HOARE LEA

Guild Living Epsom.
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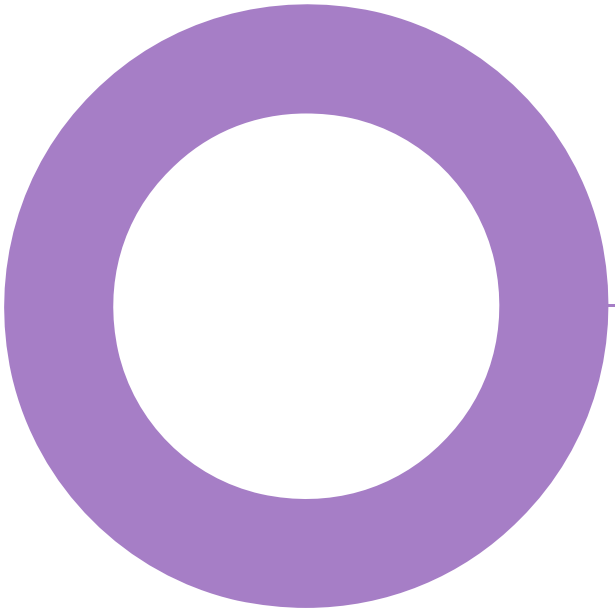
FIRE ENGINEERING
STAGE 2 REPORT
FOR PLANNING
REVISION 01 – 05 FEBRUARY 2021



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	2021-01-15	First issue	CR	BR	MH
01	2021-02-05	Updates to Building A heights	CR	BR	MH

Project number: 19/20260
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Contents.

1. Introduction.

The purpose of this report is to provide a summary of the fire strategy for planning submission. This report should be read in conjunction with the architectural plans produced by Marchese Partners.

Where not explicitly described within this report, it is assumed that, in all other respects, the building will be designed to comply with the relevant sections in BS 9991:2015 [1], BS 9999:2017 [2] and Firecode HTM 05-02 2015 [3], or the supporting British Standards referenced therein, such as BR 187:2014 [4]. The report will outline the current guidance and proposed strategy for the development.

The principles within the report are subject to, and approval by, the Statutory Authorities, however this report in not suitable for Building Regulations submission. The Approved Inspector (Bureau Veritas) have provisionally confirmed that they are in agreement with the overall approach of the strategy, and Surrey Fire and Rescue Service have reviewed the car stacker strategy.

1.1 Development description

The Guild Living development in Epsom consists of two buildings, each of which are split into sections of different heights, as shown in Figure 1. The development will provide a variety of living accommodation for people with different and changing needs. Independent residential living will be provided as well as supported living and 24-hour care facilities. There will be on site ancillary accommodation including swimming pool, restaurant and lounge, as well as commercial units such as childcare and retail.

