STAGE 3
FIRE STRATEGY

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PROJECT:

THOMAS' LONDON DAY SCHOOL
QUEEN'S ROAD
RICHMOND UPON THAMES
TW10

CLIENT:

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Contents

1. Introduction

1.1. Purpose of Report

Hilson Moran has been appointed to provide fire strategy advice for multiple blocks located within Thomas' London Day School located in Richmond upon Thames, London.

The purpose of this report is to provide a stage 3 fire strategy for Thomas' London Day School. The blocks within the Thomas' London Day School are being proposed to be refurbished. The blocks include the Main building, the Library building, Longley House and Red House. This report highlights the recommendations for the proposals within the Thomas' London Day School considering that the existing structure while remain and the changes are proposed within the existing structure. While it will be ensured that the existing conditions are not made less satisfactory upgrades will be carried out where possible to enhance the building's fire safety.

This fire strategy report is produced as part of the stage 3 submission and therefore contains outstanding elements within the design that affect the overall fire strategy. It should be noted that further discussion and amendments will take place as the design progresses to the next stage. The updates will be captured as part of the next design stage.

1.2. Legislative Requirements

Fire safety of building works is legislated by the Building Regulations 2010 (including amendments up to 2019) "the Regulations". The Regulations have been enacted under the Building Act 1984 and are published by the Controller of HMSO. The Regulations impose requirements on people carrying out building work. The requirements are functional rather than prescriptive in nature which means that the designer is given the freedom to choose the method they use to satisfy the legislation.

This strategy has been developed to address the requirements of Part B of the Regulations that governs fire safety of building design. These requirements are segregated into distinct aspects of building design as follows:

- B1 – Means of warning and escape;
- B2 – Internal fire spread (linings);
- B3 – Internal fire spread (structure);
- B4 – External fire spread; and
- B5 – Access and facilities for the fire and rescue service.

All aspects of the fire safety design remain subject to review by the building control body (including their statutory consultation with the local fire and rescue service), and, ultimately, formal approval by the building control body.

The final fire strategy report will form part of the information pack handed over to the building operators under Regulation 38 to assist the responsible person to operate and maintain the building with reasonable safety in accordance with the Regulatory Reform (Fire Safety) Order 2005 "FSO". Further information regarding the FSO is provided in the fire safety management section of this report.

1.3. British Standard BS 9999:2017 and BS 9991:2015

BS 9999:2017 the Code of Practice for fire safety in the design, management and use of buildings has been used as the principal fire guidance to develop the fire strategy for Thomas' London Day School. This code of practice offers the advantage that it allows a more rational approach to fire safety by setting the means of escape capacities based on a risk profile of the building, rather than simply applying a generic assessment for all building types.

For sleeping accommodation within Main building, BS 9991:2015 the Code of practise for fire safety in the design, management and use of residential buildings is used. This code of practice provides guidance on the fire safety of the residential accommodations.

1.4. Regulatory Reform Order (Fire Safety) 2005

The Fire Precautions Act, Fire Precautions (Workplace) Regulations and other selected fire safety legislation have been repealed and replaced by the Regulatory Reform (Fire Safety) Order (FSO) implemented in April 2006.

The Building Regulations continue to apply to new buildings and extensions but virtually all buildings (except dwellings) are also subject to the FSO when they are occupied. It is a requirement of the legislation that the responsible person (owner/occupier) carries out a fire risk assessment, and where more than 5 people are employed, this assessment should be written and available for inspection by the fire authority if requested.

1.5. Report Disclaimer

This report has been prepared for the sole use, benefit, and information of Bidwells for this property only. Hilson Moran liability in regard to the information contained within this report does not extend to any third party, unless specifically agreed in writing by Hilson Moran.

This report has been prepared based on the information available to Hilson Moran at the time of its preparation. The report is applicable to the named building only. It remains valid only in its original form, any modifications made to the report are invalid unless agreed in writing by Hilson Moran.

This report is based on the drawing information provided to us by IID Architects.

Fire resistance periods stated in this report are those required by the Building Regulations as interpreted by the guidance given in BS 9999. No assessment is made regarding the ability of the structural frame, the fire walls, the floors slabs or the fire doors to meet this requirement.

