DELTA
FIRE
ENGINEERING

Darwin Court, Gloucester Avenue, London, NW1 7BQ
Planning Gateway 1 Fire Statement

This document provides the required information for Planning Gate 1 Fire Statement for the proposed additional level for Darwin Court Development in Camden, London

FE20097_Darwin Court_PGO_01
30th April 2024

1.0 Site Address

Table 1 Site Address

Site Address	
Site address line	Darwin Court Gloucester Avenue Camden
County	London
Site postcode (optional)	NW1 7BQ

2.0 Description of Proposed Development

The description of the development as stated on the application for permission form is:

'Construction of a single-storey roof extension to the properties comprising Darwin Court to provide residential units and improvements to the existing entrances to the building'.

Darwin Court is a group of residential apartment blocks located on Gloucester Avenue, Camden, London, completed in 1973 by Ronald Salmon & Partners architectural practice.

The proposal seeks to add an additional residential floor to Darwin Court apartment blocks. The existing development consists of a total of 105 apartments, which are predominantly two-bedroom flats.

There are three buildings within the development. The first linked block contains apartments 1-25 (six storeys) and 26-45 (five storeys). The second linked block contains apartments 46 65 (five storeys) and 66-89 (six storeys). The last building contains apartments 90-105 within a four-storey building. Note, no access is provided between each of the blocks.

As part of a proposed extension project an additional storey will be constructed at existing roof level across each of the blocks. For Blocks A and E, a single 3-bedroom open-plan apartment is proposed. For Blocks B, C and D two 2-bedroom apartments are proposed.

There are significant deviations present within each of the blocks. As part of the works, the proposal aims to provide significant enhancements over the existing conditions present within the building.

3.0 Qualifications & Experience of the Author

Table 2: Qualifications

Qualifications	
Name	Joel Koyithara
Academic Qualifications	BEng (Hons)

Joel has over 5 years of experience in Fire Engineering and is currently a Senior Fire Engineer. Joel is currently doing an MEng degree in Fire Engineering at the University of Central Lancashire. Joel has keen interest in researching the tenability conditions within common corridors in code-compliant design. For his undergraduate dissertation, his research was evaluating the conditions exposed to occupants within the common corridor in a code-compliant design. Multiple scenarios were evaluated, e.g. how increasing the

shaft to determine whether or not this will impact the occupants exposure conditions. The results have been also compared against engineering guidance documents such as PD7974 and SCA Guidance.

During his career, he has worked on a wide range of projects including residential (student, private and PRS), commercial, industrial, office, educational and more in the UK.

Table 3: Qualifications

Qualifications	
Name	Joe Hart
Academic Qualifications	BSc (Hons) MSc
Professional Qualifications	Member of the Institution of Fire Engineers Member of the Society of Fire Protection Engineering Member of the International Association for Fire Safety Science Associate Member of the Energy Institute Affiliate Member of the Royal Institute of British Architects
Role	Reviewer

Joe is the Group Director and founder of the Delta Innovation Group and Head of Fire Engineering at Delta Fire Engineering Ltd. Joe has extensive knowledge in Fire Engineering with over 10 years commercial experience and is also Head of R&D at Delta Research and Development. Alongside his role at Delta, Joe is Lecturer in Fire Engineering at the University of Central Lancashire where he teaches fire engineering at both undergraduate and postgraduate levels.

4.0 Consultation

No Building Control / Fire Service consultation is understood to have taken place on issues relating to the fire safety. Consultations with all relevant Authorities Having Jurisdiction (AHJs) will be undertaken at later stages as the design progresses.

The fire safety design of the development will be primarily based on guidance within BS 9991: 2015 Fire safety in the design, management and use of residential buildings – Code of practice for residential areas. Where the design deviates from the guidance contained within the British Standards, this will be assessed using fire engineering principles following the general methodology of PD 7974.