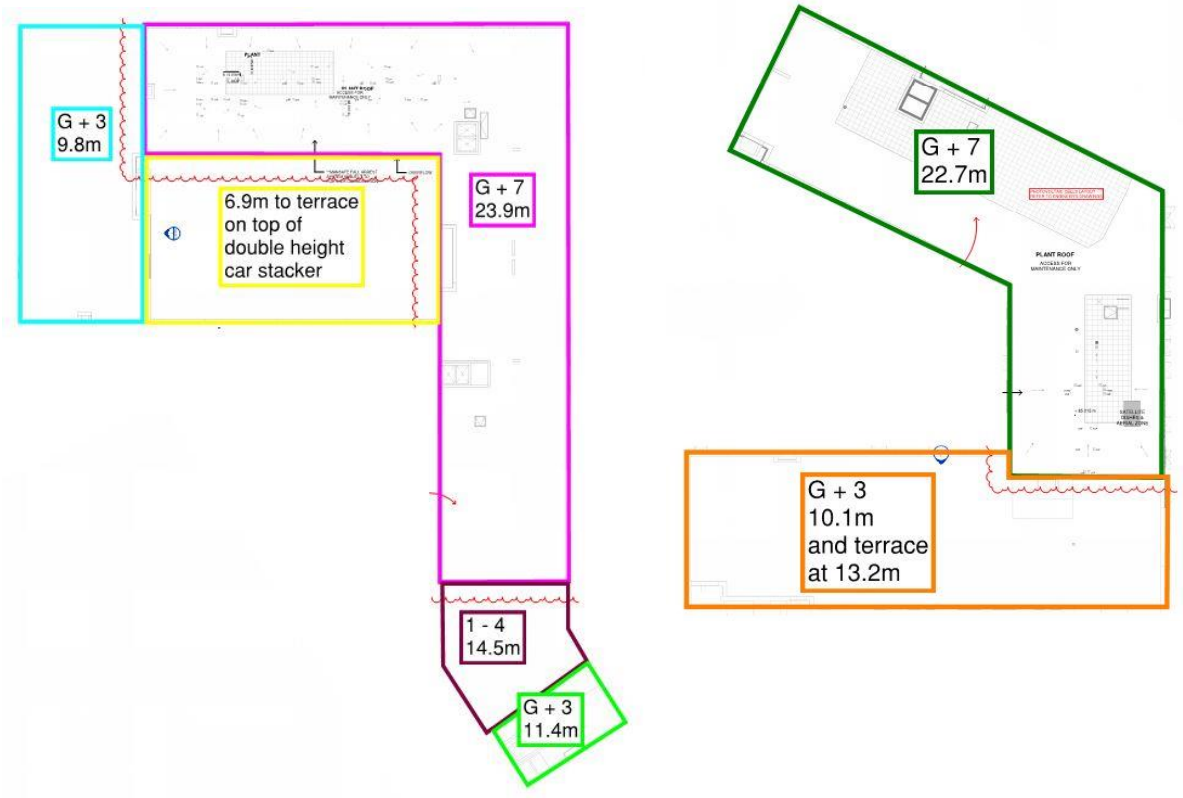

Figure 1: Building Heights from fire service access level to top occupied floor level or terrace where applicable.

1.2 Types of uses

1.2.1 Residential

The Epsom development provides the following residential accommodation types:

- Guild Living Residences (GLR) - independent living.
- Guild Care Residences (GCR) – independent living with support and care services.
- Guild Care Suites (GCS) – dependent occupants in care.
- Key worker Apartments – independent living as per GLR.

1.2.1.1 Guild Living Residences (GLR) and Key worker (KW) apartments

The GLRs will be long-term or adapted homes for residents who are capable of independent living and evacuation. When residents in GLR are no longer capable of independent living and evacuation, they will move to another residency type within the Guild Living facility where they can be supported.

The keyworker apartments are apartments for staff of the Guild Living development or the local hospital and are for residents who are independent of the rest of the development.

GLRs and KW apartments will be designed in accordance with the guidance in BS 9991:2015.

1.2.1.2 Guild Care Residences (GCR)

The GCRs will provide specialised housing for people who require support and care services. This may include sheltered / assisted living / extra-care facilities where residents are living independently with managed on-site care and support services, for example meals, domestic help, assisted bathing, occasional nurse visits.

It cannot be assumed that occupants are capable of independent escape, therefore the fire strategy has been developed on the basis of assisted evacuation with notification given to an on-site warden on activation of any fire alarm.

In the Epsom development the GCRs have access to the care suites (GCS), therefore they will follow the design for the GCSs.

1.2.1.3 Guild Care Suites (GCS)

The care suites will house occupants who are dependent and require 24 hour nursing care and attendance.

The occupants cannot be assumed to be capable of independent evacuation, therefore the fire strategy has been developed on the basis of assisted progressive horizontal evacuation.

The fire strategy for the GCSs is be based on the guidance in HTM 05-02, and with fire engineered solutions as allowed in HTM 05-02 paragraphs 1.20 and 1.21. The guidance for occupants with mental health disabilities (such as dementia) will not be followed as the GCS are not a mental health facility.

1.2.2 Ancillary accommodation

The ancillary accommodation is on the Ground and First floor levels and is split between both buildings. It is understood that all residents will have access to the ancillary accommodation on the site. The ancillary accommodation will be designed in accordance with BS 9991:2015 and BS 9999:2017.

