lobby – each flat opens directly into the common stair. Smoke from a fire in the incident flat is likely to spread into the common stair during evacuation when the entrance door to the stair is opened.

For able-bodied occupants, the risk of the stair being smoke logged can be mitigated by using the balconies. However, if a fire were to occur in a flat occupied by PRM, the stair is the only escape route. The stair is also a protected refuge for the PRM to wait for assistance, as the passenger lifts are not evacuation lifts. Presently, there is no provisions in the stair for the PRM to call for assistance.

The lack of protected lobby, potentially causing the stair to be smoke logged and the lack of means to ventilate smoke from the stair present a life safety risk to the building occupants. The lack of any communication system in the stair for the PRM to call for assistance is unacceptable in terms of safe means of escape provisions.

Extended travel distance

The flat does not have a common internal corridor serving all rooms. This means the travel distances within the flat should be limited to 9 m from the furthest point in the flat,

The current travel distance within the flat to the entrance door is approximately 10.1 m which exceeds the recommendations of BS 9991 (maximum travel distance of 9 m for single means of escape within flats), as shown in Figure 11 below.

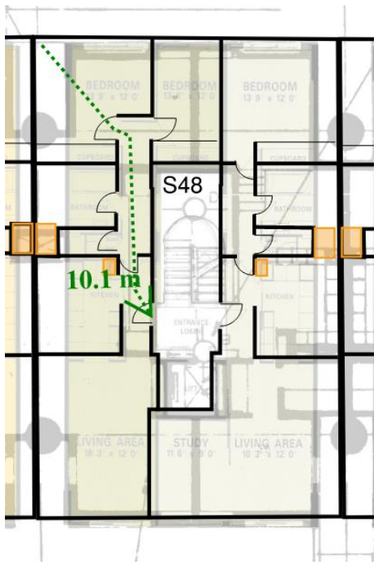


Figure 11: Extended travel distance for single means of escape for PRMs

Flat entrance width

BS 9991 has no specific recommendations for means of escape for PRMs. However, BS 9999 recommends the total door width should be not less than 850 mm where unassisted wheelchair access is necessary. During the site visit, it was confirmed that the flat entrance doors have a width of 880 mm.

Evacuation strategy for PRMs

BE confirmed that there is currently no evacuation management plan for PRMs and that the leaseholder of the flats is responsible for their own evacuation. It is strongly recommended for BE to have in place a strategy and management plan for the evacuation of PRMs. It is a recommendation in the Grenfell Tower Inquiry: Phase 1 report that '*the owner and manager of every high-rise residential building be required by law to prepare personal emergency evacuation plans (PEEPs) for all residents whose ability to self-evacuate may be compromised (such as persons with reduced mobility or cognition)*'.

Recommendations:

- Provide an emergency voice communication system on each stair landing, for the PRMs to call for assistance.
- Provide smoke ventilation to all the common stairs, e.g. by means of openable vent at the top of the stairs.
- Provide an automatic fire detection and alarm system for each flat (Section 4.1.9 for details).
- BE to put in place management plan and evacuation strategy for the evacuation of occupants, in particular for PRMs.
- Clear briefing to all occupants of Andrewes House on the available escape routes.
- Clear briefing to PRMs on the evacuation procedures and the use of the emergency voice communication system to call for assistance.

4.1.7 Exit signage

The External Fire Risk Assessment FRA prepared by Frankham Risk Management Services in March 2018 states that there are suitable and sufficient exit and directional signs in place in Andrewes House.

BS 9991 recommends exit signage to be in accordance with BS 5499-4 and BS ISO 3864-1. In particular, for stair that serves storeys both above and below the point of final exit, the final exit should be immediately apparent by the provision of additional signage.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that in all high-rise residential buildings, floor numbers are clearly marked on each landing within the stairways and in a prominent place in the lobbies such that they can be seen in normal conditions and in low lighting and smoky conditions.

Existing provisions

BE advised that there is a sitewide inspection (currently paused) to examine the condition of existing signage and to replace them where necessary.

During the site visit it was confirmed that the exit signage is not adequately provided. All are non-illuminated wall mounted signs and without an adjacent emergency light. Below are some examples of the gaps in provisions:

- Exit signage indicating discharge level on the final exit level is not provided;
- Inadequate exit signage along the balconies;
- Missing signage inside the stairs for flats on L01 and L02 to escape in the upward direction;
- No signage in the storage areas; and
- Signs directing to firefighting shafts (SC44) are not conspicuous.

Proposed Improvements

All exit signage provided in Andrewes House is recommended to be in line with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report.

Recommendations:

- BE to carry out a sitewide inspection and provide exit signage in accordance with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report.

4.1.8 Emergency lighting

In accordance with BS 9991, emergency lighting should be provided in accordance with BS 5266-1.

Existing provisions

Andrewes House is provided with an emergency lighting system with battery back-up. During the site visit, it was not possible to determine the light fittings that are part of the emergency lighting system. The stairs on the middle floors are relatively dim and the lighting was limited to the fittings around the lift door.

Proposed Improvements

A full survey on emergency lighting is recommended and to remediate any of the non-compliances throughout the building for emergency lighting to be in line with BS 5266-1.

Recommendations:

- BE to carry out a sitewide survey and provide emergency lighting in accordance with BS 5266-1.

4.1.9 Fire detection and alarm

BS 9991 recommends that flats in multi-storey buildings shall be provided with an alarm and detection system in line with BS 5839-6. The recommended system for an existing flat is Grade D1 Category LD2, where Grade D1 is a provision of one or more mains powered detection system each with a sealed in standby supply consisting of a battery and Category LD2 system is where detection is only provided at points where the fire risk is high or where combustion products would present a significant hazard to life.

In addition to the recommendations of BS 9991, the Grenfell Tower Inquiry: Phase 1 report recommends that all high-rise residential buildings, existing and new, are provided with facilities to allow the fire and rescue service to simultaneously evacuate the building. High-rise buildings are defined as buildings over 18 m in height and hence Andrewes House is considered a high-rise building.

Existing provisions

Andrewes House is currently not provided with a fire detection and alarm system with exception of the BE owned flats. These flats, on tenancy lets, are provided with an LD2 alarm and detection system, with a 10-year battery backup. The proportion of these flats are small compared with the privately owned leasehold flats.

In the case of privately owned flats, it is the responsibility of the tenants and owners to install an alarm and detection system. It should be noted that this is only a recommendation by BE, as the freeholder, and not compulsory. BE has no record of the flats that are equipped with such system within the flats.

There is no fire detection and alarm system in the common areas.

There is also no facility to allow the fire and rescue service to simultaneously evacuate the building.

- it is unlikely for one fire incident to compromise all the stairs in the building;
- It is equally unlikely for a fire incident to compromise both the balconies, which are escape routes for flats above the Podium level.
- Andrewes House is a concrete building, with concrete construction between the flats and around each stair. The external walls are also concrete construction and mainly non-combustible. BE advised that there is no combustible insulation within the walls. Hence, the risk of rapid fire spread across the building is low.
- There are three firefighting shafts, separated from one another by distance and fire rated construction. It is unlikely for all the shafts to be compromised by one fire incident.

Therefore, it is not recommended to provide a facility to initiate simultaneous evacuation of the building. This is to be discussed and agreed with London Fire Brigade.

Proposed Improvements

A Grade D1 Category LD2 system in line with BS 5839-6 is recommended for all the flats in Andrewes House, due to the following reasons:

- An improvement to the flats with extended travel distances due to the single means of escape and/or the lack of an internal hallway within the flat. The system provides an early warning to occupants so that they quickly evacuate from their flat.
- An improvement to evacuation of PRMs, with a single means of escape and requiring assistance to evacuate to the place of ultimate safety.
- Due to the potential risk of fire/smoke spread via the kitchen extract shunt duct arrangement (see Section 4.3.6), the detection and alarm system provides improvement by providing early warning in case of breach of compartmentation.

Recommendations:

- Provide a Grade D1 Category LD2 system in line with BS 5839-6 is recommended for all the flats in Andrewes House

4.1.10 Fire suppression

Based on BS 9991, sprinkler protection is required for buildings with a floor higher than 30 m above ground level. However, the recent revision of ADB Volume 1: 2020 amendment states that the threshold building height (for residential buildings) for the provision of sprinklers has been reduced from 30 m to 11 m.

Existing provisions

Andrewes House is not provided with sprinkler protection. The building height from ground to the topmost occupied storey is 27 m (drawing number 37 527).

Proposed Improvements

British Standard Code of Practice CP3: Chapter IV (1962) which was the relevant code at the time Andrewes House was built (1969) does not require any sprinkler protection to high-rise residential buildings. Also, the recent change of trigger height from 30 m to 11 m in ADB has been made in the 2020 amendments.

It is considered acceptable for Andrewes House to remain as existing due to the following reasons:

- Andrewes House is a concrete building, with concrete construction between the flats and around each stair. The external walls are also concrete construction and mainly non-combustible. BE advised that there is no combustible insulation within the walls. Hence, the risk of rapid fire spread across the building is low.
- The stairs for means of escape and firefighting access are of concrete construction. Provided that the fire doors are rectified (refer to Section 4.3.3), the integrity of the stairs are unlikely to be compromised by a fire incident in a flat.
- The flats above the Podium level (a larger proportion of the building) have multiple escape routes along the external balconies. A fire incident in a flat is unlikely to compromise the use of both balconies as escape route.
- Andrewes House complies with the recommendations of the relevant guidance at the time of construction CP3;
- Andrewes House complies with relevant codes until the recent changes made in ADB 2020 amendments;
- The building is not undergoing change in use nor material alteration and therefore does not require by the Building Regulations to be upgraded to meet the current guidance.

In terms of life safety, sprinklers will not be required as the current provision is considered to provide adequate life safety features for safe evacuation of the building. However, without an automatic means of suppressing a fire (such as a sprinkler system) may pose a significant threat to the property protection of the building. As Andrewes House is part of the Barbican Residential Development with heritage and culture significance, there may be requirements from insurers that are in addition to the Building Regulations.

Recommendations:

- BE to consult with the insurers regarding any additional requirements for property protection.

4.1.11 Smoke control

In order for fire and smoke to be directed outwards and upwards, BS 9991 recommends the balcony to be open sided. The opening to be at least 50% of the vertical plane and uniformly spread across the surface. The opening should be at least between the top of the balustrade at 1.1 m and the soffit to the balcony above.

Balcony existing provisions

BE confirmed the distance from the balcony surface to top of the balustrade glazing is 960mm and from the top of the balustrade glazing to the soffit is 1430mm which is compliant as it is more than 50% of the vertical plane across the surface as shown in Figure 12.

Figure 12: Photos of both South and North facing balconies

4.1.12 Refuse storage cupboard and post box

BS 9991 recommends refuse rooms provided for the storage of refuse should be separated from other parts of the building and should not be located within or accessed directly from common stairs. Rooms provided for the storage of refuse should be approached only by way of a protected lobby having not less than 0.2 m^2 of permanent ventilation or a suitable mechanical alternative.

There is no recommendation in BS 9991 for post box. Considering the fire load content such as parcels, even though not to the same scale as refuse, it is recommended to not locate the post box within the common stairs.

Existing arrangement

Every flat in Andrewes House is provided with a refuse storage cupboard and a post box adjacent to the flat entrance door, for the use of the flat occupants only. The refuse storage and post box are accessible from both the stair landing outside the flat and within the flat; they

comprise of a metal frame cupboard with asbestos backed doors on both the stair landing side and the flat side.

There is no ventilated lobby provided and no other mitigation measures provided in Andrewes House for refuse storage areas.

Proposed Improvements

The current arrangement does not comply with the recommendations of BS 9991. Refuse storage is considered a high fire hazard area and the location within the common stair poses a risk to the occupants. A fire involving the refuse can cause fire and smoke to affect the use of the stair and to spread into the flat. It is therefore critical for the door separating the refuse storage and post box from the stair to be fire rated door.

As a recommendation to this non-compliance, the doors to the refuse storage from the common area should be fire rated to 60 minutes with smoke seals. Although this does not fully meet the current recommendations of BS 9991, this is considered an improvement to the current arrangement. The recommended additional detection and alarm system in each flat will serve to provide early warning in the event of a fire in the flat. The new fire rated door separating the refuse storage and post box from the stair will serve to limit fire and smoke spread, maintaining the use of the stair for means of escape and protected refuge.

Recommendations:

- If doors to the refuse storage and post box cupboard on the stair landing are not fire doors meeting the current standard, it is recommended for new fire doors (FD60S) to be provided.

4.1.13 L03 Storage area

BS 9991 states no storeroom should open directly to a common stair. Instead, there should be a ventilated lobby between the storeroom and the stair.

BS 9999 states storage areas greater than 1 m^2 in area but not greater than 450 m^2 (other than refuse storage areas) need to be separated from other parts of the building with a minimum standard of fire resistance of 30 minutes.

Existing provisions

There are storage areas on L03 of Andrewes House which open directly into corridors leading to the common stairs and firefighting stairs. The storage areas are in separate rooms, designated to each of the flats. There is no fire separation between the storage rooms and the corridors serving the rooms. The corridors lead to the stairs and are only separated by glazing partitions and doors (Figure 13)

There is no exit signage, emergency lighting, automatic detection or alarms within the storage areas. This is a non-compliance against the current standards.

During the site visit, it was not possible to check the travel distances nor the dead end distances for compliance with BS 9999. It is understood from BE that there are some dead end corridors.

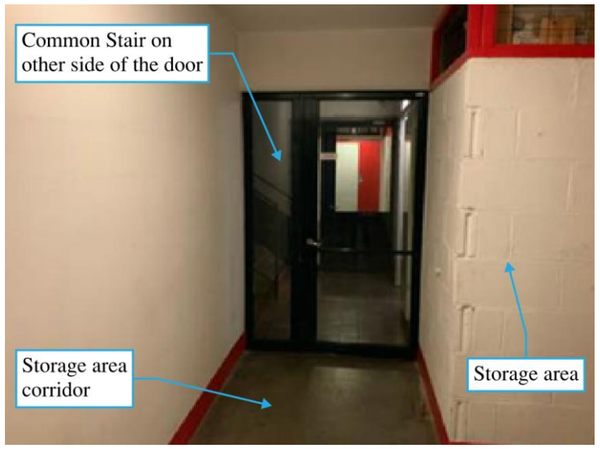


Figure 13: Storage area directly accessible from the stairs

Proposed Improvements

As a recommendation to the above non-compliance, all of the storage areas should be provided with a minimum L2 fire alarm and detection system as recommended under Table 7 of BS9999, as well as exit signage and emergency lighting in accordance with the relevant standards. Refer to Section 4.1.7and 4.1.8 for recommendations on exit signs and emergency lighting.

A survey should be undertaken or floor plan to be provided to assess the compliances of the travel distances within the storage area.

The stairs are directly accessible from the corridors (that are connected to the storage rooms). This is a non-compliance as lobbies should be provided in between the two areas. However, the current arrangement is considered acceptable due to the following:

- All common stairs are recommended to be provided with openable vents. Refer to Section 4.1.6;
- Minimum L2 system of automatic detectors and alarms will be installed within the storage areas to provide early warning to escape in case of fire. As such, when occupants are evacuating during the early stages of the fire, smoke spread into the stairs should be minimum.

Recommendations:

- Provide a minimum L2 automatic fire detector and alarm throughout the storage areas.
- Provide adequate exit signage and emergency lighting.
- If the partitions between the storage areas and stairs are not fire rated, they should be replaced by:
    - 120 minutes fire resisting construction, including FD60S doors, to separate storage areas from the fire fighting stairs (SC38, 44 and 49)
    - 60 minutes fire resisting construction, including FD30S doors, to separate storage areas from the common stairs
- Assess the compliance of the travel distances within the storage areas.

4.1.14 Back-up power supplies

BS 9991 states life safety systems are to be provided with a secondary power supply. The primary power source should generally be taken from the public electricity supply, with secondary power being supplied from an alternative utility supply from another substation, a generator or uninterruptible power supply (UPS) or batteries.

Where practicable, power supplies should be provided via two separate intakes into the building from the same external substation or via a single intake and a standby generator.

Existing provisions

Andrewes House is provided with a number of life safety systems including emergency lighting, firefighting stair ventilation and firemen's lifts. Secondary power supply to these life safety systems is provided as follows:

- Emergency lighting – provided with battery as the secondary power supply;
- Firefighting stair smoke ventilation – provided with battery as the secondary power supply;
- Fireman lifts - no secondary power supply;
- Emergency exit signage – BE confirmed the emergency exit signs are standalone, the signs will need emergency lighting to provide enough light to the signs. Refer to Section 4.1.7 and 4.1.8 for recommendations.

The condition of the back-up power supply system is unknown.

BE confirmed that there are no additional life safety systems in the building requiring back-up power supplies.

Proposed Improvements

The lack of back-up power supply to the firemen's lifts has been confirmed by BE and is a non-compliance against the current standards. Refer to Section 4.5.3 for further recommendations on the firemen's lifts.