5.0 Site layout plan with block numbering as per building schedule referred to in 6.

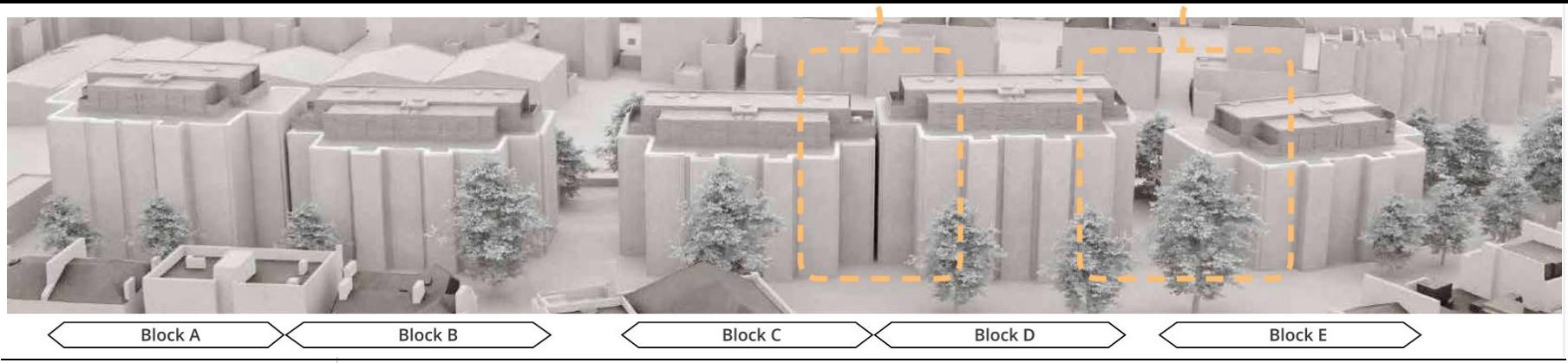

Figure 1: Site Plan - Proposed Block A and Block B

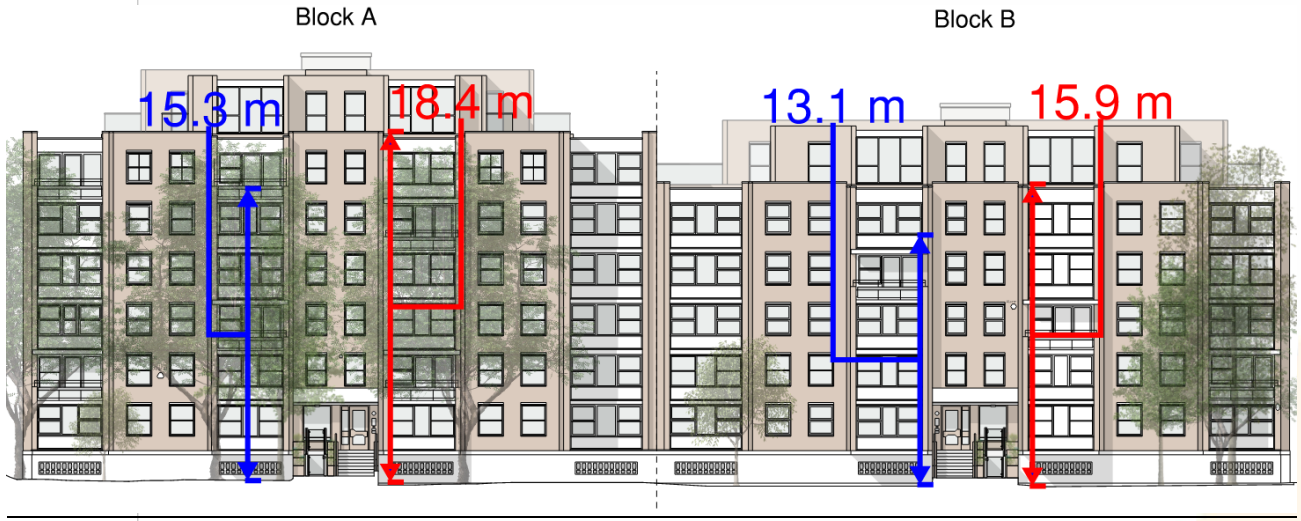

Figure 2: Block A and B- Existing and Proposed Heights

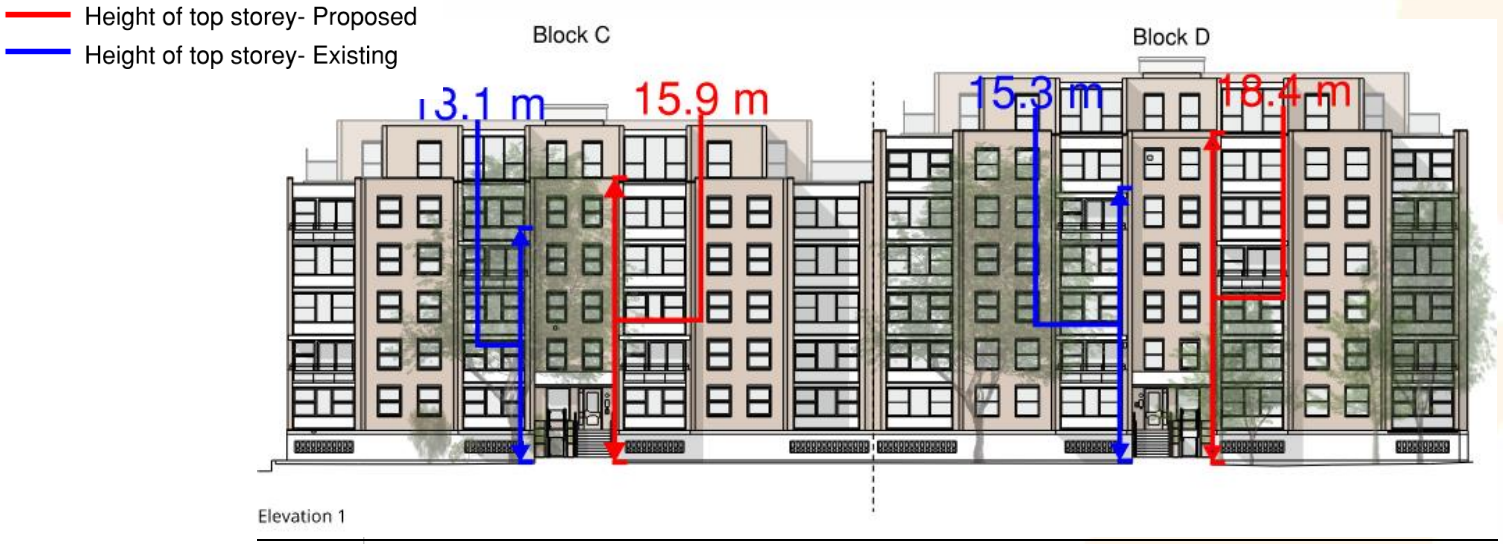

Figure 3: Block C and D- Existing and Proposed Heights

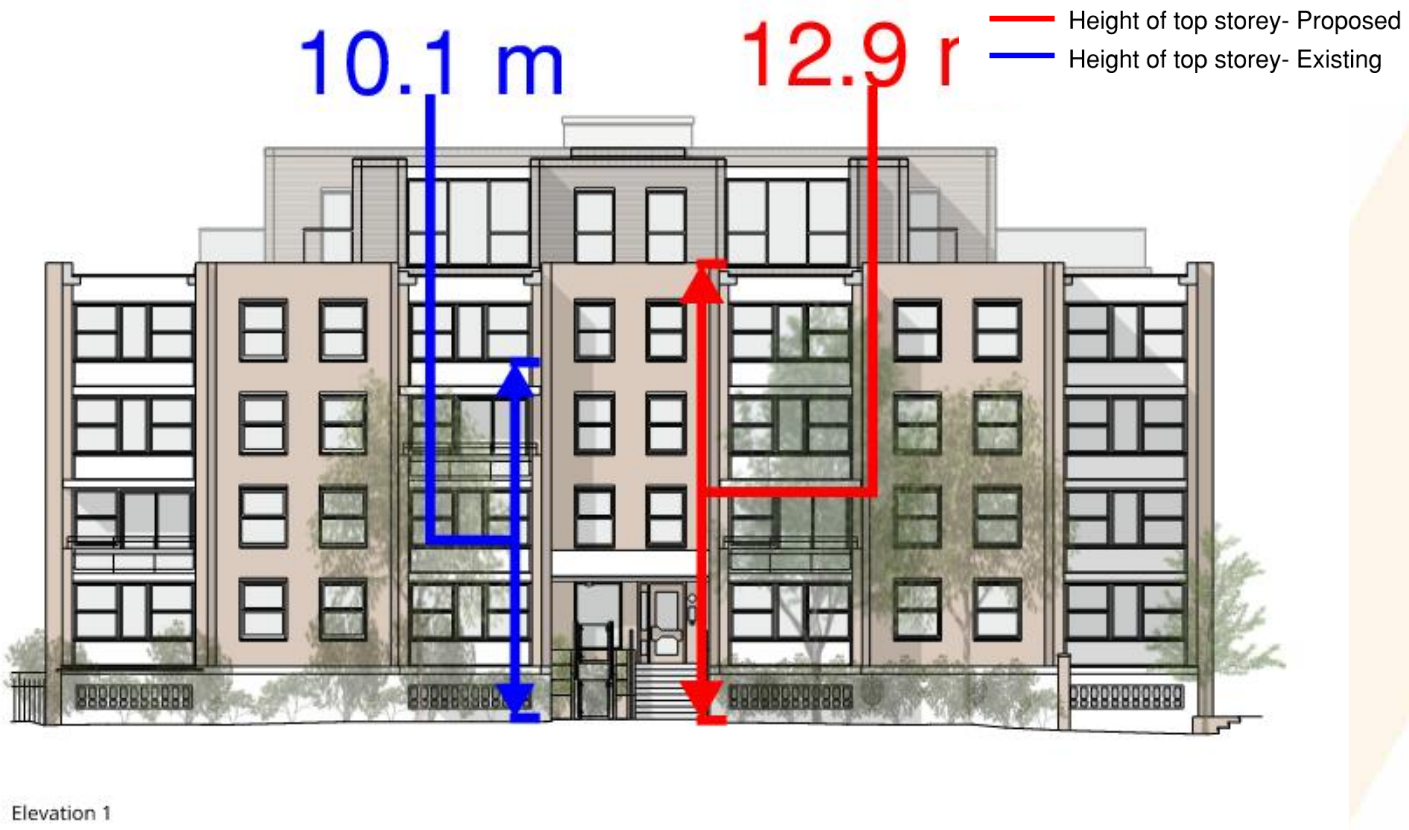

Figure 4: Block C and D - Existing and Proposed Heights

6.0 The principles, concepts and approach relating to fire safety that have been applied to the development

Site information				Building information			Resident safety information		
a) Core no. as per site layout plan above	**b) block height (m), number of storeys excluding those below ground level, number of storeys including those below ground level**	**c) proposed use (one per line)**	**d) location of use within block by storey**	**e) standards relating to fire safety/ approach applied**	**f) balconies**	**g) external wall systems**	**h) approach to evacuation**	**i) automatic suppression+**	**j) accessible housing provided**
Blocks A & D	**Existing:** Height: 15.3m Lower Ground, Ground Floor + 5. Upper Floors **Proposed** Proposed Height: 18.4m Lower Ground, Ground Floor + 6 Upper Floors	residential flats, maisonettes, studios	Levels 01-11	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, partial	M4(2) where practically possible