Unless stated otherwise this report outlines the fire safety requirements necessary to meet life safety criteria as required under Part B of the Building Regulations, 2010. Property protection requirements are not addressed within this report.

1.6. Basis of Report

This stage 3 fire strategy report has been created using the guidance provided in BS 9999:2017. The use of this standard (as opposed to BB 100) in this existing school building has been discussed and agreed upon with the building control.

Where not specifically stated, fire safety provisions should be specified and installed according to the current edition of relevant published guidance, BS 9999:2017, in this instance.

The strategy has not been developed to address property protection. However, the features that are included for life safety, as required by the Building Regulations, will contribute in some extent to business and property protection.

This report is based on the drawings provided by IID Architects for Stage 3 as shown in Table 1-1.

Drawing Title	Drawing Number	Rev	Received Date
Fire Strategy – Lower ground floor Main Building	1714 IID XX XX DR A-0121	NA	30/11/2023
Fire Strategy - Ground Floor Main Building	1714 IID XX XX DR A-0122	NA	30/11/2023
Fire Strategy - First Floor Main Building	1714 IID XX XX DR A-0122	NA	30/11/2023
Fire Strategy - Second Floor Main Building	1714 IID XX XX DR A-0122	NA	30/11/2023
Fire Strategy - Third and Fourth Floor Main Building	1714 IID XX XX DR A-0122	NA	30/11/2023
Fire Strategy – Library Plans	1714 IID XX XX DR A-0122	NA	30/11/2023
Fire Strategy – Other Building Plans	1714 IID XX XX DR A-0122	NA	30/11/2023

Table 1-1: Drawing List

A consultation has been conducted with both the building control and design team regarding the aforementioned floor plans on 08/12/2023. Additionally, reference should be made to the comments provided on the drawings dated 12 December 2023 following discussion with the Building Control discussion

2. Building Description

There are four blocks where the proposed modifications are being proposed in the Thomas' London Day School campus. They are the Main building, the library building, Longley House and Red House.

The current use and proposed use of these blocks are listed in the table below.

Current use	Proposed use
Main Building – Lower ground	
TV room and Common room	Music Tech Classroom and Music Classroom
Gym	Dance
Biological Science lab	Gym
Physical Science lab	Changing rooms
Science prep room	Staff Changing and PE Office
Main Building – Ground floor	
Kitchen	Kitchen
Offices	Offices
Lecture rooms	Hybrid Dining rooms
Dining room	Dining rooms
Café	Café
Lecture room	Drama
Unnamed rooms	Offices
IT room	Classroom
Unnamed rooms	Classrooms
Main Building – First floor	
Resident life staff	Office
Unnamed rooms	Classroom
Art department	Dept. Room
Hogarth room	Classroom
Unnamed rooms	Classrooms
Nurse room	Office
Bedrooms	Classrooms
Upper dining room	Void
Void	Staff room
Bedrooms	Classrooms
Main Building Second floor	
Bedrooms	Classrooms
Main Building Third floor	
Bedrooms	Bedrooms
Main Building Fourth floor	
Bedrooms	Bedrooms

Current use	Proposed use
Library Building – Basement	
Gas Meter	Gas Meter
Boiler room	Boiler room
Switch room	Switch room
Server room	Unnamed room + Server room
Water storage	Water storage
Toilets	Toilets
Lecture room	Assembly Hall
Library Building – Ground floor	
Offices	Exam/Study Hall
Workroom	
Offices	
Unnamed open space	
Library Building – First floor	
Group Study	Classroom
Open space	Classrooms
Library Building – Second floor	
Office	Science prep
Classrooms	Science labs & Science Classrooms
Library Building – Third floor	
Offices	Office, Scient prep room, Science labs
Longley House – Ground floor only	
Art Studio	DT Studio
Unnamed rooms	Store
Bedrooms	Graphics and fabrication classroom
Red house – Basement	
Cellar	Plant
Red house – Ground floor	
Unnamed rooms	Sixth form common room, Head of sixth form
Red house – First floor	
Unnamed rooms	Sixth-form study rooms
Red house – Second floor	
Unnamed rooms	Sixth-form study rooms

Table 2-1: Current and proposed use

Thomas' Day School, an established educational institution, is proposed to be refurbished. While the majority of the spaces are undergoing cosmetic enhancements, certain areas will witness alterations in functionality. Notably, a section of the first floor and the entire second floor in the main building are proposed to be refurbished from bedrooms to classrooms. This proposed modification not only changes the function of the floors but also improves the overall safety conditions by eliminating the existing sleeping risk on levels 01 and 02.