Recommendations:

- BE to ensure that secondary power supply systems are in good operation condition and maintained in accordance with the relevant standards. It is recommended for BE to establish the compliance of the secondary power supply provisions against the relevant standards.

4.2 Internal fire spread (linings)

BS 9991 recommends the following for wall and ceiling linings:

- Circulation spaces/ common corridors – Class 0 in line with BS 476-7 (national class) or Class B-s3, d2 or better in line with BS EN 13501-1 (European class);
- Within apartments – Class 1 in line with BS 476-7 (national class) or Class C-s3, d2 or better in line with BS EN 13501-1 (European class).

Existing provisions

There is no information on the wall and ceiling linings across the common areas of Andrewes House as well as within the flats. Based on limited number of site photographs received from BE, the walls appear to be concrete for the common areas including the firefighting stair and the common stair areas.

As concrete finish is expected to achieve Class A1, it meets the recommendations of BS 9991. However, this is based on the assumption that wall and ceiling linings are concrete finishes throughout all areas of the building as shown on the photographs provided by BE. If there are areas within the building where the above requirements are not likely to be achieved, they will need to be discussed and addressed separately.

4.3 Internal fire spread (structure)

4.3.1 Structural fire resistance

Under BS 9991 guidance, unsprinklered buildings greater than 18m but less than 30 m in height shall be provided with 90 minutes fire resisting construction for load bearing capacity. Elements of structure supporting the firefighting shafts are required to achieve 120 minutes.

Elements of structure are required to achieve loadbearing capacity (R) only, however when certain elements also act as separating elements (i.e. walls) integrity (E) and insulation (I) are also required.

Existing provisions

Information on the existing building structure is based on the structural drawings in the Arup Archive. It has been assumed that all elements (i.e. walls, slabs, etc.) shown in the structural drawings are elements of structure and therefore loadbearing.

Based on the structural drawings (drawing numbers: 37 515 and 37 516) the following information on structural elements was obtained:

- Common stair wall thickness: 197 mm
- Walls between flats (Wall 2 as shown in Figure 14): 360 mm
- Firefighting stair wall thickness: 178 mm
- Floor slab thickness (excludes balcony slabs): 229 mm

The wall and slab thickness varies from one location in the building to another; the above dimensions represent the smallest (and therefore most conservative) of those observed from the drawings reviewed. The above dimensions have not been verified through site inspections.

The following guidance documents have been used to assess the potential fire rating offered by the dimensions of the walls and slabs:

- BS EN 1992-1-2-2004: Eurocode 2 Design of Concrete Structure Part 1-2: General rules – Structural fire design (Eurocode 2), which is the current guidance; and
- CP 114:1957 British Code of Practice, The Structural Use of Reinforced Concrete in Buildings, which is the relevant code at the time of construction.

In assessing the potential fire rating, the following assumptions are made:

- The thickness of structural elements stated above apply throughout the building;
- All structural elements are reinforced concrete;
- The concrete covers over the reinforcement bars meet the values stated in the relevant guidance at the time of construction (CP 114); there is no information on the depth of the existing concrete covers for this aspect to be assessed;
- Floor slabs are simply supported one-way slabs throughout the building;
- No structural calculations are available and therefore the utilisation factor of the structural members is unknown. When checking against the requirements of Eurocode 2 a utilisation factor of 0.7 has been taken as a conservatism;
- The fire resistance requirements given in CP 114 cover loadbearing capacity, integrity and insulations;
- Structural drawings are only available for apartment levels above Podium (Floor 1 to 6). There are no information/drawings for levels below the Podium (L01-L02) or Floor 7.

The table below compares the existing dimensions of the structural elements with the requirements from the two guidance documents.

Table 3: Summary of structural element thickness against code requirements

Existing structural element	Existing element thickness	Eurocode 2 requirements	CP 114 requirements	BS 9991 requirements	Comments
Common stair wall	197mm	170mm (REI90)	101.6mm (REI90)	R90	Achieving both the Eurocode 2 and CP 114 for REI90 rating
Walls between flats	360mm	170mm (REI90)	101.6mm (REI90)	R90	Achieving both the Eurocode 2 and CP 114 for REI90 rating
Firefighting shaft wall	178mm	160mm (REI120)	101.6mm (REI120)	R120	Achieving REI90 under the Eurocode 2 and R120 under the CP 114.
Floor slab	229 mm	100mm/120mm (REI90/REI120)	127mm (REI90 and REI120)	R90	Achieving both the Eurocode 2 and CP 114 for R90 and R120

The thickness of the structural elements to meet the required fire ratings appear to meet both the current guidance and the relevant guidance at the time of construction.

4.3.2 Fire compartmentation

Fire compartmentation is required to limit fire spread within the same building and protect means of escape. BS 9991 recommends the following fire ratings:

- Compartment walls (non-load bearing) between flats (Wall 1 as shown in Figure 14): FR60 EI. If the compartment walls are also part of the load-bearing elements (Wall 2 as shown in Figure 14), then the fire rating increases to FR90 REI;
- Compartment floor: FR90 EI (refer to Section 4.3.1 above);
- Passenger lift shaft: FR90 REI;
- Common stair shaft: FR90 REI;
- Firefighting shafts: FR120 REI;
- Any risers penetrating compartment floors: FR90 REI;
- Fire stopping – same level of fire resistance as the compartment wall it passes.

Existing provisions

Information on the existing construction is also based on the structural drawings in the Arup Archive. For elements that are not shown on the structural drawings but are required to be of fire rated construction in accordance with BS 9991, dimensions were provided by BE through site measurements.

Similar to the structural elements, the Eurocode 2 and CP 114 guidance are used to establish a nominal fire rating of the compartmentation.

There compartment walls separating the flats are (refer to Figure 14 below):

- Wall 1 has a thickness of 178 mm (drawing number 37 516) and verified on site by BE to be 180 mm. Such wall thickness is expected to achieve a nominal fire rating of 90 REI;
- Wall 2 has a thickness of 360 mm, as measured by BE. Such wall thickness is expected to achieve a nominal fire rating of FR120 REI.

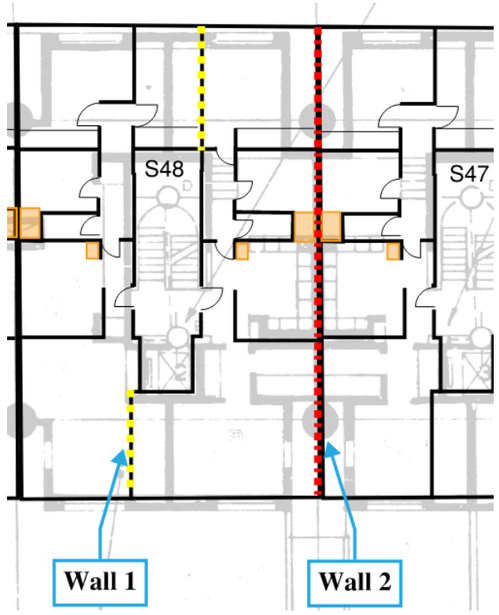


Figure 14: Compartment walls separating the flats

Lift shaft has a thickness of 178 mm (drawing number reference 37 516) which is expected to nominally achieve FR90 REI. Refer to Section 4.3.1 above for the common stairs and firefighting shaft walls.

There is currently no drawing or information available on the material nor the thickness of the riser construction in each of the flats (kitchen risers and bathroom risers). BE confirmed there are mixture of concrete and asbestos panels that form riser walls and that there is no additional information available on the risers within the flats.

4.3.3 Fire doors

BS 9991 recommends the specification, installation and maintenance of hinged or pivoted pedestrian fire doors to be based on BS 8214. This standard recommends fire rating of doors to be tested in accordance with either BS 476-22 or BS EN 1634-1.

The following fire rating requirements are based on Table 12 of BS 9991:

- Fire door separating firefighting stair and firefighting lobby: FD30S;
- Passenger/firemen's lift landing door: FD30;
- Fire door separating a flat from a space in common use: FD60S*;
- Enclosing a protected shaft forming a lift well or service shaft: FD60S.

*Note: BS 9991 requires that the fire door separating a flat from a space is common use is to be FD30S. In the case of Andrewes House this has been upgraded to FD60S as a result of the stair landing being used as a refuge space for PRMs, the single means of escape and the lack of protected lobby at each level.

In addition, the *Grenfell Tower Inquiry: Phase 1* – report recommends that all residential building containing separate dwellings (whether or not they are high-rise buildings) to:

- Carry out an urgent inspection of all fire doors to ensure they comply with applicable legislative standards; and
- To be required by law to carry out checks at not less than three-monthly intervals to ensure that all fire doors are fitted with effective self-closing devices in working order.

Existing provisions

There is no information on the existing doors for Andrewes House. However, based on the information provided on the document 'Abridged results from the test of 86 Thomas More House (double leaf door and a single leaf door)' issued by CTO S A on 21/01/2020, the fire doors in Thomas More have not satisfied requirements for 30 minutes (EI30) class door. The fire doors were tested in accordance with PN EN 1363-1:2012 and PN EN 1634-1+A1:2018.

Although the test was not carried out specifically for the fire doors in Andrewes House, it is assumed that Thomas More and Andrewes House have identical fire doors as they are part of the Barbican Residential Development. BE confirmed that the doors in Andrewes House are identical to those in Thomas More.

The fire door separating each flat from the common stair or the firefighting shaft is critical for maintaining the availability of the stair for means of escape. In particular, PRM evacuation relies on the stair landing as the protected refuge, while awaiting assistance.

There is no information on the fire rating of the lift landing doors. The risk of a fire starting in the lift shaft is low, provided that the lift machine room is fire separated from the lift shaft as recommended by BS 999. In line with Clause 15.8 of BS 9999, where lifts are located within a protected stair enclosure (which is the case for the common stairs as they are the only means of escape for PRMs), the lift machine rooms should be separated from the lift shaft to prevent fire and smoke spreading into the lift shaft and into the stairs. It is therefore, recommended that the separation between the lift machine room and lift shaft is inspected to understand if it is likely to achieve a level of fire resistance.

During the site visit, the doors to services risers within the stairs were not labelled fire doors and were not being maintained properly to provide separation between the riser and the stairs. Figure 15 shows one of the doors for service risers.

Figure 15: Service shaft door within one of the common stairs

Recommendations:

- Install new FD30S fire doors separating the firefighting stairs and lobbies.
- Install new FD60S fire doors at each flat entrance.
- A full survey should be carried out to inspect the existing doors to service risers that are located within the stair enclosure and replace them with new FD60S fire doors where required.
- BE to keep records of inspection and testing of fire doors in the future, at not less than three-monthly intervals to ensure that all fire doors are in working order.
- Separation between the lift machine room and lift shaft to be inspected to understand if it is likely to achieve a level of fire resistance.

4.3.4 Cavity barriers

Clause 33.1.1 of BS 9999 recommends that cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should be provided at the junction between an external cavity wall and every compartment floor and compartment wall. It also needs to be provided at the junction between an internal cavity wall and every compartment floor, compartment wall or other wall or door assembly which forms a fire resisting barrier.

Existing provisions

BE have confirmed that there are no cavity barriers in Andrewes House due to the build-up of the walls not having any cavities. It is also noted that there are no voids in the balconies. Figure 16 illustrates an aperture where a balcony door frame has been removed showing no cavity within the structure.

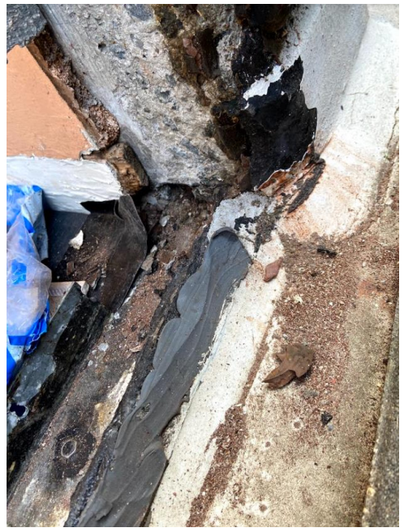


Figure 16: Aperture of a balcony door frame showing no cavity

4.3.5 Fire stopping

BS 9991 (Clause 24.4 and Figure 24) recommends where a building service passes through a compartment wall or floor it shall be adequately fire stopped in line with the compartment fire resistance.

Existing provisions

There is currently no information on the provision of fire stopping for Andrewes House. Based on the External Fire Risk Assessment FRA prepared by Frankham Risk Management Services in March 2018, fire stopping registers are not in place.

4.3.6 Kitchen and toilet shunt duct risers

In accordance with BS 9991, vertical ventilation ducts should be enclosed throughout their height with fire resisting construction. Where a horizontal ventilation duct penetrates the fire resisting construction, BS 9999 recommends four different methods of maintaining the fire separation at the penetration:

- Method 1: thermally actuated fire dampers;
- Method 2: fire resisting enclosures e.g. fire rated plasterboards;
- Method 3: protection using fire-resisting ductwork;
- Method 4: automatically actuated fire and smoke dampers triggered by smoke detectors.

BS 9999 Section 32.5.2.2 also states that Methods 1 and 4 should not be used for extract ductwork servicing kitchens and this is due to the likely build-up of grease within the duct which can adversely affect the effectiveness of any dampers.

In the Barbican Residential Development, it is understood that a common approach to maintain fire separation between flats is to use shunt duct arrangement for the kitchen and toilet extract ventilation ducts. The purpose of shunt duct is to avoid the need for fire protection using the Methods described above. A shunt duct arrangement comprises of branch ductwork (‘s’ or inverted ‘s’ shaped) that are connected to the main extract ductwork as shown as Figure 17. In addition to the downward bend of the shunt duct, a fan at the top of the main extract ductwork maintains a negative pressure that stops smoke from spreading out of the ductwork.

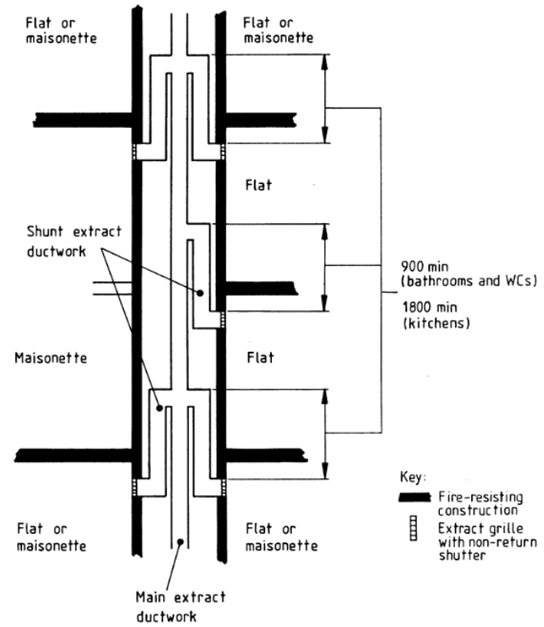


Figure 17: Layout of shunt duct system (BS 5588 Part 9)

Shunt duct arrangement is a recognised approach in BS 5588-9:1999 – *Fire precautions in the design, construction and use of buildings Part 9: Code of practice for ventilation and air conditioning ductwork*, for extract ductworks serving toilets. However, it is not normally acceptable for use in kitchen extraction because of the fire risk inherent in kitchens. The guidance mentioned that if shunt duct is used for kitchen extraction, careful consideration should be given to possible pressure differentials within the system to avoid the transfer of smoke and other products of combustion from one dwelling to another by means of the ductwork system. This guidance has been withdrawn and is no longer referenced in other current standards including the Approved Document B.

Existing provisions

In Andrewes House, it is understood that the main kitchen extract riser and the shunt ducts are of concrete construction. Dimensions of the concrete construction are unknown, but likely to have some inherent fire rating. The kitchen extract riser is located within the kitchen and

serves all the flats on the same vertical stack. The extract fan is located at the top of the main riser and on continuous operation. The height of the shunt duct from the kitchen hood to the main extract riser has been assumed by BE to be approximately 2.2 – 2.3 m as it is 200 – 300mm below the flat above. BE also confirmed that the shunt ducts are 'L' shaped instead of the more common 'S' shaped as shown in Figure 17. The internal grease build up within the vertical portion of the shunt ducts and within the main extract risers are unknown.

The toilet extract riser is located within the toilet of each flat and serves all the flats on the same vertical stack. The side backing on to the toilet wall contains asbestos and the rest of the walls are concrete. The vertical section of the toilet riser is assumed to be approximately 1.5m in height with metal galvanized construction. The remaining dimensions of shunt duct and the operation of the extract fan are unknown.

Whilst the use of shunt duct in lieu of other forms of fire protection is no longer in line with current UK guidance, their use for toilet extract risers is still allowed in other countries (Australia – AS 1688.1; USA – International Building Code). Considering the low risk nature of toilets and provided that the installations are in line with the details of the guidance, the use of shunt duct for toilet extract riser is considered acceptable.

However, it is not recommended to use shunt duct for kitchen extract riser. The presence of grease in the duct may affect the effectiveness of the shunt system in maintaining fire and smoke separation. Failure of compartmentation between the flats presents a life safety risk to the occupants, especially as the kitchen extract riser is located opposite the flat entrance, which is the only means of escape for the PRMs and flats below the Podium level.