		Ancillary Accommodation- Car Park	Lower Ground	Approved document B vol 2 – Non-Residential Areas			Simultaneous-Non-Residential Areas		
Block B & C	Height: 12.6 m Ground Floor + 4 No. Upper Floors	residential flats, maisonettes, studios	Ground-04	BS9991	class A2-s1, d0 or better*	class A2-s1, d0 or better*	stay put	yes- residential sprinklers, partial	M4(2) where practically possible
		Ancillary Accommodation- Car Park	Lower Ground	Approved document B vol 2 – Non-Residential Areas			Simultaneous-Non-Residential Areas		
Block E	Height: 34.7m Ground Floor + 11 No. Upper Floors	residential flats, maisonettes, studios	Levels 01-11	BS9991	class A2-s1, d0 or better*	class A2-s1, d0 or better*	stay put	yes- residential sprinklers, partial	M4(2) where practically possible
		Ancillary Accommodation- Car Park	Lower Ground	Approved document B vol 2 – Non-Residential Areas			Simultaneous-Non-Residential Areas		

+ contemporary guidance sprinklers should be provided throughout the building. It is proposed to provide sprinklers throughout all new floor levels, however it is understood no sprinkler provision is in place on existing floors, including the car park. It is not proposed to extend coverage to existing floor levels, however this non-compliance will require early engagement with the approval authorities.

*** For Block B, C and E, although these buildings are not treated as relevant buildings, the overall building height is greater than 11m, as such the construction of the new levels for external walls and specified attachments should achieve a rating of Class A2-s1, d0. Profiled or flat steel sheet at least 0.5mm thick with an organic coating of no more than 0.2mm thickness is also acceptable.**

7.0 Specific Technical Complexities

Mechanical Ventilation

In accordance with BS 9991, for common escape routes in single stair buildings with a floor level more than 11m above ground, every flat should be separated from the common stair by a protected lobby or common protected corridor. As per Figure 6 of BS 9991, ventilation should be provided to the common corridor/ventilated lift lobby.

During the site visit, it was noted that there are no smoke control measures provided within the common corridors of the existing buildings, with the unventilated common corridor opening directly into the stair within each of the blocks.

Although the building is existing, as part of the works to significantly improve B1 - Means of Warning and Escape, it is proposed that additional doors will be provided on the existing levels, which will in turn create a designated lift lobby similar to that of Figure 6a of BS9991. Note, the lift lobby will also be provided with mechanical ventilation. The area indicated in blue in the figure below indicates the ventilated area. The area shaded in red indicates the indicative location of the mechanical ventilation system.