1.2.3 Commercial units

The commercial units will be treated independently of the rest of the development and will be designed in accordance with BS 9999:2017. Table 1 outlines the risk profiles adopted for each unit type.

Table 1: Commercial risk profiles.

Unit type	Occupancy type	Fire Growth Rate	Sprinklers?	Risk Profile
Childcare	Awake and unfamiliar (B)	Medium (2)	Yes	B1
Café / Retail	Awake and unfamiliar (B)	Fast (3)	Yes	B2

1.3 Legal and General Requirements.

The Legal & General Real Assets 'Materials Selection and Specification Guidance' shall be applied in addition to the standards described herein. The Materials Selection and Specification Guidance document sets down particular requirements covering (but not limited to) the following topics:

- Building envelope design
- Level of detail required for fire strategies and design specifications (to prevent contractor substitution of products)
- Sprinkler protection
- Sprinkler pipework materials

The document states that "*Fire engineering to facilitate the use of hazardous or substandard materials or to reduce the installation of firefighting equipment, fire compartmentation, fire resistance or fire controls is not permitted*"; however, some fire engineered solutions are proposed in the Epsom development. We consider that in all cases the functional requirements of the Building Regulations are being met.

2. B1 – Means of warning and escape.

2.1 Guild Living Residences and Key Worker Apartments.

- It is proposed to adopt a 'stay put' evacuation strategy for the GLR and KW apartments. That is, only the occupants of the apartment of fire origin will evacuate on activation of the fire detection and alarm system. The occupants of other apartments will usually be relatively safe to remain in place, protected by a high level of compartmentation, unless they choose to escape or are instructed otherwise by the fire and rescue service.
- The apartment layout will be one of three types:
  - Studio apartment (KW apartment only)
  - Open plan apartment with maximum dimensions of 16m x 12m if the kitchen is enclosed, and 8m x 4m if kitchen is open. Where the kitchen is open the cooker should be sited at least 1.8m remotely from the escape route. A Computational Fluid Dynamics (CFD) assessment will be undertaken where apartments exceed this size.
  - Apartments with an entrance hall. The entrance hall is not required to be protected.
- Open plan apartments are suitable for people who can escape independently and within a typical timeframe. If a resident's condition changes such that they require accessible features within an apartment and can no longer be expected to escape unaided within the timeframe that an able-bodied person would be expected to escape, then it is the expectation that the resident will either be relocated to an apartment which has an entrance hall, or the open-plan unit in which they reside will be adapted to include an entrance hall.
- The maximum travel distance from any point in the apartment to the apartment entrance door should not exceed 20m.
- A grade D LD1 fire detection and alarm system will be provided in each apartment in accordance with BS 5839-6:2013 [8]. The system will be independent and linked to an onsite warden (available 24 hours a day).
- The common corridors of the GLR and keyworker apartments have a mixture of single direction and alternative direction escape. The guidance of Figure 7 in BS 9991 will be followed for travel distance limits, and a combination of automatic opening vents (AOVs) and mechanical smoke extract shafts will be used to ventilate the corridors.
- Where the single direction travel distance in the corridor exceeds the 15m limit, a CFD analysis will be undertaken to show that the design meets the functional requirements of the Building Regulations.
- The common corridors will be provided with a Category L5 automatic detection system in accordance with BS 5839-1:2017 [9]. This system has the sole purpose of operating the smoke ventilation system in that corridor where the detector is activated.
- The final exit from the stairs should be treated as an extension of the stairs and lead directly to the outside or via a protected passageway to the outside. Where the final exit is via a protected passageway it should

be provided with the same protection of the stair and so residential apartments or ancillary accommodation should not directly access this passageway .The final exit should be at least as wide as the stairs and provided with the same standard of fire protection (i.e. fire resistance and lobby protection).
- The stairs will be provided with a 1.0m^2 free area AOV at their head.
- No disabled refuges or lifts for evacuation are proposed for the KW and GLR apartments, except where these lifts continue from the second floor of building A where they are provided for the GCR and GCS.