Provision of fire detection and alarm system is one of the improvements, providing early warning before the single escape route via the flat entrance is compromised. In addition, the risk of fire spread via the shunt duct can be reduced by closing the connection from the current kitchen extracts with fire resisting construction and replace the existing extract hoods with recirculation type extract hoods.

It is not recommended to install fire dampers in the kitchen extract duct because it is not a recommended practice and there is no fire damper product that has been tested for use in such environment (Arup has consulted different fire damper manufacturers in the UK).

Recommendations:

- Replace existing shunt duct arrangement with closed circuit/recirculation kitchen extract. The remaining shunt duct opening into the service riser is to be closed with fire resisting construction.

4.4 External fire spread

4.4.1 Fire spread to neighbouring buildings

Buildings must maintain the minimum separation distance from the site boundary to protect itself and adjacent buildings against external fire spread. A building that is located less than the required separation distance from the site boundary will be required to be provided with mitigation measures to prevent fire spread such as fire rated external walls. In accordance with BS 9991, there are four methods used to determine the maximum permissible amount of unprotected façade. In this case, the most appropriate method is the enclosing rectangle in line with BR 187.

Existing arrangement

There is no information available on the location of the site boundary in relation to Andrewes House. The building boundaries or the relevant boundaries are as follows:

- North – To the middle of the Barbican water gardens, 17 m;
- South – To the middle of Fore Street, 28 m;
- The Postern (South) – To the mid-point between the two buildings, 7.5 m.
- East – Directly adjacent to Willoughby House, < 1 m;
- West – Directly adjacent to Gilbert House, < 1 m.

An external fire spread calculation has been undertaken for a single flat using the above assumed boundary distances. The enclosing rectangle method in line with BR 187 was carried out. The results show that no protection is required to the facades. Please refer to Appendix B for the calculation.

BRE 187 states unprotected areas can be discounted where the boundary and the building are at an angle of more than 80˚ to each other. As shown in Figure 18 below, both Gilbert House and Willoughby House are at an angle of more than 80˚ from Andrewes House and therefore it is not required to consider external fire spread.

Figure 18: Existing roof arrangement for Andrewes House and adjacent blocks

4.4.2 Façade material

BS 9991 recommends the following material classifications for external areas of the façade of buildings greater than 18 m in height:

- Areas < 1 m from the boundary – Cass 0 (National class) or Class B-s3, d2 or better (European class);
- Areas > 1 m from the boundary and > 18 m in height – Class 0 (National class) or Class B-s3, d2 or better (European class).

The Building Regulations also require materials which become part of an external wall (i.e. cladding material, insulation product, filler material – not including gaskets, sealants and similar) and specified attachment (e.g. balcony) of a residential building with a storey at least 18m above ground level to achieve European Classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled 'Fire classification of construction products and building elements. Classification using the test data from reaction to fire tests'.

In addition, the *Grenfell Tower Inquiry: Phase 1 report* recommends that the owner and manager of every high rise residential building be required by law to provide their local fire and rescue service with information about the design of its external walls together with details of the materials of which they are constructed and to inform the fire and rescue service of any material changes made to them;

Existing provisions

As stated in Section 3.4.1, the East and West elevations which are directly connected to Willoughby House and Gilbert House have been confirmed by BE to be provided with solid concrete construction.

In the case of the North and South facades, the walls have been confirmed as concrete (based on the information provided in the EWS1 form by City of London Corporation issued in 2020). The concrete panel is considered to achieve Class A1, and therefore it meets the recommendations of BS 9991.

In the case of balconies, the build-up consists of concrete paving slabs sitting on top of a felt membrane. The felt is a membrane and therefore under Regulation 7(3) of Approved Document B, is exempted from having to meet the requirements for a European Classification of A2-s1, d0 or better.

It is also recommended to provide information about the design of external walls and details of the materials in the Fire notice box for the fire and rescue service to be able to have access to the information when they arrive on site.

Recommendations:

- Include information about the design and materials of the external walls in the Fire Notice Box, to be located by the fire service access point at St Giles Terrace.

4.4.3 Roof materials

BS 9991 recommends buildings where the roof is less than 6 m away from any point on the relevant boundary needs to be provided with a roof covering designation of AA, AB or AC in line with BS 476-3 (equivalent to Broof(t4) classification in line with BS EN 13501-5 European classifications).

Existing provisions

The flat roof building of Andrewes House consists of either felt with insulation or a liquid membrane with concrete paving slab on top. Arup is not aware of any information available to confirm the fire performance of these materials. BE confirmed that there is no information available on roof material.

As shown in Figure 18, Willoughby House and Gilbert House are within 6 m of Andrewes House. There is a risk of fire igniting on the roof through the exposed felt layer. However this is considered acceptable to remain as existing due to the following:

- The top layer of the roof is formed by concrete paving slabs which are non-combustible and unlikely to contribute to surface spread of flame.
- Even if the felt layer ignites, it is unlikely for the fire to grow into a significant fire as there are concrete paving slabs on top which will smother the fire;
- Fire does not spread easily down a vertical surface and therefore a fire on the flat rooftop of the building is unlikely to spread down to the flats on the lower levels via the facade. In addition to this, building façade is also made out of concrete so even if fire on the roof was to grow it would not ignite the façade and would remain contained to the roof.

4.5 Access and facilities for the fire service

4.5.1 Fire main inlet

BS 9991 recommends buildings fitted with dry fire mains should have access for a fire appliance to within 18 m of each fire main inlet connection point, with the inlet visible from the fire appliance.

Existing provisions

Andrewes House is provided with three dry risers – one for each firefighting stair. The dry riser inlets serving each firefighting stair is as follows:

- SC38 - On the Willoughby House end on the corner of Fore Street and Moor Lane.
- SC44 – Adjacent to the basement ramp entrance on Fore Street.
- SC49 – On the Gilbert House end and adjacent to the stair entrance at ground floor on St. Giles Terrace.

For a mark-up showing the locations of the dry riser inlets please refer to Appendix A2. The dry riser inlets are all within 18 m of a vehicle parking area.

4.5.2 Fire service access

BS 9999 recommends that the entry of the firefighting access shaft at rescue service access (vehicle access level) level should be directly from open air or by way of a protected corridor not exceeding 18 m in length.

Existing arrangement

Firefighting access into the building is provided at carpark level (L03) for SC38 and SC44. For SC44, the firefighting personnel access will be via the carpark ramp on Fore Street, down to L03. For SC38, access to the carpark is via an external stair by Moor Lane. For SC49, firefighting access is provided at ground level on St Giles Terrace.

The carpark has large openings along the top and runs the entire length of Andrewes House, where fire service will be able to access the two firefighting shafts SC38 and SC44 as shown in Figure 19.

Figure 19: L03 Carpark level access to SC44

All three firefighting shafts are connected to both North and South facing balconies through firefighting corridors. This arrangement applies between Podium Level to the top storey. However, it has been assumed that the Fire and Rescue Service will only use the North facing balcony (bedroom side) to reach the fire incident flat. The South facing balcony (living room side) may not provide enough width due to privacy screens for the Fire and Rescue Service to travel with the necessary firefighting equipment.

The levels below Podium Level do not have balconies on either side of the building. Fire and Rescue Service will be likely to use the common stair to access the fire incident flat. BE to consult with the London Fire Brigade.

Apart from SC49, the firefighting access to SC38 and SC44 is through L03 carpark which is a basement level. Considering that this is an existing site with very limited scope to change the firefighting access arrangement, the firefighting access from L03 car park level is considered acceptable on the following basis:

- As shown in Figure 19, there are large openings across the carpark to provide ventilation to the basement carpark level. This is not a basement in the traditional sense (i.e. enclosed underground space).
- BE advised that The London Fire Brigade is familiar with the Andrewes House configuration and firefighting access arrangement. This will help the firefighters to plan the most efficient access and set up, to suit the location of the fire.
- The access routes via the carpark involve shorter travel distances to the lifts, compared with access via the podium.
- As discussed in Section 4.1.6 above, it is recommended to provide smoke ventilation to all the common stairs. This is an improvement that may also benefit firefighting activities.

Recommendations:

- Consultation with London Fire Brigade to discuss and agree the access arrangement.

4.5.3 Facilities for the fire brigade

BS 9991 recommends buildings with a floor higher than 18 m above fire and rescue service access level should be provided with firefighting shaft(s) containing firefighting lifts. A sufficient number of firefighting shafts should be provided to meet the maximum hose distance of 60 m to cover all parts of the building and at least two firefighting shafts should be provided in buildings with a storey of 900 m^2 or more in area.

Firefighting shafts should be constructed in accordance with the recommendations given in BS 9999.

Andrewes House is provided with three firefighting shafts (SC38, 44 and 49) with a firefighting stair, dry riser, firemen's lift and firefighting lobby/corridor.

Firefighting stairs

BS 9999 recommends a common stair which is a firefighting stair should have an unobstructed width (measured between the walls and/or balustrades) of 1.1 m. The width should be kept clear for a vertical distance of 2.0 m.

BS 9999 also recommends only services associated with the firefighting shaft should pass through or be contained within the firefighting shaft.

Existing provisions: the width of the stairs has been measured by BE and have been confirmed to have a clear width of 1000 mm (between handrails). It is currently unknown how much the handrails protrude into the stairs.

The width of the three firefighting stairs in Andrewes House is non-compliant with the current recommendations of BS 9999. Considering the stay-put policy and the firefighting stairs are unlikely to be congested, the reduced width of the stair is considered acceptable. The effort and cost associated with increasing the width of the are considered to outweigh the benefits gained from a wider stair. Therefore, the current arrangement is proposed to be retained.

It has also been confirmed during the site visit that SC38 and SC44 extend down to L04 subway level. There are services going through the stair as shown in Figure 20. As this is a non-compliance to the relevant standards, it is recommended to either:

- Re-route the services to prevent the services going through the firefighting shafts, or
- Enclose the services in a fire rated box (120 minutes) and the fire doors adequately separate L04 from the firefighting shafts SC38 and SC44. However, enclosing the services in a fire rated box may result in impinging on and reducing the width of the firefighting stair. This will need to be reviewed further.

Figure 20: Service not related to firefighting shaft passing through the firefighting stair

Recommendations:

- Consultation with London Fire Brigade to discuss and agree the reduced firefighting stair width.
- To either re-route the services away from the firefighting shaft or provide fire rated enclosure (120 minutes) to the services running through the firefighting stair. If the services are to be boxed in fire rated enclosure, it will need to be further reviewed to ensure it does not reduce the stair width of the firefighting stair.
- Doors separating the subway from the fire fighting shafts shall be FD120S (increased fire rating due to the lack of fire fighting lobby). Carry out inspection on the fire doors to maintain adequate level of fire separation.

Firefighting lobby/corridor

BS 9999 recommends firefighting lobby to have a clear floor area of not less than 5m^2 and not exceed 20 m^2 for lobby serving up to four lifts. All principal dimensions should not be less than 1.5 m.

Existing provisions: the firefighting shaft layouts are shown in Figure 21 and Appendix A2 The current firefighting lobbies have approximate areas of 13.1 m^2 for SC38 and 49, and 7.6 m^2 for SC 44. These exceed the minimum 5m^2 recommended in BS 9999.

The width of the corridors/lobby is 960 mm, which is less than the 1.5 m minimum width. The width of the northern balcony is only 690 mm. Due to space constraint, there is very limited scope to increase the width of the corridors/lobbies/balconies, without adversely affecting the adjoining flats. In addition, the reduced width may delay firefighting activities but not considered to present a significant risk to life safety. Therefore, the current arrangement is proposed to be retained.

Recommendations:

- Consultation with London Fire Brigade to discuss and agree the reduced lobby/corridor width.

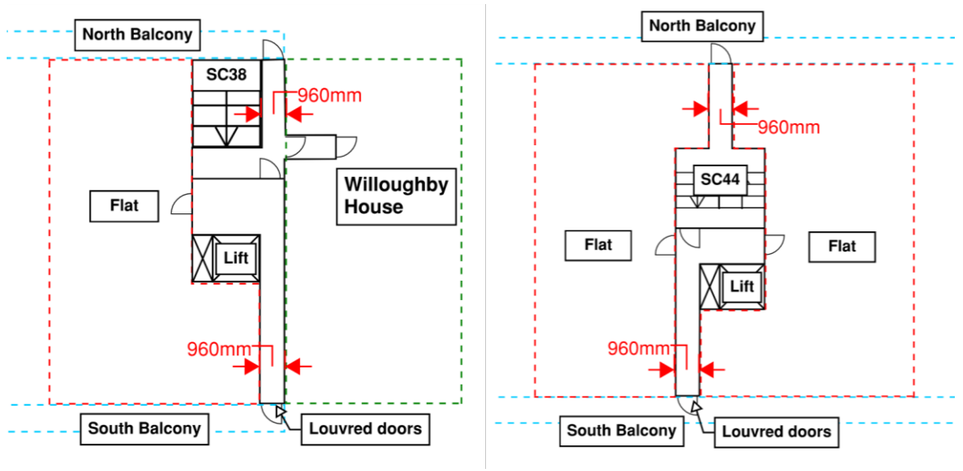


Figure 21: Current layout of firefighting shafts (not to scale)

Firefighting lifts

In line with BS 9991 and BS 9999, new firefighting lifts installations should be in accordance with BS EN 81-72:2020.

In addition, the *Grenfell Tower Inquiry: Phase 1 report* recommends that the owner and manager of every high-rise residential building be required by law to carry out:

- Regular inspections of any lifts that are designed to be used by firefighters in an emergency and to report the results of such inspections to their local fire and rescue service at monthly intervals;
- Regular tests of the mechanism which allows firefighters to take control of the lifts and to inform their local fire and rescue service at monthly intervals that they have done so.

Existing provisions: It has been confirmed by the lift consultant on 08/04/2021 that the lift installations are in line with the following:

- The lifts are firemen's lift and were installed to BS 5655-1:1979;
- The lift has a fire switch located at the fire services access level. The switch, when activated returns the lift to that floor and stops the landing buttons from calling the lift, rendering it under the control of the fire service;
- There is no back-up or secondary power supply to the lift;

At the time the lifts are believed to have been refurbished, BS EN 81-72 had not yet come into effect (the first revision was released in 2003) and therefore, it is unlikely that the current lift installation meets the recommendations of BS EN 81-72.

It is currently unclear what specification of the firemen's lift is, with exception of lifts not being provided with secondary power supply. There is no other information available.

During the site visit, it has been confirmed that the lift control systems are on L03 carpark level for SC38 and 44, and on Podium level for SC49.

Recommendations:

- Carry out inspections of the three firemen's lifts (including lift control system) at monthly intervals to report the results of every inspection to the local fire and rescue service

Smoke control for firefighting lobbies and stairs

BS 9999 recommends that all firefighting shafts should be provided with smoke ventilation system – this can be natural or mechanical ventilation.

In buildings with balcony approach, the firefighting stair should be provided with an openable vent with a free area of 1 m^2 at the top of the stair, which can be remotely operated at fire and rescue service access level. In addition, a minimum ventilation opening of 1.5 m^2 (free area) is to be provided for the firefighting lobby at each level.

Existing provisions: all firefighting stairs are provided with automatically opening vents at the top of the stairs (see Figure 22 below). Each vent is operated by a switch located on the fire service access level, by the firemen's lift. During the site visit, the dimensions of the vents were measured to be approximately 1.1 m by 0.8 m, which is less than the required ventilation opening.

Figure 22: Staircase 49 opening vent

There is a louvred vent above the door connecting each firefighting lobby to the balcony. The vents have been measured as:

- SC 38: 790 mm by 340 mm = 0.27 m^2;
- SC 44: 860 mm by 340 mm = 0.29 m^2;
- SC 49: 790 mm by 3400 mm = 0.27m^2.

The area of ventilation serving the firefighting lobbies are less than the minimum 1.5 m^2 recommended. As a compensatory measure, it is recommended that before undertaking firefighting activities, the fire brigade should open the door between the firefighting lobby and the balcony to allow sufficient air to flow into the firefighting shaft.

Recommendations:

- Consultation with London Fire Brigade to discuss and agree the ventilation arrangement to the firefighting lobby.
- Include a reminder to open the door between the firefighting lobby and the South Balcony in the Fire Notice Box.

4.5.4 Dry riser and hose coverage

BS 9991 recommends buildings greater than 18 m and less than 50 m in height should be provided with a dry riser system. In the case of unsprinklered building, no part of a storey should be more than 45 m from a riser outlet located in the firefighting shaft.

Existing provisions

There are dry riser outlets located within each of the firefighting stair enclosure as shown in Figure 23 below.

It should also be noted that due to the provision of privacy screens along the Southern balcony which limit the width of the fire brigade route (width ranges from 460 to 510 mm wide), hose coverage has only been measured along the Northern balcony. This is shown in Figure 23 below.