Figure 5 -Typical Level- Common Corridors- Existing

Figure 6 -Typical Level- Existing Common Corridors-Proposed

Note, the installation of mechanical sytem to the existing building will include a number of significant technical complexities. Neverthless, it should be noted that this represents a significant improvement to the existing condition, and satisfies the recommendations outlined in BS 9991.

On the topmost levels/proposed levels of all the blocks, the common corridors and the lift lobbies will be ventilated via a new 1.5m^2 AOV to the roof.

It is proposed that the AOV at the head is to be 1.5m^2 rather than the minimum recommendation of 1.0m^2. This is 50% over the recommendation stated within the latest guidance and will provide significant enhacement to the stair.

Figure 7 -Block A Ventilated Lobbies

Figure 8 -Block E Ventilated Lobbies

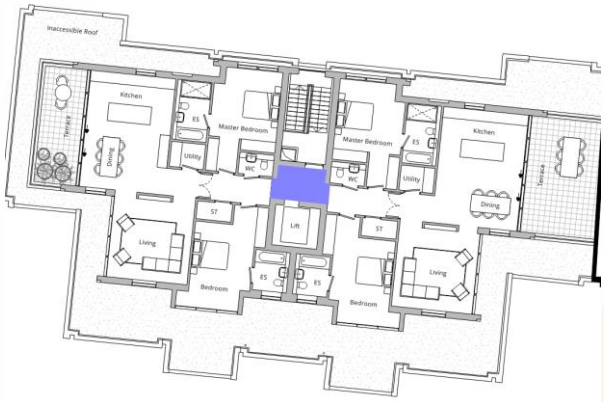

Figure 9 -Block B, C and D Ventilated Lobby

External Wall Details

The addition of the proposed level on the topmost level would mean that the Blocks A and D will have an overall height greater than 18 m. Therefore, these blocks will need to meet the criteria for a 'relevant building' as defined by Regulation 7(4) of the Building Regulations, which requires all materials used in the external wall to achieve class A1 or A2 s1, d0 standard. For Blocks B, C and E, although these buildings are not treated as relevant buildings, the overall building height is greater than 11m, as such the construction for external walls and specified attachments should achieve a rating of Class A2-s1, d0.

It is recommended that any new sections of external wall are designed to achieve a minimum class A2-s1-d0 and this will become a legal requirement for any Relevant Buildings in the development. It should be noted that remediation may be required to relevant buildings where combustible elements are provided in the existing external walls. As per Approved Document B Volume 1:2022 amendments, this includes any insulation product, filler material (such as the core materials of metal composite panels, sandwich panels and window spandrel panels but not including gaskets, sealants and similar). This restriction does not apply to masonry cavity wall construction which complies with Diagram 8.2 of ADB:2019 including 2020 and 2022 amendments. The construction is understood to be two leaves of brick or concrete each at least 75 mm thickness.

The existing external walls are predominantly constructed from traditional brick and masonry. However, it is noted that there are vertical sections of panels, as seen below. It is unclear what these panels are constructed from and the fire performance of these panels, and some remediation may be required where combustible components are identified within Relevant Buildings (i.e. those over 18m).

Figure 10 Continuous Vertical Panels

Under current guidance, the external surface of all residential buildings with a building height of greater than 11 m will need to achieve Class A2-s1, d0 or better. It is unclear what performance the spandrel panels would achieve, however a review of the external wall materials will be required as the design progresses.

Compartmentation

For blocks A and D, the height measured from the ground to the top occupied floor is greater than 18m but less than 30m, as such the elements of structure of these blocks shall achieve 90-minutes fire resistance in terms of load bearing capacity when classified in accordance with BS EN 13501-2 for load-bearing elements of structure.

For blocks B, C and E, the height measured from the ground to the top occupied floor is greater than less than 18m, as such the elements of structure of these blocks shall achieve 60 minutes fire resistance in terms of load bearing capacity when classified in accordance with BS EN 13501-2 for load-bearing elements of structure.

Where one element of structure supports, carries or give stability to another, the fire resistance of the supporting element should be no less than the minimum period of fire resistance for the other element (whether that element is loadbearing or not).

In addition, the compartmentation within the protected stair should be improved within the existing building and extended to serve the proposed floor. The stair in Blocks A and D will to be designed as with 120-minutes fire resisting construction. It is also recommended that a compartmentation survey along with a fire door survey is carried out.