In the Library building, a major refurbishment is proposed to eliminate the existing open stair, thereby removing the atrium condition within the structure. The proposed modification aims to provide access to two existing stairs via common corridors within the building. Within the basement, the Lecture room is proposed to be upgraded, transforming into an assembly hall for campus students. Additionally, the ground floor offices and workroom areas will be refurbished to serve as a spacious exam/study hall. The usage of level 01 is intended to remain consistent with its existing purpose. Levels 02 and 03 will see the introduction of a science prep room and science labs, replacing the previous utilization as classrooms and offices. According to the design team, simultaneous use of the assembly hall in the basement and the exam/study hall on the ground floor is anticipated, with the upper levels expected to remain unoccupied. This arrangement enhances escape conditions when both of these spaces are fully occupied.

The overall usage of Longley House and Red House is set to remain unchanged.

Figure 2-1 shows the site locations of each block that is proposed to be refurbished. The below image is taken from the google maps.

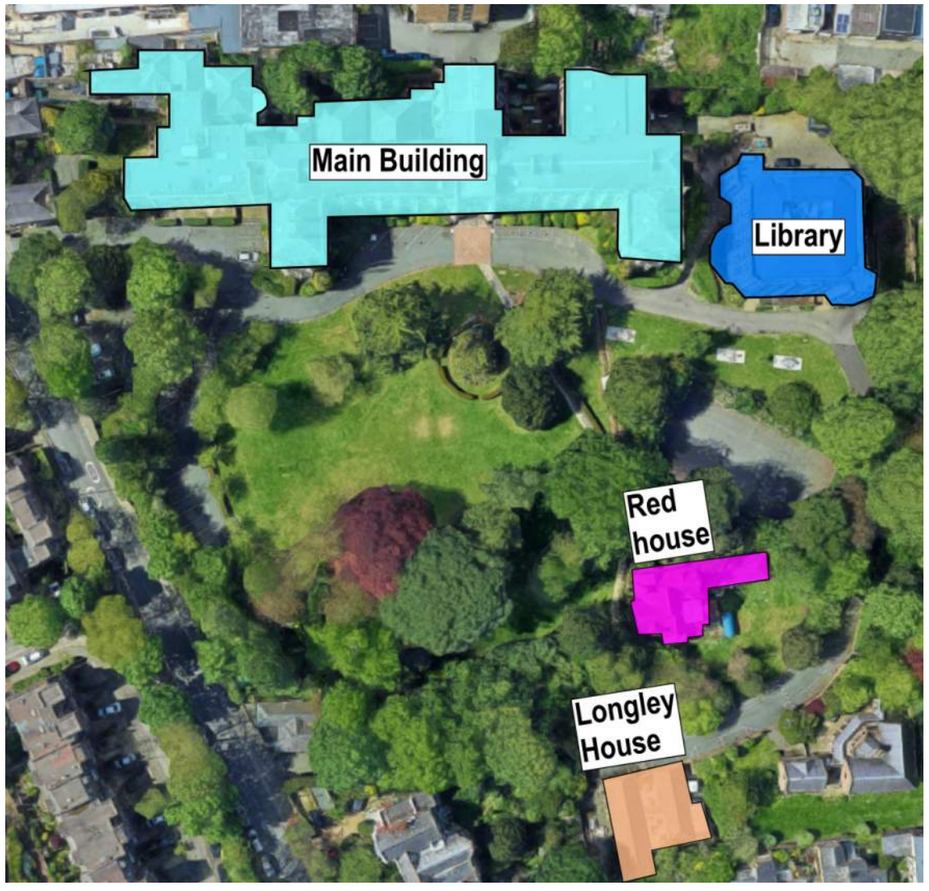


Figure 2-1: Thoms' London Day School Campus (ref. Google Maps)

3. Risk Profile

3.1. Introduction

Standard fire safety guidance to the Building Regulations set out in the Approved Document B is regarded as the "General Approach" and is applicable to all buildings that fall within the scope of the regulations. The guidance is generic and makes only limited allowances for variations in use and occupancy.