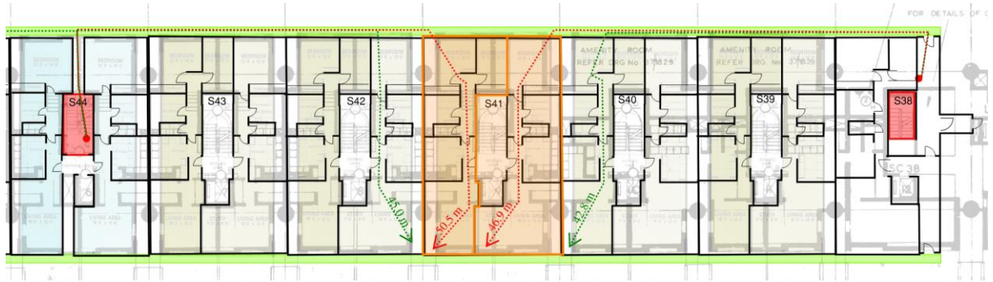


Figure 23: Hose coverage shortfall area shown in orange

There is a hose coverage shortfall affecting the flat on either side of SC41. The furthest point from a dry riser outlet is 50.5 m, which is 5.5 m over the 45 m limit. As the firefighters are likely to approach the fire incident via the open balcony, it is possible for firefighters to connect additional hose length in a safe and open environment. Hence, the existing dry riser provisions are proposed to be retained.

The arrangement for flats that are below Podium level is to be further discussed with London Fire Brigade.

Recommendations:

- Consultation with London Fire Brigade to discuss and agree the dry riser provisions and the extended hose coverage.
- Consultation with London Fire Brigade on the firefighting arrangement to flats below the Podium level.
- Include the extended hose coverage and the flat numbers in the Fire Notice Box.

4.5.5 Water supply for fire-fighting operations

External hydrants should be provided within 90m of a dry fire main inlet. Based on Google Maps information (accessed on 22.03.2021) there are two hydrants within 90m of Andrewes House – one on Fore Street nearby the basement ramp entrance and another Moor Lane.

4.6 Fire safety management

In addition to the active and passive fire safety precautions described in the previous sections, robust fire safety management plan and procedures are important for maintaining the fire safety of a building in a holistic manner. In preparing a fire safety management plan (Arup is not aware of an existing plan), the relevant items to be included in the plan are listed and described Table 4 below. These are based on the recommendations in BS 9991.

Table 4: Fire Safety Management

Item	Proposed Design
RR(FS)O	Under the Regulatory Reform (Fire Safety) Order legislation, the owner of the building (BE) is fully responsible for fire safety. This includes on-going fire risk assessment, appropriate maintenance of fire safety systems and training of staff. Although not required by fire safety guidance, it is recommended for the fire risk assessment to include the internal areas of the apartments (for example a spot check of vacant apartments). This will serve to mitigate the risk of any amendments to the building which may have an adverse impact on the fire strategy safety (e.g. breaches in compartmentation).
Fire awareness of residents.	Due to the nature of residential premises whereby it is difficult to enforce fire safety management within the apartments, there is risk of the residents' actions affecting the implementation of the fire strategy – e.g. by covering smoke detectors or creating penetrations in compartment walls. To minimise the risk of occupants affecting the performance of the fire safety features in the building, all residents must be made aware of their responsibilities in regard to fire safety at the beginning of their residence. It is recommended for all relevant fire safety information should be provided in a tenant handbook. It is the responsibility of the building operators to inform the residents of the defend-in-place evacuation strategy. Residents should also be informed that they are always provided with the option to leave and that they do not have to stay in place in the event of a fire.
Evacuation of PRMs	The evacuation of PRMs will need to be carried out by the BE staff or the fire and rescue service. The responsible person for fire safety (as defined under the RR(FS)O) will need to ensure that each PRM has a personal emergency evacuation procedure (PEEP), and where required, sufficient training and equipment are provided to staff to assist with the evacuation.
	The EVC (Emergency Voice Communication) system in the stair landings and firefighting lobbies should be regularly maintained to ensure they are in working order.
Staff training	Sufficient number of BE staff should be adequately trained in fire prevention, fire protection and evacuation procedures including evacuation of PRMs.
Maintenance and testing	An accurate record of fire precautions, and procedures for operating and maintaining any fire protection measures within the building, are necessary to enable the owner or end user to plan, document and implement control processes for maintenance and testing of fire safety systems to ensure that they operate effectively in the event of a fire. This includes systems such as: • Firemen's lifts; • Fire alarm and fire detection system; • Fire doors; • Emergency lighting and signage.
Control of work on site	The means to control work on site should be determined (e.g. repairs to structure, hot work, cleaning of ductwork). A work control system should include clear lines of responsibility communicated to contractors.
Emergency planning	A good relationship with the fire and rescue service has benefits as it ensure that the fire and rescue service is able to have an appropriate pre-determined response strategy for Andrewes House and enables the owner to seek advice where appropriate. Any changes affecting the layouts, fire safety systems, fire growth characteristics, and other relevant factors should be communicated to the fire brigade
Fire safety documentation	Fire safety information that sets out the basis on which the fire safety design was planned (i.e. this Fire Strategy Report), the fire safety management plan, the staff responsibilities etc. should be kept up to date and stored in a document management system that allows the information to be easily retrieved in the future.
General housekeeping	Good housekeeping is essential to reduce the likelihood of a fire starting or developing, and escape routes being blocked. This includes: • Maintaining all escape routes free from obstruction/or combustibles; • Fire doors to perform as intended; • Arrangements for waste control and disposal or accumulation of waste; • Floor surface of escape routes to be maintainable, even and slip-resistant;

5 Conclusion

The purpose of the fire safety review on Andrewes House is to determine the existing intent of the fire safety design and to record the findings in a fire strategy report (this document).

This report describes the existing fire safety precautions in the building and compare them with the requirements in the Building Regulations 2010 (as amended). The current standards BS 9991 and BS 9999, and where applicable the latest update of the Approved Document B Volume 1, have been used as the benchmark for the review.

Where the fire safety precautions comply with the current standards, no further action is proposed and the fire information forms part of the building fire strategy. Where the precautions are not deemed to comply with the current standards, qualitative risk assessments have been carried out to identify the life safety risks to the building occupants due to those non-compliances. The outcomes of the assessment will result in one of the following:

- Where considered acceptable to remain as existing, recommend retaining the current provisions; or
- Recommendations on possible options for enhancements/upgrades where the current fire safety provisions are considered inadequate.

The outcome of the review in terms of the identified gaps and the recommended improvement actions are summarised on Table 5 below.

Table 5: Summary of identified gaps and recommended actions

Identified Gaps	Recommended Action
Narrow escape routes along the balconies	It is important to upgrade the fire protection and the availability of the escape stair for fire evacuation. The following improvements are recommended to achieve this: • Provide early warning to occupants by installing a Grade D1 Category LD2 detection and alarm system in all the flats; • Provide smoke ventilation to all the escape stairs; and • Clear briefing to all occupants of Andrewes House on the available escape routes.
Extended travel distances in flats with single direction of egress and flats without hallway	
Lack of protected lobby between each flat and the escape stair	
Evacuation of PRMs	The following improvements to provisions for PRM evacuation are recommended: • Provide an emergency voice communication system on each stair landing, for the PRMs to call for assistance; • Barbican Estate to put in place a management plan and evacuation strategy for the evacuation of occupants, in particular for PRMs; and • Clear briefing to PRMs on the evacuation procedures and the use of the emergency voice communication system to call for assistance.
Exit signage	A survey is recommended to inspect and replace existing exit signage to comply with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report
Emergency lighting	A survey is recommended to inspect and replace existing emergency lighting to comply with BS 5266-1.
Storage areas in L03 Carpark level	The storage areas on L03 of Andrewes House are recommended to be provided with the following: • Minimum L2 automatic fire detection and alarm system in accordance with BS 5839-1; • Provide adequate exit signage and emergency lighting within the area; • Provide 120 minutes fire resisting construction, including FD60S doors, to separate storage areas from the fire fighting stairs (SC38, 44 and 49) • Provide 60 minutes fire resisting construction, including FD30S doors, to separate storage areas from the common stairs.
Fire doors at flat entrance, refuse storage/post box and service risers within stairs	It is recommended to replace all the fire doors to all the escape stair and firefighting shaft enclosures and service risers within the stairs, to maintain the fire and smoke integrity of the stair Keep records of inspection and testing of fire doors in the future, at not less than three-monthly intervals to ensure that all fire doors are in working order.
Kitchen extract shunt duct system	In order to mitigate the risk of fire/smoke spread across compartments. It is recommended to close the connection from the current kitchen extracts with fire resisting construction and replace the existing extract hoods with recirculation type hoods
Firefighting stairs (SC38 and SC44) at L04	Services running through and along the firefighting stairs SC38 and 44 at L04 should be enclosed in a fire rated box to separate them from the firefighting stairs.
Firefighting access distance, width of access routes, firemen's lift, lobby smoke ventilation and extended hose coverage	BE advised that London Fire Brigade is familiar with the configuration of Andrewes House. It is recommended to address the gaps in firefighting access and facilities through consultation and agreement with the London Fire Brigade. • Discuss and record firefighting procedures that are specific to Andrewes House in this document. • Carry out inspections of the three firemen's lifts (including lift control system) at monthly intervals to report the results of every inspection to the local fire and rescue service • Update the Fire Notice Box to include information about the design and materials of the external walls, extended hose coverage, and any relevant information following the consultation.
Others	• It is recommended to establish the compliance of the back-up power supply provisions against the relevant standards. • Consult with the insurers regarding any additional requirements for property protection. • The sitewide inspection of exit signage (by others) to take into consideration to recommendations in this document.

The review is based on a list of limitations and assumptions. Some of these will be addressed as further information is provided by BE.

It recommended for BE and Arup to explore the feasibility or implementation of the recommended remedial actions for improvement.

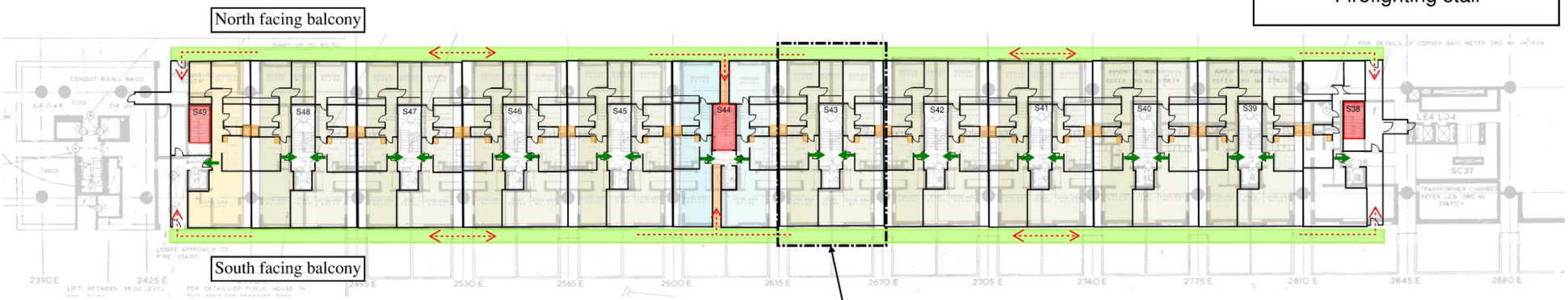
Once this has been completed, it is recommended for the CoL District Surveyor and the London Fire Brigade to be consulted, to seek their early agreement in principle.

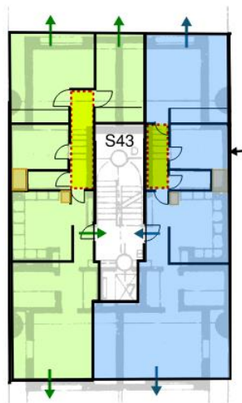
Appendix A

Fire Strategy Mark-ups

A1 Means of Warning and Escape

Andrewes House
Floor Plan Levels 1 - 6
B1 - Means of Warning and Escape





Means of Escape from a typical flat layout
3 available escape routes from each flat:
- South facing balcony
- North facing balcony
- Flat entrance

Keys:
- Note
- Firefighting stair
- Internal hallway in flat
- Balcony
- SXX Staircase Number
- Storey exit from flat
- Escape routes to Firefighting stair

Note:
The drawings used for the above assessment are:
Structural plans:
G H Buckle & Partners Consulting Engineers - Drawing no. 37/1807
Floor plan layout**:**
Barbican living - https://www.barbicanliving.co.uk/blocks/andrewes-house/andrewes-house-flat-plans/
The structural drawings are only available for apartment levels above Podium (Floor 1 to 6).

Barbican Residential
Andrewes House Fire comments
Barbican Residential
(279095-00)
01/04/21 | Prepared by: TP, VEC | Checked by: VC
SK-F-001
ARUP

A2 Fire Fighting Access

Andrewes House
Floor Plan Levels 1 - 6
B3 - Internal Fire Spread (Structure)

Fire Resistance (FR)

- 60 mins FR
- 90 mins FR
- 120 mins FR

Fire Doors

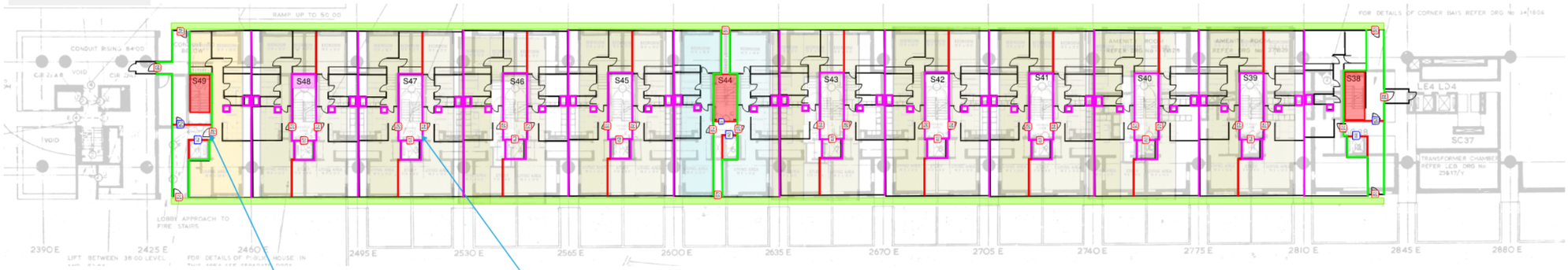
- FD 30
- FD 30 S
- FD 60
- FD 60 S

Note: The building is 27m in height (7 stories above podium level)

Compartmentation requirements
Compartment floor - 90 REI
Common Stair - 90 REI
Wall between flats (load bearing) - 90 REI
Walls between flats (non-load bearing) - 60 EI
Firefighting Stair (S38, 44, 49) - 120 REI
Shafts (passenger lifts included) - 90 REI
Firefighting lifts - 120 REI

Fire Doors
Door from flat to common stair FD60S
Door from flat to firefighting stair lobby FD60S
Door between fire fighting stair and fire fighting lobby - FD30S
Fire fighting lift doors FD30
Common lift doors FD60

Keys:
- General comment
- Note
- Firefighting Shafts
- SXX Staircase Number



Refuse and post box lockers - Fire fighting lobbies
The doors between the fire fighting lobbies and the rubbish lockers should be in line with the flat front doors in terms of fire resistance (i.e. 60 minutes).

Refuse and post box lockers - Common stairs
The doors between the stairs and the rubbish lockers should be in line with the flat front doors in terms of fire resistance (i.e. 60 minutes).

Barbican Residential
Andrewes House Fire comments
Barbican Residential
(279095-00)
01/04/21 | Prepared by: TP, VEC | Checked by: VC
SK-F-002
ARUP

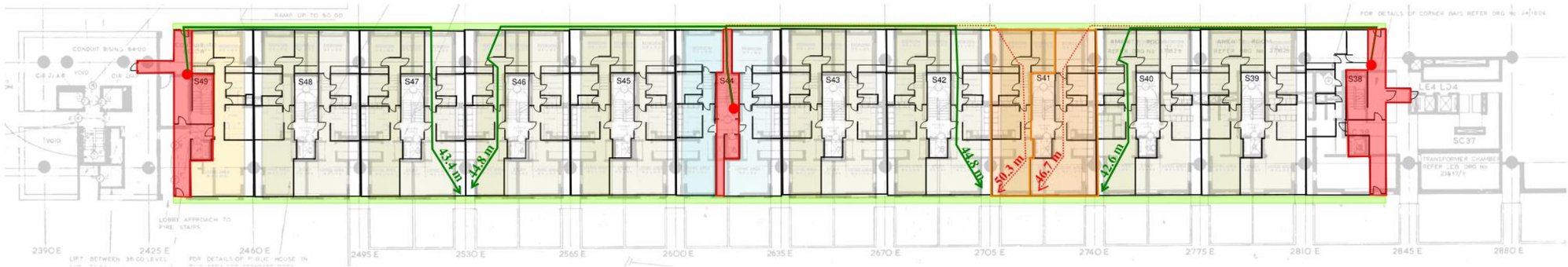
Note:
The drawings used for the above assessment are:
Structural plans:
G H Buckle & Partners Consulting Engineers - Drawing no. 37/1807
Floor plan layout**:**
Barbican living - https://www.barbicanliving.co.uk/blocks/andrewes-house/andrewes-house-flat-plans/
The structural drawings are only available for apartment levels above Podium (Floor 1 to 6).