2.2 Guild Care Residences and Guild Care Suites

- Evacuation of GCS and GCR occupants will be on a progressive horizontal basis as recommended in HTM 05-02. However, as the Guild Living developments are designed in a linear way full compliance with the HTM 05-02 guidance is not practicable, i.e. not all compartments have horizontal access to two adjacent compartments. A fire engineered solution has been developed in the Guild Living Brand Standard which has been followed in the Epsom development:
  - The GCS and GCR are located on a single level (second floor) in the Epsom scheme and are separated from other accommodation on that level. The GCSs and GCRs is separated into seven compartments (minimum three required). The largest compartment has an area of approximately 490m^2 (maximum size allowed is 500m^2) and has ten bedrooms (maximum allowed is 20 bedrooms). Each compartment is able to hold all of the occupants of the two largest compartments including any equipment necessary; this is an enhancement on the HTM 05-02 guidance.
  - Upon activation of the fire detection system in a compartment, occupants of that compartment will be assisted to move horizontally to an adjacent compartment which is considered to be a place of relative safety. Where occupants are in a remote-end compartment and the horizontal escape route is blocked by fire, all occupants in the remote-end compartment will move to a ventilated lobby which contains sufficient refuges for the number of beds in the remote-end compartment. The ventilated lobby has access to a stair and a lift suitable for evacuation with a secondary power supply.
  - Occupants on the sensory garden terrace will be moved to one of three compartments in the event of a fire anywhere in the GCS and GCR areas. Intelligent signage could be used to establish which compartments are safe to enter; however, as the evacuation is assisted, the staff will be able to direct occupants to a safe compartment.
- The GGS bedrooms are considered as assisted living apartments and therefore travel distances within the apartments should be limited to 9m. The bedrooms are not provided with any cooking facilities.
- The GGR apartments are also considered as assisted living apartments and therefore travel distances within the apartments should be limited to 9m. The GCR apartment layout is a studio therefore the bedrooms are not inner rooms. The cooker and hob will be located a minimum of 1.8m away from the escape route in the apartment.
- The maximum single direction travel distance from a bedroom door to either a point of choice of escape routes or to a core in a remote-end compartment will be no more than 15m. The overall travel distance will be no more than 60m to an escape core in a remote-end compartment. On the external sensory garden, the maximum travel distance will be no more than 45m.
- The GCS and GCR will be provided with a Category L1 automatic detection and alarm throughout the area in accordance with BS 5839-1. The system will be linked to an on-site warden (available 24 hours a day). A voice alarm may be incorporated as an enhancement.
  - Upon activation of the detection system anywhere in the GCS and GCR the kitchen goods will shut off.
  - Upon activation of the local detection system in the stair lobby, the smoke extract systems in each stair lobby will operate.
- As per the Brand Standard, the minimum width of corridors recommended in HTM 05-02 will not be applied since normal movement of occupants is expected to be on foot or in wheelchairs rather than bed movement, as would be typical in hospitals. Instead, the escape route width guidance in BS 9999 will be applied which is 1200mm where there are wheelchair users.
- In the GCSs, the corridors are used as amenity areas. Management will ensure escape routes are available at all times, and that furniture complies with HTM 05-03 Operational provisions Part C.

- The kitchens in the GCS areas will either be in a separate compartment with no bedrooms accessing the compartment or the kitchen will be enclosed from the rest of the accommodation in the same compartment.
- Two cores will be provided for escape from the GCSs and GCRs; one in each remote-end compartment. Each core will be provided with a 1200mm wide stair and a lift suitable for evacuation of people on foot or in wheelchairs.
    - The lift and the stair both open into a smoke ventilated lobby and the stairs are each provided with a 1.0m^2 AOV at the head.
    - The stair is not designed for mattress evacuation on the basis that all occupants will be assisted to escape either on foot or in wheelchairs. The lift will be provided with a secondary power supply.