Departure from this standard guidance would traditionally require a fire engineered solution.

BS 9999:2017 provides an alternative guidance and is recognised as an intermediate measure adopting a more risk-based approach, this standard works by considering the relative risks associated with the type of occupants that may be present and the potential fire growth rate determined by the building contents. This document was updated in 2017 and it is the updated version that is adopted for this project.

3.2. Occupancy Characteristics

BS 9999 categorises building occupants according to their likely level of alertness and familiarity with the building layout and procedures as illustrated below.

Occupancy characteristic	Occupancy description	Examples
A	**Occupants who are awake and familiar with the building**	**Office and industrial premises**
B	Occupants who are awake and unfamiliar with the building	Shops, exhibitions, museums, leisure centres, other assembly buildings, etc.
C	Occupants who are likely to be asleep	
Ci[a]	• Long-term individual occupancy	• Individual flats without 24-hour maintenance or management control on-site
Cii[a]	• Long term Managed occupancy	• Serviced flats, halls of residence, sleeping areas of boarding schools.
Ciii	• Short term occupancy	• Hotels
a - Occupancy characteristics Ci and Cii are included for completeness within this table but are covered in more depth in BS 9991		

Table 3-1: BS 9999: Occupancy Characteristics

The occupancy characteristic of the building is principally determined by considering whether occupants are familiar or unfamiliar with the building layout and whether they are likely to be awake or asleep.

In the case of Library, Longley House, and Red House, occupants are considered to be awake and familiar with the building. Hence, an occupancy risk profile of A is deemed reasonable for these blocks.

For the Main building, while occupants will be familiar with the structure, those on the third and fourth floors are expected to be asleep. Consequently, the occupancy characteristic is considered as A for Lower Ground, Ground, First, and Second floors, and Cii for Third and Fourth floors.

The occupancy of Thomas' London Day School Campus development is summarised as follows;

Occupancy	Occupancy Characteristic
Main Building (Levels Lower ground, Ground, 01 and 02)	A (Awake and familiar)
Main Building (Levels 03 and 04)	Cii (Sleeping areas in boarding school)*
Library	A (Awake and familiar)
Longley House	A (Awake and familiar)
Red House	A (Awake and familiar)
* Detailed requirements for sleeping accommodation are outlined in BS 9991, and for comprehensive information, specific sections of this standard will be referenced. Given the existing conditions and the presence of onsite staff, a simultaneous evacuation regime has been considered for the evacuation protocol. This approach has been discussed and approved by the building control authorities.	

Table 3-2: Thomas' London Day School development Occupancy Characteristics

3.3. Fire Growth Rate

The potential for a fire to rapidly develop and threaten the integrity of the escape routes is a key consideration in the overall fire safety of the building and will vary according to its use as illustrated in Table 3-3 below.

Category	Fire growth rate	Fire growth parameter kJ/s^3	Description	Typical Examples
1	Slow	0.003	Evenly distributed low level fire load, small discrete packets of fuel or material of limited combustibility	Reception areas, concourses (without concession outlets) and halls with limited fire load such as sports stadia and foyers
2	Medium	0.012	Evenly distributed low to mid-level fire load comprising a mix of combustible materials	Offices, lounges, classrooms, auditoria, seating areas, galleries and car parks
3	Fast	0.047	Stacked combustibles (on or off racking and shelving but excluding high rack storage), some small quantities of materials other than materials of limited combustibility (or where larger quantities are stored in separate fire-resisting enclosures), process, manufacturing or storage of combustible materials	Shop sales areas, workshops, factories and small storage buildings

Table 3-3: BS 9999: Fire Growth Rate

The relevant profiles for the uses are:

Occupancy	Fire growth rate
Main Building (Levels Lower ground, Ground, 01 and 02)	2
Main Building (Levels 03 and 04)	NA
Library	2
Longley House	2
Red House	2

Table 3-4: Thomas' London Day School development Fire Growth Rates

3.4. Summary

The risk profile of each use is categorised below.