Installation of Evacuation Lifts

The building is currently provided with lifts, however, as part of the works, it is recommended that these are upgraded to evacuation lifts. This will have significant technical complexities when works are carried out, neverthless, due to the significant advantages and to make the building safer for means of escape of any occupants, it is proposed that evacuation lifts are provided.

8.0 Issues which might affect the fire safety of the development

Sprinklers

None of the existing buildings are understood to be provided with sprinklers. Blocks A to D are greater than 11m, as such would require sprinkler provision to comply strictly in accordance with the latest recommendations (Approved Document B: Volume 1 2019-incorporating 2022 amendments). However, these buildings were built in c.1970s.

For Blocks A and D as the height of top storey, when measured from upper floor surface of top floor to ground level on lowest side, will be greater than 18m a Category 4 sprinkler system should be installed in accordance with BS 9251:2021.

For Blocks B, C and E, as the height of top storey measured from upper floor surface of top floor to ground level on lowest side these buildings will be greater than 11m but less than 18m, so a Category 2 sprinkler system should be installed in accordance with BS 9251:2021.

It is noted that under contemporary guidance sprinklers should be provided throughout the building. It is proposed to provide sprinklers throughout all new floor levels, however it is understood no sprinkler provision is in place on existing floors, including the car park. It is not proposed to extend coverage to existing floor levels, however this non-compliance will require early engagement with the approval authorities.

Number of Common Stairs

As per Clause 37c of BS 9991, ancillary accommodation should not connect with any part of the only escape route from one or more dwelling(s) on the same storey as the ancillary accommodation. Although multiple exits have been provided in the apartments which are on the same storey as the ancillary accommodation on Block B, it is noted that in Core A2, the apartments are currently not provided with an alternative means of escape. It is proposed either of the following should be provided:

As per Paragraphs 3.30 of Amendments to the Approved Documents (March Amendments), Flats should be served by more than one common stair if either of the following applies:

a) The flat is on a storey that does not meet the criteria for a single escape route or a small single stair building (see paragraphs 3.27 and 3.32).
b) The building has a top storey of 18m or more in height (see Diagram D6 in Appendix D of Approved Document B).

Although this is a deviation from the latest reccommendations, it should be noted that due to the existing nature of the building, additional staircores cannot be provided. Note, due to the layout of existing levels external stairs are not deemed feasible. Nevertheless, for the addition of one/or two apartments (depending on the blocks), the addition of dry risers, mechanical smoke ventilation system, automatic smoke detection system within common corridors/car parks and evacuation alert systems for Block A and D provide significant enhancments to what is provided.

In the existing layouts, the stair-core discharges back into the unventilated common corridor on ground floor level. Although egress from the common corridor to the external is provided, apartments open directly into the final exit route, thus, no protected exit route is provided from within the building for all blocks. As part of the work, design changes will ensure that occupants can evacuate directly to the external, i.e. stair discharge directly to the external rather than back into common corridor.

Proposed Evacuation Lift

As per Paragraphs 3.29 of Amendments to the Approved Documents (March Amendments 2024), Where evacuation lifts are provided, these should be located within an evacuation shaft containing a protected stairway, evacuation lift and evacuation lift lobby. An evacuation lift lobby should provide a refuge area for those waiting for the evacuation lift, have direct access to a protected stairway and not be directly accessible from any flat, maisonette, storage room or electrical equipment room.

However, an engineered solution with only one lobby is be proposed on the proposed level of Block B, C and D. This is based on the following:

- As this is the topmost levels, it is also proposed that occupants can take refuge within the stair without impacting the occupant flow rate within the stair. Note, the stair will be provided with 1.5 m^2 AOV to roof rather than the 1.0m^2 AOV at the head of the stair, this will provide a higher level of ventilation and protection to the stair, i.e. significantly benefit tenability conditions.
- Only two apartments will be accessed from the corridor, therefore, the expected occupancy within this level will be low.
- Although the apartments are treated as open-plan apartments with the provision of Category LD1 Grade D1 alarm coverage in accordance with BS 5839-6 and sprinkler system in accordance with BS 9251, a 30-minute protected entrance hallway will be provided to act as a secondary lobby/provide some fire resistance between the area of fire origin (high risk area e.g. kitchen) and the lift.
- Fire size will be controlled due to the provision of sprinklers, and as such the likelihood of flashover is significantly reduced.