2.3 Ancillary accommodation

- The ancillary accommodation including residential amenity areas, plant rooms/roofs and the car stacker will operate a simultaneous evacuation strategy, with each building treated separately. The shared terrace in Building B will simultaneously evacuate upon activation of the alarm in any amenity area or apartment in Building B.
- A Category L1 automatic detection and alarm in accordance with BS 5839-1 will be provided in all ancillary and plant areas including the car stacker. Manual call points will also be provided on at all storey exits from residential amenity areas.
    - The detection system in the car stacker will operate the mechanical smoke ventilation system in the car stacker.
    - Where sliding doors are provided on the ground floor, these should power open upon activation of the detection system in the ancillary areas.
- Travel distances in ancillary areas will be limited in accordance with table 14 of BS 9991. On the accessible terrace of building B, the single direction travel distance in open air is limited to 45m.
- The ancillary accommodation on the upper floors of building A will use the residential stairs to evacuate as the accommodation is for resident and maintenance use only. Access is provided to the two lifts suitable for evacuation therefore no other refuges are provided. The stair accessing the terrace in building B will be provided with a refuge on this level.
- The exact design of the car stacker bays will be developed to accommodate the necessary number of cars, the means of escape routes, the smoke ventilation system and the sprinkler system.

2.4 Commercial units

- The commercial units will each adopt a separate simultaneous evacuation strategy which will also be separate from the amenity areas.
- The fire alarm and detection specification for each commercial unit will depend on the fit-out requirements of the tenant, typically automatic fire detection is provided. It is recommended that a minimum of a Category L3 fire alarm system is provided to each commercial unit in accordance with BS 5839-1.
- The commercial units are on the ground floors with step free exits directly to the outside. The maximum travel distances are limited as follows. Where the layout is unknown, 2/3 of the following distances should be taken as the maximum:
    - B1 (Childcare) : 24m single direction / 60m with alternative
    - B2 (Cafe / Retail) : 20m single direction / 50m with alternative
- Childcare facilities should be situated adjacent to an external wall on the floor of discharge and should not have fewer than two exits.

3. B2 – Internal fire spread (linings)

Refer to Section 4 of HTM 05-02 for the GCS and GCR and Section 20 of BS 9991 for all other areas for further information on the below:

Table 2: Limitations for internal linings in GCS and GCR areas.

Location	European Class [Note 1]
Small rooms of area not more than $4m^2$	C-s3, d2
Other rooms	B-s3, d2
Circulation spaces	

Table 3: Limitations for internal linings in all areas except GCS and GCR.

Location	European Class [Note 1]
Small rooms of area not more than $4m^2$ in residential buildings and $30m^2$ in a non-residential building/compartment	D-s3, d2
Other rooms	C-s3, d2
Circulation spaces within dwellings	
Other circulation spaces including the common areas in blocks of flats	B-s3, d2

Note 1: Where a classification includes "s3, d2" this means that there is no limit set for smoke production and/or flaming droplets/particles.

Note 2: The Approved Document defines a "room" as "an enclosed space within a building that is not used solely as a circulation space". The term includes not only conventional rooms, but also cupboards that are not fittings and large spaces such as warehouses and auditoria. The term does not include voids such as ducts, ceiling voids and roof spaces.

4. B3 – Internal fire spread (structure)

4.1 Fire resistance

- In accordance with BS 9991, the structural fire resistance required for all buildings is REI 60 minutes due to the buildings being between 18m and 30m in height and sprinklers being provided throughout.
- Compartment floors at all levels with fire resistance equivalent to the elements of structure (60 minutes).
- Any shafts and risers that pass through the compartment floors are to be enclosed in equivalent levels of fire resistance (60 minutes) with E 30 S_a doors. Smoke shafts to have doors equivalent to the walls (E 60). This includes escape stairs which are not firefighting shafts.
- Firefighting shafts will be enclosed in REI 120 minutes fire resistance with E 60 S_a stair doors. Walls between elements of firefighting shaft to be REI 60 minutes with E 30 S_a (E 30 lift door).
- KW and GLR apartments are to be enclosed in 60 minutes fire resistance with E 30 S_a entrance doors.
- Cross corridor doors in KW and GLR floors are to be E 30 S_a.
- GCS compartments are to be enclosed in REI 30 with E 30 S_a doors.
- GCS bedrooms do not require to be enclosed in fire resistance.
- GCS corridors will be enclosed in REI 30 minutes with E 30 S_a doors.
- Fire hazard rooms in the GCS/GCR floor will be enclosed with REI 30 walls and E 30 S_a doors. These rooms include but are not limited to: cleaners' rooms, kitchens, linen stores, laundry, disposal rooms, staff rooms and stores.
- The double height space above the reception area should be enclosed in fire resisting construction equivalent to the elements of structure (REI 60 minutes).