Occupancy	Risk Profile
Main Building (Levels Lower ground, Ground, 01 and 02)	A2
Main Building (Levels 03 and 04)	NA
Library	A2
Longley House	A2
Red House	A2

Table 3-5: Thomas' London Day School development Risk Profile

4. Means of Escape

4.1. Evacuation Protocol (Simultaneous)

While the Main building incorporates sleeping accommodation, it adheres to a Simultaneous Evacuation regime. It is presumed that the existing fire strategy aligns with this simultaneous evacuation approach. The presence of an L1 category detection and alarm system throughout the entire building, encompassing sleeping accommodation areas, coupled with staff accommodation located on the same level as student accommodation, ensures ample support for timely evacuation.

Similar to the Main building, the Library, Longley House, and Red House will also adopt a simultaneous evacuation strategy.

4.2. Travel Distances

4.2.1. Guidance

In accordance with Table 11 of BS 9999, the travel distances to a final exit or place of relative safety within a protected route (e.g., protected corridor or stair) must comply with the limits shown in Table 4-1 in relation to the risk profile.

Risk Profile	Direct travel distance		Actual travel distance	
	Single direction	Alternative directions	Single direction	Alternative directions
A2	15m	37m	22m	55m

Table 4-1: Travel Distance Limits

Where the fit out of a room is not known, BS 9999 recommends taking two/thirds of the actual travel distance to account for this. Where the preliminary fit out of the floors is shown on the plans, the actual travel distances have been used. Where this is not the case, direct travel distances have been considered.

4.2.2. Increase in Travel Distances

BS 9999 allows an increase in travel distances of 15% where there is clear benefit from enhanced fire detection and alarm. (The fire detection and alarm system in place being superior to that required by guidance to Part B of the Building Regulations). As discussed in Section 5.2.1, the minimum standard required by BS 9999 in an A2 risk profile is purely a Manual System (M), however, it is noted that the blocks that are proposed to be refurbished in Thomas' London Day School development target a fire detection and alarm system achieving a minimum of Category L1.

The table below shows the maximum travel distances utilising the 15% increase. Where the preliminary fit out of the floors is shown on the plans, the actual travel distances have been used. Where this is not the case, direct travel distances have been considered.

Risk Profile	Increased direct travel distance		Increased actual travel distance	
	Single direction	Alternative directions	Single direction	Alternative directions
A2	17.25m	42.55m	25.3m	63.25m

Table 4-2: Increase in Travel Distance

The figures in Table 4-2 are those to be considered for the overall travel distances.

4.2.3. Travel Distances within Sleeping Accommodation

The bedrooms located on the Third and Fourth floors are classed as cluster accommodations as per BS 9991. The guidance recommends a maximum travel distance limit of 9m in case a single exit is provided from the cluster accommodation. This distance is increased to 35m in case the escape is possible in more than one direction. Although BS 9991 recommends providing a lobby between the accommodation and the stairs, the protected lobby is not considered owing to the existing condition and adoption of simultaneous evacuation throughout the building. Stair capacity calculation also takes the non-provision of the lobbies into account.

4.2.4. Main building – Lower Ground

The lower ground floor is equipped with two escape routes: one leading through the courtyard towards the open-to-sky corridor (situated at the northwest) and the other leading to the outside through an internal corridor (located at the northeast). The travel distances at this level align with the recommendations outlined in BS 9999. It's important to note that occupants are intended to exit directly to the outside without utilizing the stairs. Nonetheless, the stairs will be accompanied by a protected lobby, and an additional cross-corridor fire door will be installed in the internal corridor.