A3 Compartmentation

Andrewes House
Floor Plan Levels 1 - 6
B5 - Firefighting access & facilities

Keys:

- Note
- Firefighting Shafts
- SXX Staircase Number
- Fire main
- 3.0 m — Compliant hose coverage (within 45m)
- 3.0 m — Non-compliant hose coverage (over 45m)
- Hose coverage shortfall areas

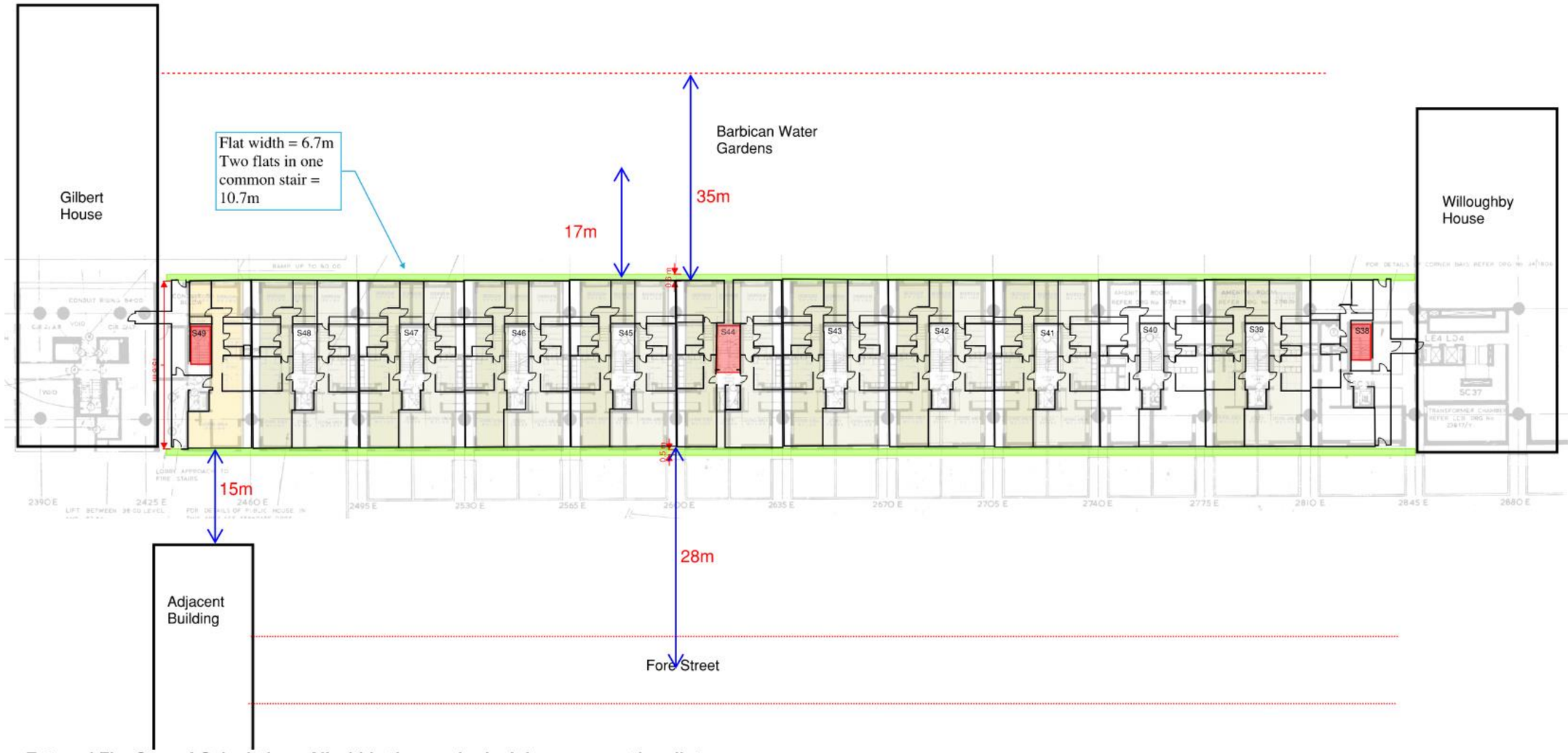


Barbican Residential
Andrewes House Fire comments
Barbican Residential
(279095-00)
01/04/21 | Prepared by: TP, VEC | Checked by: VC
SK-F-003
ARUP

Note:
The drawings used for the above assessment are:
Structural plans:
G H Buckle & Partners Consulting Engineers - Drawing no. 37/1807
Floor plan layout**:**
Barbican living - https://www.barbicanliving.co.uk/blocks/andrewes-house/andrewes-house-flat-plans/
The structural drawings are only available for apartment levels above Podium (Floor 1 to 6).

Appendix B

External Fire Spread



External Fire Spread Calculation - All within the required minimum separation distance.

Case ID	Group ID	Purpose Group	Method ID	Calculation Method	Height (m)	Width (m)	Boundary (m)	Unprotected (%)
Top floor - two fla	1	Residential (Dwellings)	2	Minimum Separation Distance	4.60	10.70	4.55	100.0
Top floor - one fla	1	Residential (Dwellings)	2	Minimum Separation Distance	4.60	6.70	3.69	100.0
Mid floor - two fla	1	Residential (Dwellings)	2	Minimum Separation Distance	2.80	10.70	3.36	100.0
Mid floor - one fla	1	Residential (Dwellings)	2	Minimum Separation Distance	2.80	6.70	2.80	100.0
		---		---				

Committee(s): Residents' Consultation Committee Barbican Residential Committee	**Dated:** 06/06/2022 17/06/2022
Subject: Provision of EWS1 Forms	**Public**
Which outcomes in the City Corporation's Corporate Plan does this proposal aim to impact directly?	**1, 2, 12**
Does this proposal require extra revenue and/or capital spending?	**N**
If so, how much?	**N/A**
What is the source of Funding?	**N/A**
Has this Funding Source been agreed with the Chamberlain's Department?	**N/A**
Report of: Andrew Carter, Chief Officer/Executive Director Community and Children's Services	**For Decision**
Report author: Paul Murtagh Assistant Director Barbican & Property Services	

Summary

The purpose of this report is to seek guidance and instruction from Members on the City of London Corporation's (the Corporation) approach to the provision (or non-provision) of EWS1 Forms across the Barbican Residential Estate.

Recommendations

Members are asked to:

1. Consider the various options within this report for the provision (or non-provision) of EWS1 Forms across the Barbican Residential Estate.
2. Accept and agree the recommendation from officers at Option 1 where, the Corporation does not undertake and issue EWS1 Forms but, does provide 'comfort' letters to individual residents upon request or:
3. Agree an alternative option from those set out in this report in relation to the provision (or non-provision) of EWS1 Forms across the Barbican Residential Estate.

Main Report

Background

1. Over the last few months, a very small number of leaseholder residents in the Barbican Residential Estate have written to the Corporation requesting the completion of an EWS1 Form in order, that they can either re-mortgage their home

or, to enable them to sell the lease on their home to a buyer who, in turn, requires an EWS1 Form for its mortgage lender.

2. EWS1 Forms have been required by members of UK Finance or the Building Societies Association (BSA) since December 2019, for any mortgage applications for leasehold properties in residential buildings over 18 metres in height. They have replaced the numerous liability letters, created by the various mortgage lender members of these organisations, which began to appear around the summer of 2019. The EWS1 Form was created by the Royal Institution of Chartered Surveyors (RICS), who intervened in order to standardise the previous liability letters. The RICS also produced a non-exhaustive list of professional bodies whose full or chartered members could complete the EWS1 Forms.

3. The Corporation does not currently provide EWS1 Forms and, the purpose of this report is to bring this matter to the attention of Members and, to set out a series of options for this Committee to consider for the future provision (or non-provision) of EWS1 Forms across the Barbican Residential Estate.

Considerations

4. The RICS guidance regarding EWS1 Forms states:

   "The EWS process, and resulting form, is a set way for a building owner to confirm to valuers and lenders that an external cladding system on residential buildings in scope above 18m in height (approximately 6-storeys) has been assessed by a suitable expert. Not every building in scope above 18m will require an EWS Form – only those with some form of combustible cladding or combustible material on balconies."

5. It must be noted that completing EWS1 Forms is **NOT** a legal requirement, despite information coming from various lenders insisting that they must be completed. Their completion is a condition being imposed on mortgage applicants by certain lenders. The legislative requirement, under the Regulatory Reform (Fire Safety) Order 2005, is the completion of a suitable Fire Risk Assessment (FRA). Residents in all blocks on the Barbican Residential Estate have direct access to the FRA's for their respective blocks via the Corporation's website or, on request through the Barbican Estate Office.

   <u>Extent of the problem</u>

6. At this stage, the number of requests that we have had from leaseholders for completed EWS1 Forms is very low however, it is possible that the number of requests will increase over time. Many lenders are insisting that an EWS1 Form is completed on ALL buildings – even those below 18 metres in height. As set out earlier in this report, an EWS1 Form is not needed for buildings less than 18 metres in height.

7. There is a serious national shortage of independent professionals that are both suitably qualified to complete an EWS1 Form and, who also have a suitable level of professional indemnity (PI) insurance. This means that most landlords/building owners are unable to get the EWS1 Forms done should they decide to do so.

8. Where it has been possible to find suitably qualified and insured professionals able and willing to do this work, quotations are being received of up to £12,000 per EWS1 Form (especially in cases where a simple visual inspection is not possible). Landlord's including the Corporation, could be faced with significant costs in completing the EWS1 Forms when, there is no legal requirement to do so.

Cost of the works

9. As stated previously, EWS1 Forms are not a legal requirement and, there is no obligation on the Corporation to complete these at its own cost. If the Corporation does decide to carry out EWS1 Forms across the Barbican Residential Estate, it will need to identify and set aside an initial budget to cover the cost of this work and ultimately, determine who will bear the cost.

10. The requirement for the completion of the EWS1 Forms, at this stage, stems directly from the specific needs of individual leaseholder residents on the Barbican Estate. The cost of completing the EWS1 Forms cannot simply be split across all leaseholders in a block for several reasons including:

    - there may only be one or, a limited number of leaseholders in the block requiring an EWS1 Form and, as such, the cost of completing the EWS1 Form may be significantly prohibitive.
    - some leaseholders have no mortgage, making the EWS1 Form irrelevant to them.
    - some leaseholders may have a cash buyer for the lease on their flat again, making the EWS1 Form irrelevant to them.
    - some leaseholders may have a long fixed-term mortgage deal so, the term of the EWS1 Form may run out before they get to make use of it.

11. Officers consider that it would be unreasonable to pass the cost of completing the EWS1 Forms on to other leaseholders when, the EWS1 Form is only being carried out to satisfy a limited number of individual mortgage applications.

Options for consideration

12. Members are asked to consider the following options for the provision (or non-provision) of EWS1 Forms across the Barbican Residential Estate and, to agree which option should be pursued.

Option 1

The Corporation does not undertake and issue EWS1 Forms for any of its blocks on the Barbican Residential Estate but, does provide 'comfort' letters to individual residents upon request (a sample 'comfort letter' is included at Appendix 'A' to this report).

There is no additional budget requirement for this option and, Option 1 is recommended by officers for approval.

Option 2

The Corporation commits to carrying out EWS1 Forms on all residential blocks across the Barbican Estate.

The estimated cost of this option (all 21 blocks) is in the region of £100,000 - £150,000 for which, additional funding will need to be identified.

Option 3

The Corporation commits to carrying out EWS1 Forms on all blocks of flats over 18 metres (six-storeys) in height across the Barbican Residential Estate.

The estimated cost of this option (based on 11 blocks) is in the region of £70,000 - £110,000 for which, additional funding will need to be identified.

Option 4

The Corporation commits to carrying out EWS1 Forms on its high-rise blocks of flats (notionally over 10-storeys or more in height) across the Barbican Residential Estate.

The estimated cost of this option (based on three blocks) is in the region of £25,000 - £35,000 for which, additional funding will need to be identified.

Financial Implications

14. There is currently no budget available for the completion of the EWS1 Forms as set out in Options 2, 3 and 4 above. If members of this Committee agree to pursue one of Options 2, 3 and 4, then, it will need to request additional funding from either City Fund or City Cash through the formal channels.

15. Members of this Committee, mindful that this is not a statutory requirement and, at this stage, is entirely for the benefit of a very small number of individual private leaseholders, will need to consider whether this is an appropriate and justifiable use of funds.

Appendices

Appendix A – Sample Comfort Letter

Paul Murtagh
Assistant Director, Barbican & Property Services
T: 020 7332 3015 E: paul.murtagh@cityoflondon.gov.uk

APPENDIX 'A' – SAMPLE COMFORT LETTER

Typical Bank PLC
London

Date

Dear Sir/Madam

Defoe House, Barbican Estate, London EC2Y 8ND

I write regarding your request for and, the applicability of the EWS1 Form for the above building, for which, the City of London Corporation is both the freeholder and manager.

The EWS1 Form itself states the following:

"Objective - This form is intended for recording in a consistent manner what assessment has been carried out for the external wall construction of residential apartment buildings where the highest floor is 18m or more above ground level or where specific concerns exist (Note 1). It should not be used for other purposes".

In accordance with this objective and, the publicly available guidance on the use of EWS1 Forms, there is no requirement for Defoe House to have an EWS1 Form as:

- it is less than 18m in overall height.
- the recently completed Fire Risk Assessment raised no specific concerns relating to the external components used in the construction of the building.
- the building was constructed in the 1970s and, the external walls have not been modified since construction.
- although there are external balconies in the construction of the building, the decking and balustrades used in their construction are made from non-combustible materials.

We can also confirm that there is no ACM/MCM cladding present anywhere on this building

I trust that you find this letter self-explanatory however, should you require any further information, please contact us via housingfiresafety@cityoflondon.gov.uk, or at the address below.

Yours sincerely

Paul Murtagh
Assistant Director Barbican Estate & Housing

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Committees:	Dates:
Corporate Projects Board for decision. Operational Property and Projects Sub Committee Barbican Residents Consultation Committee for information Barbican Residential Committee	11 May 2022 30 May 2022 6 June 2022 17 June 2022
Subject: Barbican Estate Tower Lift Refurbishment **Unique Project Identifier:** TBC	**Gateway 1-4 Project Proposal & Options Appraisal** Regular
Report of: Director of Community & Children's Services **Report Author:** Neil Clutterbuck	**For Decision**
PUBLIC	

Recommendations

1. Approval track, next steps and requested decisions	**Project Description:** This project proposes a programme of works to replace all lifts in Shakespeare, Cromwell, and Lauderdale Towers on the Barbican Estate. There are nine lifts in total, three serving each Tower. It is intended to procure a contractor that will deliver the project to the high standards required and ensure resident satisfaction. **Next Gateway: 5** Authority to start work **Next Steps:** 1. Appoint design team. 2. Resident Consultation 3. Prepare Procurement Package 4. Pre-tender S20 consultation **Requested Decisions:** 1. That budget of **£50,000** is approved to engage a specialist lift consultant to undertake liaison with internal and external stakeholders, to formulate a specification to tender and cover staff costs. 2. Note the project budget of **£50,000** (excluding risk) 3. Note the total estimated cost of the project at **£4,600,000**(excluding risk);

.