- Ancillary accommodation will be enclosed in fire resisting construction depending on the risk of contents as shown in Table 15 of BS 9991.
- The car stacker will be separated from the rest of the building with REI 120 minutes with E 120 S_a doors.
- The sprinkler tank room, any room containing life safety equipment and any substation enclosure will be enclosed in at least REI 120 minutes with E 120 S_a doors.
- Compartment floors and walls will be provided between commercial units, and between commercial units and residential accommodation. These will achieve fire resistance equal to the elements of structure (REI 60 minutes).
- Within the units, any storage rooms, kitchens and changing rooms are to be enclosed in REI 30 minutes with E 30 S_a doors.

4.2 Fire stopping, cavity barriers service ducts, pipes and shafts

- Fire stopping will be provided to all penetrations through compartment walls, floors, ducts, pipes, cabling etc. The fire resistance rating will meet the period of fire resistance of the construction it passes through.
  - Refer to Section 21 of BS 9991 and Section 32 of BS 9999.
  - For the GCS and GCR areas, the guidance of Section 5 of HTM 05-02 should be followed where it is more onerous than BS 9991.
- Cavity barriers in residential accommodation will be provided in accordance with BS 9991 Section 19.1.
- Cavity barriers in the non-residential demise will be provided to sub-divide any cavity, including any roof space, so that the distance between the cavity barriers does not exceed the dimensions outlined Section 33 of BS 9999.

4.3 Sprinklers

- Residential sprinklers (to BS 9251:2014 [5]) will be included in all KW and GLR apartments and in residential ancillary accommodation.
- Commercial sprinklers (to BS EN 12845:2015 [6]) will be included in the GCS and GCR floor (to OH1 hazard classification) as well as in the commercial units (to OH3 hazard classification).
- BS 9991 recommends that "car stacker should be protected with an appropriately designed sprinkler system, to ensure that water reaches every vehicle and to contain fire spread".
  - The New Zealand Standard for protection of a car stacker system will be followed which is slightly higher than the UK norm.
  - This is nominally an Ordinary Hazard Group 3 sprinkler system at soffit level, consisting of 18 sprinkler heads, plus 8 sprinkler heads within the car stacker.
  - A water supply duration of 90 minutes will be provided to increase the time available for the fire brigade to assess the risk and fully extinguish the fire.
  - It is recommended that the car stacking system be arranged in blocks limited to 150 m^2, separated by a minimum of 2.4 m clear space between adjacent blocks or separated by non-combustible 2 hour fire rated walls. This will align the stack areas to the protection requirements and limitations for storage configurations stated in Table 2 of BS EN 12845, and the approximate design area of the OH roof sprinkler system.
  - Refer to the MEP report for further information on the sprinkler system.

4.4 Refuse stores

- Under the BS 9991 guidance, refuse stores should be sited and constructed in accordance with BS 5906. They should be separated from other parts of the building with 60 minute fire resisting construction. The stores should be approached either directly from the open air or by way of a protected dedicated lobby provided with not less than 0.2m^2 of permanent ventilation, or a suitable mechanical alternative. Access to escape routes should not be sited adjacent to escape routes or final exits, or near to windows.