For Blocks A and E, a single 3-bedroom open-plan apartment is proposed. The lifts and stair wll be accessed via ventilated lobby. The area shaded in blue in Figure 7 and Figure 8 indicate the ventilated common corridor. Although this design is un-common, as the lift is not accessed from the stair-core on this level, this is considered acceptable for means of escape purposes due the the following reason:

- The design is similar to Figure 6b of BS9991:2015, whereby the same level of protection is provided to Figure 6b of BS9991. I.e. the lift will sperated form the apartment via a common ventilated lift lobby. The stair will be separated from the apartment via a ventilated common corridor.
- The stair will be provided with 1.5m^2 AOV to roof rather than the 1.0m^2 AOV at the head of the stair, this will provide better ventilation and protection to the stair.
- There is only one apartment on this level. Therefore, any disabled occupants can evacuate using either lift or take refuge within the stair without impacting the occupant flow rate within the stair.

The proposed provides significant enhancements to what is currently being provided within the building. Currently, no evacuation lifts nor ventilation to the stairs are provided,

in the proposals, alterations to the existing floors will be provided such tha a ventilated evacuation lift lobby will be provided along with evacuation lift. In the proposed levels due to the significantly low number of apartments one or two apartment per block, an engineered solution via enhanced ventilation will be afforded. CFD analysis to be conducted.

9.0 Local development document policies relating to fire safety

A London Plan Fire Statement will also be applicable to the scheme. A London Plan Fire Statement will be submitted alongside with this report.

10.0 Fire Service Site Plan

The blocks are existing, and the access to each of the blocks is via Gloucester Avenue. There are no fire mains within any of the blocks even though the hose laying distance is greater than 45m to the furthest point from the fire appliance setting down point. Therefore, it is proposed that all blocks should be provided with a new dry riser main.

Dry fire main inlets should be provided on the facade, close to the entrance to the building and visible from the road with outlets provided at all levels (across new and existing floors including the basement). Access should be provided for a pumping appliance to within 18m of each fire main inlet connection point, with inlets located on the face of the building.Indicative locations of the dry riser inlets and outlets have been illustrated in Figure 13 that satisfy both the maximum distance from the fire appliance to the inlet (18m).

The dry risers should be designed and installed in accordance with BS 9990 and the inlets will be on the face of the building in clear view of the Fire Service on arrival.

The height from the top storey to the access level (ground floor) is less than 18m for all of the blocks, as such no firefighting shafts will be provided/needed within the development. However, Delta Fire Engineering acknowledges that the height is very close to the threshold. As this is an existing buiding, there are no space due to constraints of existing design, as such there are no space for secondary lift, as such fire-fighting lift can not be provided. Nevertheless, as an enhancement to the building, the stair and lift shaft within Blocks A and D should achieve 120 minutes fire resistance. This is a significant enhancement from the existing. For these block an evacuation alert system in accordance with BS 8629 is also reccommended.

The above reccomendation is a signifanct enhancements to currently what is being provided.

The following is summarised: -

- There will be a dry riser inlet and outlets provided at each floor for all of the cores, inlcuding the lower level car park.
- The hose laying distance from any dry riser outlet on the upper floors will be within the reccomendation of guidance documents (previously it was not)
- Evacuation Lifts will be provided to all cores.
- Enhanced AOV's at the head of the stair, 50% over what is recommended
- Evacuation Alert System for Blocks A and D
- 120 minutes fire resistance stair and lift shaft for Blocks A and D, due to the height.