<table>
<tr><td></td><td>4. That Option 1 is approved to fully refurbish all nine lifts in the three Barbican Estate Towers.</td></tr>
<tr><td>2. Resource requirements to reach next Gateway</td><td>For recommended option 1:
<table>
<tr><th>Item</th><th>Reason</th><th>Funds/ Source of Funding</th><th>Cost (£)</th></tr>
<tr><td>Consultant Fees</td><td>Resident consultation and specification preparation.</td><td>Long lessee contributions 95%/ Barbican Res.Local Risk Budget 5%</td><td>£30,000</td></tr>
<tr><td>Staff Costs</td><td>Project Management</td><td>Long lessee contributions 95%/ Barbican Res.Local Risk Budget 5%.</td><td>£20,000</td></tr>
<tr><td>Total</td><td></td><td></td><td>£50,000</td></tr>
</table>
Costed Risk Provision requested for this Gateway: £0 (as detailed in the Risk Register – Appendix 2)</td></tr>
<tr><td>3. Governance arrangements</td><td>• Service Committee: Barbican Residential Committee
• Senior Responsible Officer: Paul Murtagh, Assistant Director Barbican Estate & Property Services
• The Project will be monitored by the Housing Programme Board</td></tr>
</table>

Project Summary

4. Context	Following a feasibility study, completed by Butler and Young Lift Consultants, it has been determined that the nine lifts that service the three tower blocks on the Barbican Estate, are now past their life cycle. Equipment utilised during the lift installation in the 1960's, and then updated in 1997, and then again in 2002, is now obsolete and parts are no longer readily available. Each tower has a designated firefighting lift which complied with the regulations at the time of installation, however, these

	firefighting features should be fully updated in compliance with the latest regulations and standards.
5. Brief description of project	The modernisation of entire lift installations, with the replacement of obsolete lift components. Provide a compliant lift installation with a minimum twenty-year lifecycle to current codes and standards, whilst incorporating the current recommendations with regards to providing improved accessibility to lifts for persons with disabilities, and firefighting and evacuation provision in existing lifts.
6. Consequences if project not approved	A major failure of any of this equipment would mean timescales to source an equivalent or compatible part would be excessive, expensive and result in a long period of lift down time. Periods of four to six weeks are not uncommon for these types of component failure
7. SMART project objectives	The nine Tower block lifts are refurbished to the current regulatory standards and updated compliancy codes. They will also meet the requirements of the London Fire Brigade and City of London's Fire Safety Advisor. The refurbished lifts to have a life span of twenty years. Works are managed to minimise disruption to residents.
8. Key benefits	Benefits deriding for the new refurbishment of all of the towers' lifts are as follows: 1.Reliability- the lift control panel, traction drive system, shaft switching/positioning system, door operating systems and running gear will be replaced with compliant and state of the art components that will provide reliability and third-party serviceability not currently available. 2. Performance- It is the intention to replace the existing Gearless DC machines, with new AC gearless machines, which operate with an increased efficiency of 25 -35%, dependent on the loading of the lift, which would increase the speed for the Towers' lifts and reduce overall average waiting times and also time to travel to the destination floor. Provisional theoretical studies indicate that for the towers, during the high demand morning peak, the average waiting time would reduce from 137 seconds to 44 seconds, and the time to destination reduced from 218 seconds to 93 seconds. With the additional use of "ECO" modules that would dim down car lighting, including indicator dimming feature, these would both utilise less power and aid the lowering of the carbon footprint, as outlined in the Climate Action Strategy. Working with the COL Energy Team, we are also exploring the

	use of a regenerative drive on each lift that generates power during use and feeds this back into the national grid. To implement this would cost approximately £6,000 per lift, but it is unsure, at this time, whether this would be redeemed over the life span of the new lifts. The new push buttons will conform to height, identification and colour as required for Disability Discrimination Act compliance. 3. Firefighting- the lifts would be equipped with the functions and features necessary to provide adequate protection for the fire service to access any given level in an emergency situation.
9. Project category	7a. Asset enhancement/improvement (capital)
10. Project priority	A. Essential
11. Notable exclusions	All other residential lifts on the Barbican Estate.

Options Appraisal

12. Overview of options	1. Procure a single contractor to complete the Tower lift refurbishment project via a compliant open tender process. 2. Undertake major repairs to all lifts, would be cheaper in the short term again, however, as highlighted earlier this would certainly lead to lengthy lift outages, causing severe disruption to residents and possible firefighting services, and would most definitely be less cost effective in the long run. 3. Doing nothing is not an option. Failure to undertake full lift refurbishment would cause severe disruption to residents and possibly firefighting services due to issues highlighted earlier.
13. Risk	**Overall project risk:** Low Further information available within the Risk Register (Appendix 2) and Options Appraisal Key risks: • Any delay to project start will increase the risk of significant failure of existing lift installations. • S20 challenge could undermine project funding. • Economic uncertainty raises the risk of cost inflation running above current estimates.

Resource Implications

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<table>
<tr><td>14. Total estimated cost</td><td colspan="2">For recommended option 1
Total estimated cost (excluding risk): £4,600,000
Total estimated cost (including risk): N/A</td></tr>
<tr><td>15. Funding strategy</td><td>Is funding confirmed:
No funding confirmed</td><td>Who is providing funding:
Mixture - some internal and some external funding</td></tr>
<tr><td></td><td colspan="2">Recommended option
<table><tr><th>Funds/Sources of Funding</th><th>Cost (£)</th></tr><tr><td>Long lessee contributions 95%</td><td>4,370,000</td></tr><tr><td>Barbican Res. Local Risk Budget</td><td>230,000</td></tr><tr><td>Total</td><td>4,600,000</td></tr></table></td></tr>
</table>

Appendices

Appendix 1	Project Briefing
Appendix 2	Risk Register
Appendix 3	PT4 Procurement Form

Contact

Report Author	Neil Clutterbuck
Email Address	Neil.clutterbuck@cityoflondon.gov.uk
Telephone Number	07712 234438

Options appraisal table.

	Option 1	*Option 2*
1. Brief description	Procure a single contractor to complete the Tower lift refurbishment project via a compliant open tender process.	Undertake major repairs to all lifts again, would be cheaper in the short term, however, as highlighted earlier this would certainly lead to lengthy lift outages, causing severe disruption to residents and possible firefighting services, and would most definitely be less cost effective in the long run. In addition, some specialist parts will become obsolete or may not be fully compatible with existing older technology.
2. Scope and exclusions	Full refurbishment, replacement of obsolete equipment to all nine Barbican Tower lifts. The lifts would be equipped with the functions and features necessary to provide adequate protection for the fire service to access any given level in an emergency situation.	Existing lift installations will remain and be repaired to extend service as far as is practically possible.
Project Planning		
3. Programme and key dates	Tender process to start winter 2022. Works to commence spring 2023 with a duration of approximately three years.	Tender process to start winter 2022. Works would commence spring 2023 and continue as required.

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	Option 1	*Option 2*
4. Risk implications	Low Further information available within the Risk Register (Appendix 2).	High significant risk of major component failure and inability to obtain obsolete materials and parts.
5. Benefits	1.Reliability- the lift control panel, traction drive system, shaft switching/positioning system, door operating systems and running gear will be replaced with compliant and state of the art components that will provide reliability and third-party serviceability not currently available. 2. Performance- It is the intention to replace the existing Gearless DC machines, with new AC gearless machines, which operate with an increased efficiency of 25 -35%, dependent on the loading of the lift, which would increase the speed for the Towers' lifts and reduce overall average waiting times and also time to travel to the destination floor. Provisional theoretical studies indicate that for the towers, during the high demand morning peak, the average waiting time would reduce from 137 seconds to 44 seconds, and the time to destination reduced from 218 seconds to 93 seconds. With the additional use of "ECO" modules that would dim down car lighting, including indicator dimming feature, these would both utilise less power and aid	In the short term there would be less capital expenditure required.

	Option 1	*Option 2*
	the lowering of the carbon footprint, as outlined in the Climate Action Strategy. Working with the COL Energy Team, we are also exploring the use of a regenerative drive on each lift that generates power during use and feeds this back into the national grid. To implement this would cost approximately £6,000 per lift, but it is unsure, at this time, whether this would be redeemed over the life span of the new lifts. The new push buttons will conform to height, identification and colour as required for Disability Discrimination Act compliance. 3. Firefighting- the lifts would be equipped with the functions and features necessary to provide adequate protection for the fire service to access any given level in an emergency situation	
6. Disbenefits	This would be a large capital expenditure.	A major failure of any of this equipment would mean timescales to source an equivalent or compatible part would be excessive, expensive and result in a long period of lift down time. Periods of four to six weeks are not uncommon for these types of component failure. This could also be catastrophic in the event of a fire, as access for firefighters would be severely restricted/limited.

	Option 1	Option 2
7. Stakeholders and consultees	Residents, including leaseholders through Section 20 consultation where they stand to incur service charges. Departments of Town Clerks, Planning and Chamberlain's (including CityProc) & City Solicitors. Members and Ward Members.	
Resource Implications		
8. Total estimated cost	Total estimated cost (excluding risk): £4,600,000 Total estimated cost: (including risk): £5,060,000	This cannot be quantified as the lifts are now at the end of their expected life span, and key components are now obsolete and not replaceable.
9. Funding strategy	The project is funded by the City Fund, the majority (circa 95%) of the cost is recoverable by way of service charges from leaseholders, the remainder (circa 5%) is funded from ongoing annual Barbican Residential local risk revenue budgets.	
10. Estimated capital value/return	N/A	
11. Ongoing revenue implications	Regular cyclical service requirements, and repairs outside existing warranties.	
12. Investment appraisal	N/A	
13. Affordability	Approximately 95% is recoverable from Long Lessees(approximately £13,000 each, subject to terms of the lease).	

	Option 1	*Option 2*
14. Procurement strategy/Route to Market	Traditional Approach. Sub OJEU.	
15. Legal implications	Maintaining the assets in a compliant way discharges the City's legal and statutory legal obligations.	Not maintain expired equipment could put City in legal jeopardy.
16. Corporate property implications	None	
17. Traffic implications	To be agreed with nominated contractors where the works have any impact on highways. Implications are expected to be virtually nil.	None
18. Sustainability and energy implications	Replacement lifts would be "ECO" modules that would dim down car lighting, including indicator dimming feature. They would also be fitted with alternating current gearless machines with a variable voltage, variable frequency control which would make lifts 30 to 40% more efficient.	None
19. IS implications	None	
20. Equality Impact Assessment	An equality impact assessment will not be undertaken.	N/A

	Option 1	*Option 2*
	The replacement lift specification will have a positive impact only on those with protected characteristics and will be fully compliant with all up to date regulations and guidelines.	
21. Data Protection Impact Assessment	The risk to personal data is less than high or non-applicable and a data protection impact assessment will not be undertaken	N/A
22. Recommendation	Recommended	Not recommended

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Project Briefing

Project identifier			
[1a] Unique Project Identifier	TBC	**[1b] Departmental Reference Number**	TBC
[2] Core Project Name	Barbican Estate Tower Lift Refurbishment		
[3] Programme Affiliation *(if applicable)*	N/A		

Ownership	
[4] Chief Officer has signed off on this document	TBC
[5] Senior Responsible Officer	Paul Murtagh
[6] Project Manager	Neil Clutterbuck

Description and purpose
[7] Project Mission statement / Elevator pitch
This project proposes a programme of works to replace all lifts in Shakespeare, Cromwell and Lauderdale Towers on the Barbican Estate. There are nine lifts in total, three serving each Tower. It is intended to procure a contractor that will deliver the project to the high standards required and ensure resident satisfaction.
[8] Definition of Need: What is the problem we are trying to solve or opportunity we are trying to realise (i.e. the reasons why we should make a change)?
The three lifts serve each Tower were originally installed by Otis Lifts in the 1960's, and then received an extensive refurbishment in 1997 and 2002 again by Otis Lifts. All lifts require extensive refurbishment, with the replacement of all major components. The original equipment installed and then updated later, is now obsolete and parts are no longer readily available. A major failure of any of these components would require a lengthy design and repair process, with the possibility of lifts being out service for a considerable amount of time. Each tower has a designated firefighting lift which complied with the regulations at the time of installation. These firefighting features should be fully updated in compliance with the latest regulations and standards.
[9] What is the link to the City of London Corporate plan outcomes?
[4] Communities are cohesive and have suitable housing and facilities. [9] Our spaces are secure, resilient and well-maintained.
[10] What is the link to the departmental business plan objectives?
Tenants and leaseholders live in well maintained and managed homes and estates.
[11] Note all which apply:

Officer: Project developed from Officer initiation	Y	**Member:** Project developed from Member initiation	N	**Corporate:** Project developed as a large scale Corporate initiative	N
Mandatory: Compliance with legislation, policy and audit	Y	**Sustainability:** Essential for business continuity	N	**Improvement:** New opportunity/ idea that leads to improvement	N

Project Benchmarking:
[12] What are the top 3 measures of success which will indicate that the project has achieved its aims?
1) Barbican Estate Tower block lifts are refurbished to the high standards required.
2) Works are managed to minimise disruption to residents and impact on the general public and wider public realm.
3) Resident satisfaction above City's corporate targets.
[13] Will this project have any measurable legacy benefits/outcome that we will need to track after the end of the 'delivery' phase? If so, what are they and how will you track them? (E.g. cost savings, quality etc.)
N/A
[14] What is the expected delivery cost of this project (range values) [£]?
Lower Range estimate: £4,300,000 Upper Range estimate: £4,700,000
[15] Total anticipated on-going revenue commitment post-delivery (lifecycle costs) [£]:
N/A
[16] What are the expected sources of funding for this project?
The project is funded by the City Fund, the majority of the cost (circa 95%) is recoverable by way of service charges from long leaseholders.
[17] What is the expected delivery timeframe for this project (range values)? **Are there any deadlines which must be met (e.g. statutory obligations)?**

Project Impact:	
[18] Will this project generate public or media impact and response which the City of London will need to manage? Will this be a high-profile activity with public and media momentum?	
No	
[19] Who has been actively consulted to develop this project to this stage? <(Add additional internal or external stakeholders where required) >	
Project Board	Housing Programme Board
Chamberlains: Finance	Officer Name: Mark Jarvis
Chamberlains: Procurement	Hirdial Rai
IT	Officer Name: N/A
HR	Officer Name: N/A
Communications	Officer Name: N/A
Corporate Property	Officer Name: N/A
Estate Management	Officer Name: Michael Bennett, Helen Davinson
Property Services	Officer Name: Jason Hayes

[20] Is this project being delivered internally on behalf of another department? If not ignore this question. If so: **Please note the Client supplier departments.** **Who will be the Officer responsible for the designing of the project?** **If the supplier department will take over the day-to-day responsibility for the project, when will this occur in its design and delivery?**	
Client	Department: N/A
Supplier	Department: N/A
Supplier	Department: N/A
Project Design Manager	Department: N/A
Design/Delivery handover to Supplier	Gateway stage: N/A

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City of London: Projects Procedure Corporate Risks Register

Project Name:	Barbican Estate Towers' Lift Refurbishment	**PM's overall risk rating:**	Low	**CRP requested this gateway**	£ -	**Average unmitigated risk**	5.0	**Open Risks**	7
Unique project identifier:	TBC	**Total estimated cost (exc risk):**	£ 4,600,000	**Total CRP used to date**	£ -	**Average mitigated risk score**	3.0	**Closed Risks**	0

General risk classification											Mitigation actions								Ownership & Action				
Risk ID	Gateway	Category	Description of the Risk	Risk Impact Description	Likelihood Classification pre-mitigation	Impact Classification pre-mitigation	Risk score	Costed impact pre-mitigation (£)	Costed Risk Provision requested Y/N	Confidence in the estimation	Mitigating actions	Mitigation cost (£)	Likelihood Classification post-mitigation	Impact Classification post-mitigation	Costed impact post-mitigation (£)	Post-Mitigation risk score	CRP used to date	Use of CRP	Date raised	Named Departmental Risk Manager/ Coordinator	Risk owner (Named Officer or External Party)	Date Closed OR/ Realised & moved to Issues	Comment(s)
R1	4	(2) Financial	Lack of interest from contractors at tender stage.	Limited tender returns may not be value for money.	Possible	Minor	3	£0.00	N		Pre-tender contractor engagement	£0.00	Unlikely	Minor	£0.00	2	£0.00		16/03/2022	Jason Hayes	Neil Clutterbuck		
R2	4	(2) Financial	Cost inflation	Budget may be insufficient in uncertain market	Possible	Serious	6	£0.00	N		Existing budgets should have an allowance built in to tender price.	£0.00	Possible	Minor	£0.00	3	£0.00		16/03/2022	Jason Hayes	Neil Clutterbuck		
R3	5	(2) Financial	Contractors financial viability at a greater risk during times of economic uncertainty	Impact of economic uncertainty on sector financial viability is unknown.	Possible	Serious	6	£0.00	N		None at present	£0.00	Possible	Serious	£0.00	6	£0.00		16/03/2022	Jason Hayes	Neil Clutterbuck		
R4	4	(1) Compliance/Regulatory	Challenge to tender awarding process	An unsuccessful contractor may challenge the tender process.	Unlikely	Minor	2	£0.00	N		A robust tendering process will be put in place in conjunction with the CLPS. Should a challenge arise, advice will be sought from CLPS and legal services to ensure the dispute is resolved rapidly and successfully.	£0.00	Rare	Minor	£0.00	1	£0.00		16/03/2022	Jason Hayes	Neil Clutterbuck		
R5	4	(1) Compliance/Regulatory	Listed status of Barbican Estate may complicate design process.	Potential programme delay.	Unlikely	Minor	2	£0.00	N		Early engagement with COL planning team.	£0.00	Rare	Minor	£0.00	1	£0.00		16/03/2022	Jason Hayes	Neil Clutterbuck		
R6	4	(1) Compliance/Regulatory	Challenge to the S20 process by lease holders.	Delay due to legal process and potential budgetry implications.	Unlikely	Serious	4	£0.00	N		Comprehensive condition survey carried out to demonstrate requirement for the works.	£0.00	Unlikely	Minor	£0.00	2	£0.00		16/03/2022	Jason Hayes	Neil Clutterbuck		
R7	4	(6) Safeguarding	Delay to start of project could seriously enhance the likelyhood of a failure to the existing machinery.	Lenghty loss of service to residents and inreased risk in the event of an emergency.	Possible	Major	12	£0.00	N		Robust project management to ensure project time scales are met.	£0.00	Possible	Serious	£0.00	6	£0.00		16/03/2022	Jason Hayes	Neil Clutterbuck		
R8								£0.00				£0.00			£0.00		£0.00						
R9								£0.00				£0.00			£0.00		£0.00						
R10								£0.00				£0.00			£0.00		£0.00						
R11								£0.00				£0.00			£0.00		£0.00						
R12								£0.00				£0.00			£0.00		£0.00						
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R15								£0.00				£0.00			£0.00		£0.00						
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R19								£0.00				£0.00			£0.00		£0.00						
R20								£0.00				£0.00			£0.00		£0.00						
R21								£0.00				£0.00			£0.00		£0.00						
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PT4 - Committee Procurement Report

This document is to be used to identify the Procurement Strategy and Purchasing Routes associated with a project and only considers the option recommended on the associated Gateway report.