5. B4 – External fire spread

5.1 External wall build-up

- Both buildings are over 18m in height and are considered to be "relevant buildings" and therefore Regulation 7 of the Building Regulations 2010 (As amended) requires the entire building, including any non-residential areas to meet the following: the external wall construction, and specified attachments including balconies, solar shading or solar panels, should achieve European Classification A2-s1, d0 or Class A1. This does not apply to the following:
  - cavity trays when used between two leaves of masonry;
  - any part of a roof (other than any part of a roof which falls within paragraph (iv) of Regulation 2(6)) if that part is connected to an external wall;
  - door frames and doors;
  - electrical installations;
  - insulation and water proofing materials used below ground level;
  - intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
  - membranes;
  - seals, gaskets, fixings, sealants and backer rods;
  - thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or
  - window frames and glass.
- Additional guidance on the application of this Regulation is provided in Section 10 of Approved Document B (2019), including guidance on membranes, window spandrel/infill panels, thermal breaks and shop signage. It is recognised that the recent changes to the Building Regulations are not reflected in the guidance of BS 9991 (2015) & BS 9999 (2017). On this basis, the guidance within Approved Document B should be referred to which accounts for the aforementioned changes.
- Green walls are considered to be part of the external wall and are therefore not acceptable. Planters on balconies which are built into the balcony do come under the regulation; however, those which are removable and are therefore more akin to furnishings would not.
  - Climbing plants could be reasonable with a management strategy to control the growth and spread of the plant. Non-combustible materials, planters and substrate should be used where attached to an external wall.
- The accessible terraces are considered as roofs; however, as they are accessible, they also perform the function of a floor. Planting and combustible contents such as benches and pergolas are therefore acceptable on the terraces.

5.2 Space separation analysis

- The risk of external fire spread throughout the development will be assessed using the *Enclosing Rectangle* (ER) method outlined in the BRE report No.187 [20]. Although the GCS level is at a height less than 12m, BR 187 will also be followed for the GCS floor due to the overall height of the building.
- Boundary distances will be taken to the midpoint between buildings or to the site boundary. The actual site boundary will be used, except when the building is adjacent to a road between two buildings, where a relevant site boundary located in the middle of the street will be used rather than the site boundary.
- The largest compartment has been assessed on each façade with the position that all other compartments should follow the results of this worst-case scenario. The external fire spread calculations have been carried out based on the following assumptions detailed within BR187:
  - The radiation intensity at each unprotected area is assumed to be 84 kW/m^2 for the residential apartments and ancillary accommodation (except the car stacker).
  - The radiation intensity at each unprotected area is assumed to be 168 kW/m^2 for the commercial units and the car stacker.

- In accordance with BS 9999 guidance in Appendix B2 *"If an atrium building is sprinklered, the area of fire involvement is likely to be reduced to such an extent that the potential for fire spread to adjacent buildings can be regarded as being comparable to that of an equivalent non-atrium building that is compartmented at each level and protected by a sprinkler system."* Both the double height space in the GCS reception and the car stacker are similar to an atrium due to the levels being linked, and can therefore be considered in the same way as a non-atrium building that is compartmented at each level and protected by sprinklers. On this basis, the car stacker and the double height space will be treated as a single storey for external fire spread calculations.
- Where façades face each other but there is an angle of more than 80° each wall can be treated with a separate relevant boundary.
- The inclusion of sprinklers allows the unprotected area to be doubled for the same boundary distance, and thus decreases the amount of façade (and associated structure) requiring to be fire resisting.
- Where protection is required to the façade this will achieve RE 60 and REI 15 for fire exposure from inside the building. This also applies to the structure supporting the façade.
- The unprotected areas should be spread evenly across the façade to avoid hot spots.
- In addition to the space separation analysis:
  - Any areas of the façades which are less than 1m from the relevant boundary should provide fire resistance equivalent to the elements of structure (60 minutes) in terms of integrity and insultation from each side separately. The external wall can have only small, unprotected areas of no more than $1m^2$ as outlined in Figure 45 of BS 9999.
  - Any wall within 1.8m of an external escape route should be provided with 30 minutes fire resistance from inside the building (integrity only);
  - Where a protected stairway projects beyond, is recessed from or in any ways forms an internal angle of not more than 135° to the adjoining external wall of the building, then the distance between any unprotected area in the external enclosures to the building and any unprotected area in the enclosure to the stairway should be at least 1800mm, as per Figure 15 of BS 9999.
  - The firefighting shaft should be protected from external fire as per Figure 23 of BS 9999.