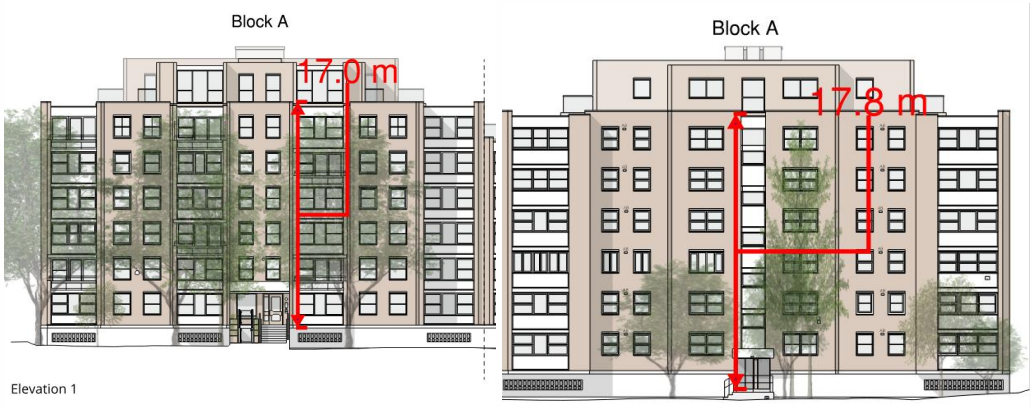

Figure 11 Fire Service Access Height- Blocks A and D

11.0 Emergency Road Vehicle Access

The site is accessed via Gloucester Avenue. Gloucester Avenue is an existing public highways and no works will be carried out to these roads by the proposed scheme. The proposed road accessed from Vigar Way will need to be dimensioned in accordance with BS 9999:2017, to provide sufficient access for fire and rescue service vehicles. Currently it is noted that sufficient widths have been provided in the proposed road providing access to both of these residential blocks, c.5.5m. These provisions are illustrated on the Fire Service site plan- see Figure 12.

As per the BS9999, Turning facilities should be provided in any dead-end access route that is more than 20 m long. It is currently noted that there are no dead-end conditions present..

Is the emergency vehicle tracking route within the site to the siting points for appliances clear and unobstructed?

- **Yes**

12.0 Siting of Fire Appliances

The distance from the parking position of a fire appliance to a dry riser inlet will not exceed 18m. The approximate distance is measured to be 9m. See indicative location of the fire appliance in Figure 13.

13.0 Suitability of water supply for the scale of development proposed

Nature of Water Supply:
Hydrant -Private

Water supplies for firefighting purposes will be provided by either local fire hydrants or/and private hydrants, provided such that they will be within 90m to all dry riser inlets to all buildings in the development. Location of hydrants have not yet been finalised at this stage of the design.

Does the proposed development rely on existing hydrants and if so are they currently usable / operable? Don't Know- As the development is existing, it is expected that the hydrant is in working condition, nevertheless, this will need to be checked and confirmed.

14.0 Fire Service site plan

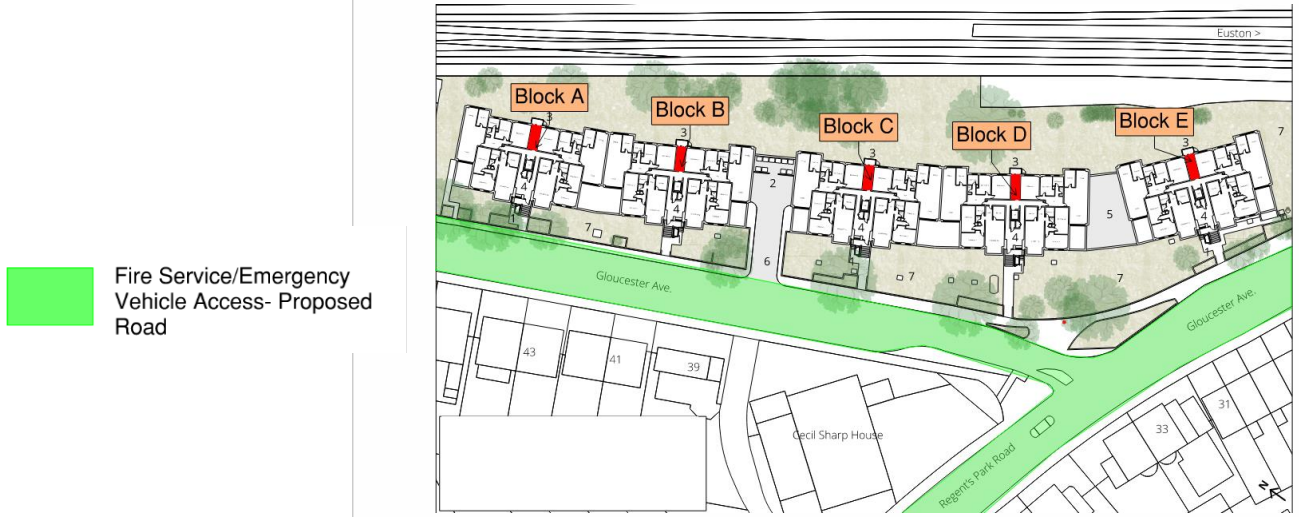

Figure 12: Fire Service Access Route

Figure 13: Indicative Locations of Inlets and Fire Service Appliance

15.0 Signature

Written By	Verified By
	
Joel Koyithara BEng (Hons) Senior Fire Engineer Delta Fire Engineering Ltd	**Joe Hart** BSc (Hons) MSc MIET MIFireE MSFPE AMEI Group Director, Head of Fire Engineering Delta Fire Engineering Ltd