Introduction

City Procurement Project Reference:	**22/01/DCCS**		
Project / Contract Title:	**Barbican Estate Tower Lift Replacement**		
Project Lead & Contract Manager:	**Neil Clutterbuck**	**Lead Department:**	**DCCS**
Category Manager:	**Hirdial Rai**	**Other Contact:**	
Total Contract Value (excluding VAT and inc. extension options):	**£4,000,000**	**Contract Duration (inc. extension options):**	**36 months**
Budget approved Capital/Revenue:	**No Capital**	**Capital Project reference (if applicable):**	
Gateway Approval Process - **Is this project subject to the Gateway process?** Yes - **If so, what was the last Gateway report, and date of approval, and what is the next Gateway report and scheduled date for recommendation for approval? Gateway 1 – 4 to be approved.**			
Opportunity for Inter-City Collaboration (is there another site/department that could benefit from this project)?			

Procurement Strategy Recommendation

City Procurement team recommended option
Option 1 – Traditional Approach

Route to Market Recommendation

City Procurement team recommended option
Option 1 – Sub OJEU

Specification and Evaluation Overview

Summary of the main requirements: **This project proposes a programme of works to replace all lifts in Shakespeare, Cromwell, and Lauderdale Towers on the Barbican Estate. There are nine lifts in total, three serving each Tower. It is intended to procure a contractor that will deliver the project to the high standards required and ensure resident satisfaction.**	
Technical and Pricing evaluation ratio **60% (Technical) / 40% (Price) TBC**	
Overview of the key Evaluation areas (if known at this stage): **N/A**	
Does contract delivery involve a higher than usual level of Health & Safety, Insurance, or Business risk to be allowed in the procurement strategy? No.	
Are there any accompanying documents with this report? *e.g. PT0/outlined project plan identifying roles and responsibilities as appropriate* **If yes, please include information in the appendices section below.**	**Yes ☐ No ☒**
Will this project require the winning supplier(s) to process personal data on our behalf?	**Yes ☐ No ☒**
Is there a requirement for a Performance Bond on this Project and if so, on what grounds? No.	
Will the procurement process require a financial assessment? Yes ☒ No ☐ **If yes, please indicate recommended assessment: FinanceCheck ☒ Financial Appraisal ☐**	

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Committee(s): Residents' Consultation Committee Barbican Residential Committee	**Dated:** 06/06/2022 17/06/2022
Subject: Update Report – Beech Gardens (North West Podium) Waterproofing Project	**Public**
Which outcomes in the City Corporation's Corporate Plan does this proposal aim to impact directly?	**1, 2, 12**
Does this proposal require extra revenue and/or capital spending?	**N**
If so, how much?	**N/A**
What is the source of Funding?	**N/A**
Has this Funding Source been agreed with the Chamberlain's Department?	**N/A**
Report of: Andrew Carter, Chief Officer/Executive Director Community and Children's Services	**For Information**
Report author: Paul Murtagh Assistant Director Barbican & Property Services	

Summary

The purpose of this report is to update Members on the latest position with the City of London Corporation's (the Corporation) Beech Gardens (North West Podium) Waterproofing Project, the subsequent issues that have arisen and the outcome of the steps taken to facilitate completion of the project.

Recommendations

Members are asked to note the contents of this report.

Main Report

Background

1. The Beech Gardens (North West Podium) Waterproofing Project was undertaken to address on-going issues of water penetration through areas of the Barbican podium including, White Lyon Court, John Trundle Highwalk, Beech Gardens and Bryer Court pond, into the commercial premises below, car parks and the Beech Street tunnel.

2. The on-going water penetration had led to a saturation of the structure of the podium which, could cause corrosion of the reinforcement and subsequent deterioration of the concrete structure over the long term.

3. As part of the preparatory works for this project, all the drains in the vicinity of Beech Gardens were subject to a detailed drainage survey. All blockages were cleared and, the drains were subsequently jet washed. However, further investigations were carried out because of localised 'ponding' and, in one particular area, a burst drainage pipe indicated that the internal diameter of the drainage pipes had been significantly reduced.

4. It had been agreed that a separate proposal to remedy issues with the drainage across the whole of the Barbican Estate would be brought to the respective Committees/Sub Committee but, this did not happen.

5. The scope of this project was essentially the replacement of the waterproof membrane and the replacement of soft landscaping to an area of approximately 10,000m². There was no provision for the replacement of the associated drainage, which was specifically excluded from the project.

6. At the time of the commencement of this project in November 2013, there were some 43 separate leaks into units including Virgin Active (as it was at the time), the GSMD, BUPA and Parking Services. Practical Completion for the works was achieved in June 2015 however, a Gateway 6 (Outcomes Report) has still not been submitted for this project, due to subsequent defects outlined below.

Considerations

7. Shortly after Practical Completion was issued when, the works were substantially completed, isolated leaks developed, mainly around the running track and Studio A in Virgin Active. The contractor that carried out the waterproofing works returned to the site on several occasions to investigate the cause of the leaks and, where appropriate, carried out subsequent remedial works.

8. As a result of further leaks, further investigation works were undertaken to establish whether there were issues relating to the quality of the workmanship, failings in the original design and specification or, if there were any other related issues.

9. Concerns were raised that the Crossrail expansion works that took place across and under the Barbican Estate may have contributed to the problem. However, Crossrail undertook a detailed assessment of its works and, the impact on the Barbican podium and, concluded that this was not the cause of the apparent failure of the recent podium waterproofing works.

10. As the leaks continued, it was agreed with the original contractor to carry out further detailed 'movement' monitoring over a period of 12 months to establish whether there was any evidence to support concerns that there were issues with the design and specification, particularly in relation to the potential inadequate tolerance that had been allowed in the design of the detail of the structural expansion joints.

11. The outcome of the 'movement' monitoring over that 12-month period was that the likely problem was in the original design and specification for the project. Given the potential liability issues and subsequent costs, the Corporation took the decision to commission an independent review of the whole project to advise on whether

the post-contract defects could legitimately be attributed to the design of the project or, the workmanship.

12. The original commission for the independent review was awarded to the Building Research Establishment (BRE). However, with the agreement of the BRE, the commission was subsequently transferred to Sandberg Consulting Engineers to maintain continuity and consistency.

13. Whilst the independent review was thorough and detailed, to some extent, perhaps inevitably, it was somewhat 'inconclusive'. The review did conclude that the waterproofing works undertaken, in the main, are resisting the passage of water to the underside of the floor slab as intended. However, there is some doubt as to whether the decision to leave the existing asphalt coverings in place and 'overlay' with the new chosen waterproofing system was the right thing to do. For the current Phase 2 of this project, the removal of the existing asphalt coverings is recommended.

14. At the time the review was undertaken, there were very few leaks found in comparison to the overall area recovered as part of the original project. Based on the evidence found, Sandberg concluded that "there does not seem to be a widespread failure within the paving layers and this, in our opinion, would inhibit an investigation into potential design or installation liability issues".

15. The Sandberg report does, however, acknowledge that if the quantity of leaks does start to increase and develop into 'clusters', further investigation may be needed to help establish whether more fundamental failures are occurring.

Current Problems

16. At the time of writing this report, the Leisure Centre is suffering from leaks on to the running track, one in Studio A and, a more significant leak into the lobby/office below the running track. Other leaks have been reported but, these have been attributed to leaks from various service pipes that are the responsibility of the service provider.

17. As always, we are responding to these 'new' leaks by carrying out an intrusive investigation before determining what remedial action is required. The larger new leak is directly below an expansion joint but, two floors (more than six metres) down from podium level. Early indications are that we will need to open areas of the wall outside the men's changing room to help us determine the cause and 'route' of the leak.

Way Forward

18. Whilst we are currently awaiting the results of more recent investigation works that we have carried out on the current leaks particularly, relating to the tiling joints and expansion joints, it would seem that there is no merit in pursuing liability claims against either the contractor or, the design consultants. Although we do still retain some of the 'retention' from the original contract for the waterproofing works, we will likely need to release this to the contractor.

19. There are clearly issues with the condition and performance of the podium drainage on Phase 1 and, this needs to be addressed. We are currently carrying out detailed surveys of the drainage and, we will need to decide how and when we tackle the defects that are highlighted.

20. It is extremely important to note that the experiences that we have had with Phase 1 of the waterproofing works on the Barbican podium have been very useful and informative for the current and future phases of the project. With any project, even one as 'uncertain' as this one, it is crucial that the 'lessons learnt' are used to inform and guide future projects. Some key aspects of the lessons learnt have been set out previously in this report but, others include:

    - ensuring that the waterproofing membrane is laid to a completely dry substrate and, to enable this, the timing and planning of the works should be given serious thought and consideration to avoid, wherever possible, particularly inclement weather.
    - planning, timing and permissions for carrying out 'hot works' associated with the waterproofing works.
    - building into the project the scope for the regular review of the existing design and, the scope for design change where necessary and appropriate.
    - understanding and planning the works in relation to 'noisy works', the limitations of the Barbican Estate and permitted working hours. This needs to be built into the design and specification of the works to avoid delays and additional costs as a result on permitted working hours and 'noisy works'.
    - further consideration of the decision taken at Phase 1 to leave the existing asphalt coverings in place and 'overlay' with the new chosen waterproofing system.
    - ensuring that all associated drainage works are carried out as part of the overall waterproofing project to avoid the issues that arose from Phase 1.

21. It should be noted that this report is an update report only and, does not negate the need for a Gateway 6 – Outcomes Report. Following final completion of our outstanding investigations, it is intended that a Gateway 6 report will be submitted to the relevant Committees/Sub Committees including, the Barbican Residential Committee.

Appendices

None

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GAG Report to the RCC 6 June 2022

Some good news. As you may recall the Gardens Advisory Group (GAG) has been conducting the area by area inspections of the gardens on its own through the pandemic. In our last report I highlighted our hope that we would be able to resume joint inspections with members of the City Gardens Team.

Those joint inspections have now recommenced. We have conducted three out of the four area inspections with the last one scheduled for May 27th. The willingness of Jake Tibbetts, City Gardens Manager, to make himself available to join each of the inspection teams has been very much appreciated.

Joint inspections produce a much more fruitful dialogue than simply writing and circulating reports. Joint inspections also enable residents to benefit from the knowledge and expertise of City Gardens staff on all matters gardening which is an additional welcome benefit. If a member of the Barbican Estates Office were available to join the next round of inspections they would be very welcome.

Members of the RCC may have noticed the discussion on Barbican Talk about the three year long absence of the fountains and the waterfall on the lake. Inspection of the gardens in the lake revealed a further range of problems: deteriorating brickwork that is admitting water to some beds and a bulge in the weir. According to the discussion on Barbican Talk the Barbican Centre pays 50% of the costs of the lake, the Corporation pays 7.5% and residents, through the service charge, pay 42.5%. This service charge payment - if the Barbican Talk report is accurate – makes the lake's infrastructure a matter for the RCC. Further delays in effecting essential repairs are likely to result in greater deterioration and damage.

Among the joys and difficulties of gardens is that they are not static – they grow, develop, blossom and deteriorate. If we are to have gardens of the quality appropriate to our listed building status, we need a long term plan for their continuing and continuous re-development. It is now widely recognised that there is an overdue need for a comprehensive property maintenance programme to keep our buildings in good condition. In parallel, a comprehensive garden maintenance programme that responds to the challenges of climate change and garden usage as well as the natural development and deterioration of plants, shrubs and trees is also required. The Gardens Advisory Group is proposing to engage in discussion with City Gardens and the BEO on how such a programme might best be developed.

Jim Durcan
Chair
Gardens Advisory Group

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Electric Vehicle Charging Working Party

RCC Report for June 2022

Current Provision

There are currently 62 charge points located around the estate. Reliability is generally good, with significant improvement in the Breton carpark. But the provision is poor in Willoughby, where first generation equipment is unreliable, and Lauderdale, where connectivity is poor. Every car park has some provision.

To overcome patchy provision the following protocol has been established.

- Any resident in the Barbican can charge their car in any carpark in the Barbican.
- CPAs have been instructed not to be vigilant in moving vehicles on after the charge cycle is complete.
- In January 2022, the WP set up an EV User Group, which now has 25 members. This user group shares experiences.

Future action

There are connectivity issues in some of our carparks, which means that the BP App (which is the default mechanism for use) does not work. The only solution is for residents to use a card-based subscription service, which despite its many attractions is expensive for users with low demand. We are trying to get BP to modify this approach.

Commercial position

We have to remind ourselves that these chargers are owned and operated by BP Pulse. We have successfully removed the BEO from the payment system (to the relief of both the BEO and residents). This means residents are subject to the commercial pressures of the external market.

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To RCC members
From: resident members of LSCWP

LSCWP Report

Background

The last six months have seen extensive work undertaken at all levels with the BEO and DCCS Officers, as well as Councillors, on issues of costs, value for money and accountability in relation to the Service Charge and Car Park Concierges.

The original objective was "*to identify efficiencies that will not reduce service but should provide some offset against additional costs we are asked to pay by the City Corporation to maintain our current concierge/CPA service".* Frequently referred to as "opportunities for quick wins".

As we approached the end of March we agreed that we needed a major checkpoint not only because we were reaching the end of the financial year but also because residents should be informed of progress. We therefore reported back to the instigators of this piece of work, the BA/RCC Chairs and Vice Chairs. We noted that there were no quick wins although there appeared to be significant savings opportunities without any reduction in services which have been raised with officers and need further follow up. These will be discussed at the RCC meeting.

We also noted that there were a number of other points for follow up, including alternative options for the operation of the Car Parks, although these may be better reviewed by other working parties with a remit for service delivery.

It is important to note that from the start we envisaged that any savings delivered through the Service Charge account should be a suitable offset for any increased Car Park charges to maintain the level of service in the Car parks.

Whilst this work on costs was undertaken there were numerous discussions on the issue of accountability. This issue is well documented in previous LSCWP reports but marks the distinction between the City's requirement and focus on the full recovery of costs incurred in the Service Charge account and the Leaseholders requirement to have fuller engagement on the costs incurred within the Service Charge with particular regard to value for money.

It is therefore pleasing to note that following our input, the revised Job Description for the new Head of the Barbican Estate now includes the following within the main duties and responsibilities

- Provide strategic direction and pro-active leadership to managers and front-line staff of the Barbican Residential Estate Office, having accountability and responsibility for all services (and associated budgets) to leaseholders and tenants (including commercial tenants).

We would expect this to be part of a review the interim Head of the Barbican Estate will be undertaking on the operation of the BEO.

David Lawrence

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NOTES/KEY POINTS ARISING FROM A SERVICE LEVEL AGREEMENTS MEETING
21 FEBRUARY 2022

1 Present

Officers- Michael Bennett, Helen Davidson, Luke Barton
Residents - Averil Baldwin, Tony Swanson, Andrew Tong

2 Estate -wide order data

The Estate Office (EO) had expanded the "order" information Robbie had previously compiled in relation to Defoe. It showed numbers of orders and their value, broken down by priority level, category, block,and whether or not they were included in the service charge (see attached).
It was agreed that this was useful, transparent information to provide to residents and could be valuable in identifying trends and future priorities and projects. The data showed, for example, how big an issue water penetration was proving to be. The information might also assist regular inspections and the identification of problems before they escalated. **Action- EO to produce this information throughout the Estate**

3 Revised KPIs

The EO's streamlined set of KPI's was welcomed. However, they focussed on efficiency. More needed to be done to measure satisfaction among residents. The KPIs also needed to be included in the revised SLA booklet and publicised in the monthly residents' bulletin. In the discussion that followed, it was agreed:
- to consider running a resident satisfaction survey once more;
- to re-introduce customer surveys after jobs were completed;
- "post-covid", for officers, e.g. House Officers, to be more visible throughout the Estate and reflect changed priorities, e.g., more frequent fire-safely balcony checks;
- to consider how to re-launch and communicate the KPIs.

(The EO pointed out that the new property maintenance system " Civica", currently being tested, has built-in questionnaires on quality of service).

Action -EO to report back on the above

4 The SLA Booklet

Although the contents of the booklet might ultimately be affected by future developments, e.g. Estate Office re-organisation, it was agreed that it would be useful to re-issue it as soon as possible. There had been attempts at revision in 2018 so a start had been made. To keep costs down it was agreed that the booklet should be launched on-line in the first instance.