6. B5 – Access and facilities for the Fire Service

6.1 Vehicle access

- Vehicle access will be provided for the fire service around much of the site to within either 18m of a dry riser inlet or 45m to the furthest point in a ground floor room.
- There is a dead end longer than 20m in the North of the site and a fire engineered solution will be proposed for access to the cores on this façade.
- Typical fire tender specifications from BS 9999 Table 20 have been used:

Appliance type	Min. width of road between kerbs (m)	Min. width of gateways (m)	Min. turning circle between kerbs (m)	Min. turning circle between walls (m)	Min. clearance height (m)	Min. carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5

6.2 Firefighting facilities

- Parts of building A are over 18m in height and therefore two firefighting shafts are provided as the area is more than 900m2. A single firefighting shaft is provided to the part of building B over 18m.
- The firefighting shafts will consist of:
  - Firefighting stair (minimum 1100mm wide) with AOV at head;
  - Firefighting lift (with water protection to lift shaft);
  - Rising fire main (dry riser); and
  - Smoke ventilated lobby (common corridor or separate lobby on HTM floor).
- No services not pertaining to the firefighting shaft should pass through or be accessed from the firefighting shaft, including on the stair discharge route on ground floor level, but not including the common corridor on upper levels. Fire engineered solutions are proposed as follows:
  - It has been agreed that water services will be accessed from the ground floor lobby of core B1.
  - A 120 minute fire resisting ceiling will be provided to the stair discharge route of core A3 to separate the services in the ceiling void from the firefighting shaft. No access will be provided to the ceiling void.
- All escape stairs will be provided with a dry riser with an outlet in the stair on every level. Rising mains are designed in accordance with BS 9990:2015 [22].
- The hose laying distances to the furthest areas are within 45m of a dry riser.
- The commercial units and ground floor ancillary areas will be accessed directly from the fire service vehicles.
- The hose laying distances to the furthest areas are within 45m of the vehicle access.
- Where the building is being erected more than 100m from an existing fire-hydrant, additional hydrants will be provided within 90m of the dry fire main inlets.
- Staff are available on site 24/7 who will greet the fire service upon arrival and provide the fire service with a pack of information including: a set of simple fire plans, a copy of the fire strategy and any relevant information such as operating instructions for firefighting lifts.

6.3 Car stacker smoke ventilation

- The car stacker system will be provided with a mechanical smoke ventilation system designed in accordance with BS 7346-7 [7] and having the objective of clearing smoke during a fire and/or after a fire has been suppressed. The system will achieve 10ACH.

7. Conclusion.

The scheme will generally comply with the guidance of BS 9991:2015, BS 9999:2017 and HTM 05-02; however, some areas highlighted in this report may require a fire engineering solution or require to be developed further.

This document is a fire safety summary produced to assist the design team with the planning application from a fire safety point of view and is not a fire strategy suitable for Building Regulations submission.

8. References.

[1] British Standards Institution (BSI), *BS 9991 : Fire safety in the design, management and use of residential buildings - Code of practice*. BSI Global, 2015.
[2] *BS 9999 : Fire Safety in the Design, Management and use of Buildings - Code of Practice*. British Standards Institution, 2017.
[3] Department of Health, *Health Technical Memorandum HTM 05-02 : Firecode - Guidance in support of functional provisions (Fire safety in the design of healthcare premises)*. 2015.
[4] R. Chitty, *BR 187 : External fire spread: building separation and boundary distances*, 2nd ed. Bracknell: IHS BRE, 2014.
[5] British Standards Institution (BSI), *BS 9251 : Sprinkler systems for residential and domestic occupancies. Code of practice*. BSI Global, 2014.
[6] British Standards Institution (BSI), *BS EN 12845 : Fixed firefighting system - Automatic sprinkler systems - Design, installation and maintenance*. BSI Global, 2015.
[7] British Standards Institution (BSI), *BS 7346 - 7 : Code of practice on functional recommendations and calculation methods for smoke and heat control systems for covered car parks*. BSI Global, 2013.

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