Action -It was subsequently agreed that Nabeela, the EO's communication's officer, would take forward the booklet revision with Averil. The two held their first meeting on 23 February and are planning to meet again w.c. 7 March.

5 AoB

Michael would be retiring in two weeks. Resident members thanked him for all he had done for residents and wished him well in retirement. His successor would be announced in due course.

Next meeting 26 May
Members of Working Party
Averil Baldwin, Jane Smith, Juliet McNamara, Tony Swanson, Andrew Tong and Jim Durcan

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Minutes of the Asset Management Working Party

Monday, 4 April 2022: 5:30 - 6:15 pm by Zoom.

Officers:

Mike Saunders
Jason Hayes

Residents

Christopher Makin (Chair)
Tim Cox (took the minutes)
Henry Irwig
Tam Pollard
Randall Anderson
Matthew Dendy
Margarita Chiclana

Apologies:

Fiona Lean
Ted Reilly

1. Minutes / Matters Arising

The minutes of the meeting of 21 February 2022 were approved, with no corrections or additional items being raised.

2. Underfloor Heating Working Party

It was agreed at the previous meeting that the AMWP and the Underfloor Heating Working Party (UHWP) should work closely together on matters of common interest. The Chair reported that he and Ted Reilly had now joined the UHWP to ensure alignment.

Mary Durcan has resigned as Chair of the UHWP because of other commitments.

3. Savills Stock Condition Survey

It was reported at the last meeting that officers are creating components to load into the City's asset management system, Keystone, based on the Savills survey. This is a manual process because of the number of different kinds of component that could be recorded in a building.

Jason Hayes reported that this process is on target for completion by the end of May.

4. Window survey

Mike Saunders is awaiting a quote from a surveyor to assess the condition of top-floor windows around the estate.

Henry Irwig reported that, on a recent walk around the estate, he was struck by the different exposures of different facades to the weather. He suggested widening the scope of the survey, as discussed in December, to include sampling of windows in other exposed areas (e.g. at the back of Ben Jonson, where lower level windows are not protected by overhanging balconies).

The survey would also address: (i) The location of currently problematic or suspect elements; (ii) A description and classification of the various types of deterioration found; (iii) An analysis of the various root causes of each type of deterioration; (iv) An evaluation of alternative methods for repair and/or replacement; (v) An indication of the potential costs and benefits involved.

ACTION: Mike Saunders to add sampling of other windows to the survey.

5. Garchey

Ahead of the meeting, Mike Saunders had provided a report from a contractor, which formed the basis for discussion. The report concerned communications with Thames Water (**TW**).

The Garchey is a combined grey (kitchen waste) water and surface (rain) water system. Building Regulations Approved Document Part H5 requires any system for discharging rainwater to a sewer to be separate from the conveyance of foul water (which includes grey water). See: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/442889/BR_PDF_AD_H_2015.pdf. TW think any Garchey replacement would need to comply.

The balcony drainage connects to the Garchey stack at each level from roof downwards, so separating rainwater and grey water could potentially require redirecting these connections to a separate down service. The installation of separate drops is potentially very problematic in terms of feasibility, cost and disruption and this will need further consideration.

TW have also stated that they would consent to a surface-water connection to a public sewer only when it has been proven that a hierarchy of disposal methods (set out in the report) has been examined and proven to be impracticable. There should also be a preference for green over grey features, in line with a drainage hierarchy".

The report concluded by recommending that City of London engage a firm of Public Health Consulting Engineers to provide the expert advice required to move this forward to a conclusion.

Tim Cox and Randall Anderson queried TW's views. Mike Saunders confirmed that, under the existing arrangements, solid waste from the Garchey ends up in a tanker, but all the water passes straight through to the public sewer. The Garchey should no longer be used for much solid waste given the recycling arrangements for residents, and the amount of grey water should reduce if the Garchey is removed because there would no longer be a need to flush the bowls. Since rainwater already flows to the sewer via the Garchey, it is difficult to see why there should now be an examination of other disposal methods (most of which seem clearly impracticable).

In response to a question about interim cost savings, Mike said there were only 3 members of the Garchey staff, which was the minimum required (allowing for holidays, sickness, etc).

[TC Note: On a brief look, Building Regulations Approved Document Part H5 looks as if it "applies only to a system provided in connection with the direction of extension of the building".]

ACTION: Mike Saunders to revert to TW with our challenges.

6. Fire Signage

Jason Hayes confirmed that the application for listed building consent had been submitted.

In response to a question about the need for signs, Jason confirmed that signs were needed only if there was a risk of confusion about the exit route to take if there is a fire (including whether to go down or up). This meant that some blocks would need signs but possibly not all.

ACTION: Jason Hayes to confirm which blocks will require signs.

7. Fire Door Replacement Programme

Jason Hayes reported that the audit of doors was complete and there were more different types of door than first thought. Work was now starting on a brief for the design team and on identifying whether any types of door should be prioritised for risk reasons. Once designed, each type of door would need to be tested for fire resistance. There may be some scope for conforming doors to reduce the number of different types, but this is likely to be limited for listed building reasons.

ACTION: Jason to confirm number of different door sets, and potential number to be tested.

8. Redecorations

Jason Hayes reported that work is progressing around the estate (and Henry Irwig said that the work in Bryer seemed to be “good and thorough”.

Following the meeting, Jason provided the following report on the cost implications of the delay in starting work and exclusion of the door sets from the programme:

> The tender for the Barbican Estate Redecoration Programme 2020-25 closed at the end of October 2019. Post tender negotiations with the successful bidder (K&M McLoughlin) were opened shortly after with a 2% reduction in price secured as a Best & Final Offer in February 2020. Due to the unprecedented circumstances brought about by the global Covid-19 pandemic which took hold in March 2020, execution of the contract was suspended in order to minimise the risk of exposure to residents.
>
> During this period of suspension, the proposed redecoration of residential front doors was omitted from the contract sum as these were scheduled for short term replacement. This saw a reduction in the region of £60k to the contract sum. It is accepted that this reduction would not cover the full balance of the omittance of the front doors, however, during the extended period in which the contract was on hold the construction industry was experiencing cost inflation in advance of 5%. The redecorations contractor would have been well within its rights to request an uplift in line with the cost increases they were facing (as did many of the other contractors the City has been working with during this time).
>
> As a gesture of good will, K&M did not apply a general uplift but will have recovered a small portion of the cost increases against the reductions applied to the front door omittance. A 5% uplift on a £3,500,000 contract would equate to an additional £175k. Officers, in a Progress Report (June 2021), argued that the result negotiated was a good outcome for residents and recommended proceeding with the contract; this view was supported by the RCC and BRC. Contracts were formally exchanged with the contractor in November 2021.

9. Lifts

Jason Hayes reported that Gateways 1 to 4 had been written and would be presented to the next RCC meeting. These Gateways cover the steps from obtaining approval to start the project up to obtaining permission to proceed to tender the work.

Jason was asked about whether other lifts were likely to require work in the near future so that the tender could include them and benefit from economies of scale. This would be covered in the stock condition survey.

10. Roof Working Party

As recorded in previous minutes - *The outcome of the Savills survey would determine the need for, and constitution of this WP.*

11. Dates of Future Meetings

The next meeting is scheduled for 5:30 on Monday, 13 June with Ted to take the minutes.

Meeting (and minute takers) are also scheduled for:

1. 26 September, Fiona
2. 5 December, Henry

RCC June 2022 Underfloor Heating Working Party Report

Seasonal Load

The second seasonal load shift trial concluded satisfactorily at the end of April. Residents will be polled during the summer to determine if the scheme should be made permanent.

Major Interventions

The Woking Party has been working with the BA's Climate Change group on several initiatives with the City's Climate Action Group (CAG). We have been fortunate in persuading the CAG to commission and pay for an investigation into potential interventions.

So far, the City's consultants have quantified the thermal savings that might arise from these interventions. The next step is to determine the likely costs of implementing these interventions. This costing is ongoing; several of the City's contractors are providing these cost estimates. Using these two sets of data, we will be able to determine the cost effectiveness of these interventions. the areas under investigation are

- Insulation of soffits
- Insulation of barrel-vaulted roofs
- Modifying the air extraction processes in our flats
- Modifying air flows, particularly in staircase blocks
- Designing potential resident installed insulation
- The perennial investigation of individual controls

Communication with residents

An extensive article has been produced for the June edition of Barbican Life which examines these issues and the potential human factors, surrounding the implementation if these interventions. A discussion forum has been set up on the BA website and a town hall meeting will be jointly hosted by the RCC and the BA to determine a way forward.

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Committee(s): Residents' Consultation Committee - For Information Barbican Residential Committee – For Information	**Dated:** 06062022 17062022
Subject: Progress of Sales & Lettings	**Public**
Which outcomes in the City Corporation's Corporate Plan does this proposal aim to impact directly?	4
Does this proposal require extra revenue and/or capital spending?	**N**
If so, how much?	**£**
What is the source of Funding?	
Has this Funding Source been agreed with the Chamberlain's Department?	
Report of Andrew Carter Director of Community and Children's Services	**For Information**
Report author: Anne Mason Community and Children's Services	

Summary

This report, which is for information, is to advise members of the sales and lettings that have been approved by officers since your last meeting. Approval is under delegated authority and in accordance with Standing Orders. The report also provides information on surrenders of tenancies received and the number of flat sales to date.

Recommendation(s)

.
Members are asked to:

- Note the report.

Main Report

Background

1. The acceptance of surrenders of tenancies and the sale and letting of flats are dealt with under delegated authority.

Current Position

SURRENDERS/TERMINATIONS

2.

Case No	Type	Floor	Rent Per Annum	Tenancy commenced/ expired	Reason for Surrender	Date of Surrender
1	23	7	£25,550	Periodic	Moved to nursing home	05/04/22
2	52	01	£21,250	30/03/2020 29/03/2023	Moved to sheltered housing	10/02/22

RIGHT TO BUY SALES

3.

	06 May 2022	**01 December 2021**
Sales Completed	1080	1080
Total Market Value	£96,348,837.21	£96,348,837.21
Total Discount	£29,830,823.62	£29,830,823.62
NET PRICE	£66,518,013.59	£66,518,013.59

OPEN MARKET SALES

4.

	06 May 2021	**01 December 2021**
Sales Completed	867	867
Market Value	£164,784,271.97	£164,784,271.97

5. Fifteen exchanges of sold flats have taken place with the sum of £720,254 being paid to the City of London.

6. The freeholds of 14 flats in Wallside have been sold with the sum of £35,000 being paid to the City of London.

7. A 999 year lease has been completed with the sum of £43,200 being paid to the City of London.

APPROVED SALES

8.

CASE	Block	Floor	Type	Price	Remarks as at 06/05/2022
1	Ben Jonson House	1/2	M2B	£677,500	proceeding
2	Defoe House	1	20 (1 bed)	£870,000	proceeding
3	Andrewes House	4	20 (1 bed)	£850,000	proceeding

COMPLETED SALES

9. No sales have completed since the last report.

SALES PER BLOCK

10.

BLOCK	TOTAL NO. OF FLATS	TOTAL NO. SOLD	NET PRICE £	% NO. OF FLATS SOLD
ANDREWES HOUSE	192	186	18,238,760.00	96.88
BEN JONSON HOUSE	204	196	14,877,454.83	96.08
BRANDON MEWS	26	24	1,057,460.00	92.31
BRETON HOUSE	111	110	8,869,412.50	99.10
BRYER COURT	56	55	2,307,338.50	98.21
BUNYAN COURT	69	68	6,484,280.00	98.55
DEFOE HOUSE	178	173	17,414,782.50	97.19
FROBISHER CRESCENT	69	69		100.00
GILBERT HOUSE	88	87	11,046,452.50	98.86
JOHN TRUNDLE COURT	133	133	5,467,527.50	100.00
LAMBERT JONES MEWS	8	8	1,400,000.00	100.00
MOUNTJOY HOUSE	64	63	5,925,723.50	98.44
THE POSTERN/WALLSIDE	26	22	5,959,130.00	84.62
SEDDON HOUSE	76	75	8,445,677.50	98.68
SPEED HOUSE	114	109	13,589,848.50	95.61
THOMAS MORE HOUSE	166	163	14,483,455.00	98.19
WILLOUGHBY HOUSE	148	147	14,972,670.50	99.32
TERRACE BLOCK TOTAL	1728 (1728)	1688 (1688)	150,539,973.33 (150,539,973.33)	97.69 (97.69)
CROMWELL TOWER	112	103	27,005,801.00	91.96
LAUDERDALE TOWER	117	114	24,553,779.63	97.44
SHAKESPEARE TOWER	116	111	30,001,185.60	95.69
TOWER BLOCK TOTAL	345 (345)	328 (328)	81,560,766.23 (81,560,766.23)	95.07 (95.07)
ESTATE TOTAL	2073 (2073)	2016 (2016)	232,100,739.56 (232,100.739.56)	97.25 (97.25)

Key Data

Strategic implications –

Financial implications – Receipts from sales are credited to the City Fund.

Resource implications - None

Legal implications - None

Risk implications - None

Equalities implications – None

Climate implications - None

Security implications - None

Appendices

None

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Committee(s) Barbican Residential Committee	Date: 17062022
Subject: Barbican Arrears	**Public**
Which outcomes in the City Corporation's Corporate Plan does this proposal aim to impact directly?	**4**
Does this proposal require extra revenue and/or capital spending?	**N**
Report of: Andrew Carter Director of Community and Children's Services	**For Information**
Report author: Anne Mason	

Summary

This report, which is for information is to advise members of the current arrears in respect of tenants and leaseholders on the Barbican Estate.

Recommendation

Members are asked to note the report.

Main Report

Background

1. Leaseholders and tenants are billed quarterly in June, September, December and March. The charges raised include charges for car parking and baggage stores.

2. A further analysis of arrears cases is contained in Appendix 1 (Non-public).

Current Position

3. Leaseholders and freeholders

		No of free/ leaseholders		
Charges raised for period	£11,477,968		2016	
Target level of net arrears 1% Actual level of net arrears 0.58%				
Age Analysis of Debt:	Mar 22		Sept 21	
Value of debts				
3 - 6 months	£ 47,222.80	53	£45,376. 20	64
6 – 12 months	£ 30,437.10	28	£ 27,232.10	35
12 - 24 months	£ 25,547.05	9	£ 27,920.37	14
Over 24 months	£ 35,521.35	6	£ 39,022.95	4
Total arrears outstanding	**£138,728.30**		**£ 139,551.62**	
Action taken:				
Amounts subject to arrangement	£ 0.00	0	£ 0.00	0
Amounts referred to Comptroller for recovery action	£ 71,623.95	7	£ 71,496.36	7
Amounts awaiting write-off	£ 0.00	0	£ 0.00	0
Net debt outstanding	**£ 67,104.35**		**£ 68,055.26**	

There is a total of 63 leaseholders in arrears.

Of the amounts owing for over 12 months (£61,068.40) £51,286.82 is included in the amounts referred to C&CS, the remaining £9,781.58 relates to 4 cases.

The net debt outstanding comprises 56 accounts.

4. Tenants

		No of tenants		
Charges raised for period	£1,565,422	57		
Target level of net arrears 1%				
Actual level of net arrears 0.00%				
	Mar 21		Sept 21	
Age Analysis of Debt:				
Value of debts				
3 - 6 months	£ 5,684.42	2	£ 6,263.66	3
6 - 12 months	£ 10,986.93	1	£ 13,436.58	3
12 - 24 months	£ 25,535.57	1	£25,135.57	1
debts over 24 months	£ 21,785.44	1	£ 9,410.44	1
Total arrears outstanding	**£ 63,992.36**		**£ 58,551.01**	
Action taken:				
Amounts subject to arrangement	£ 224.42	1	£ 1,380.44	1
Amounts referred to Comptroller for recovery action	£ 63,767.94	1	£ 52,847.94	1
Net debt outstanding	**£ 0.00**		**£ 17.87**	

There are 2 tenants in arrears.

5. Former tenants' arrears

		No of former tenants		
Charges raised for period to	N/A		2	
Target: as flats are surrendered infrequently the target is that action on arrears must be dealt with within 3 months				
	Sept 21		Jun 21	
Age Analysis of Debt:				
Value of debts 3 - 6 months	£ 0.00	0	£ 1,026.51	2
Value of debts 6 - 12 months	£ 1,017.51	1	£ 2,607.55	1
Value of debts 12 - 24 months	£ 0.00	0	£ 0.00	0

Debts over 24 months	£12,697.75	1	£12,697.75	1
Total arrears outstanding	**£16,331.81**		**£16,331.81**	
Action taken:				
Amounts subject to arrangement	£ 0.00		£ 0.00	
Amounts referred to Comptroller for recovery action/in dispute	£12,697.75		£12,697.75	
Awaiting write off	£ 0.00		£ 0.00	
Net debt outstanding	**£ 1,017.51**		**£ 1,017.51**	

There are 2 cases in total.

Appendices

- Appendix 1 – Arrears Update (Non-Public)

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