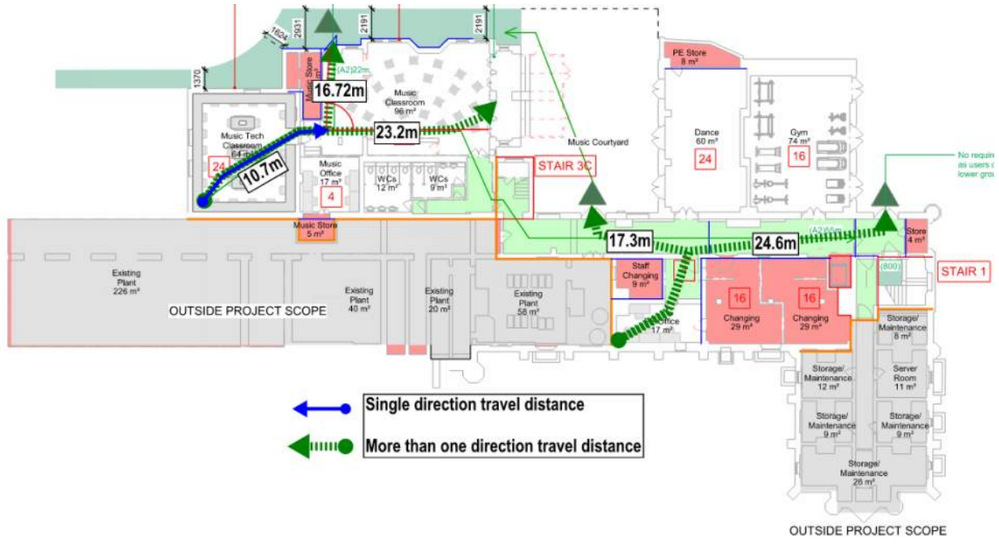


Figure 4-1: Lower Ground Floor Travel Distances

4.2.5. Main building – Ground Floor

The travel distances on the ground floor align with BS 9999 requirements. Multiple exit routes are available from all areas of the ground floor, and single-direction travel distances meet the recommended standards. It's important to mention that the discharge arrangement for Stair 4 is currently under consideration and will be revised as the design advances. Any modifications will be reflected in the subsequent versions of the fire strategy report.

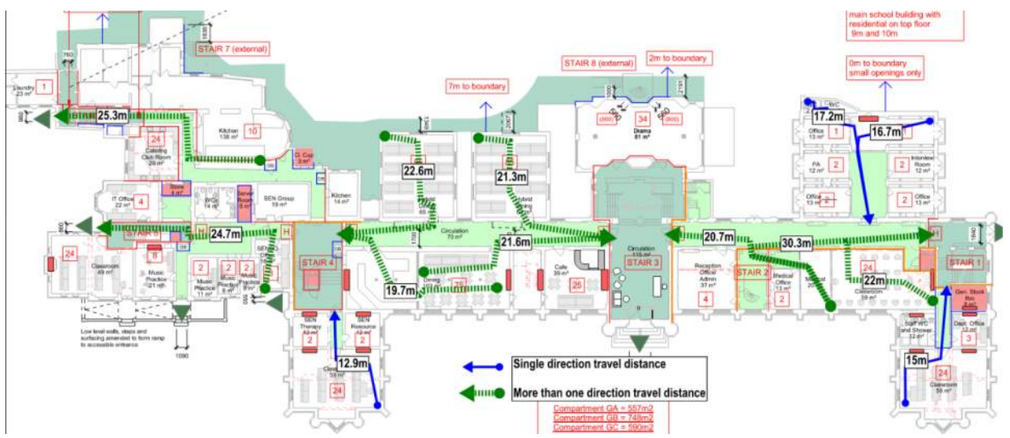


Figure 4-2: Ground Floor Travel Distances

4.2.6. Main building – First Floor

The travel distances adhere to BS 9999 standards. The west wing is equipped with three stairs, while the east wing has one exit stair. Additionally, a secondary escape route, in the form of a spiral stair, is situated near the staff dining area. Although not designated as an escape stair, it may serve as an accommodation stair for reaching ground floor levels for evacuation. The occupant load in the east wing utilizing the escape stair will be limited to under 60 persons, considering the single exit provision.

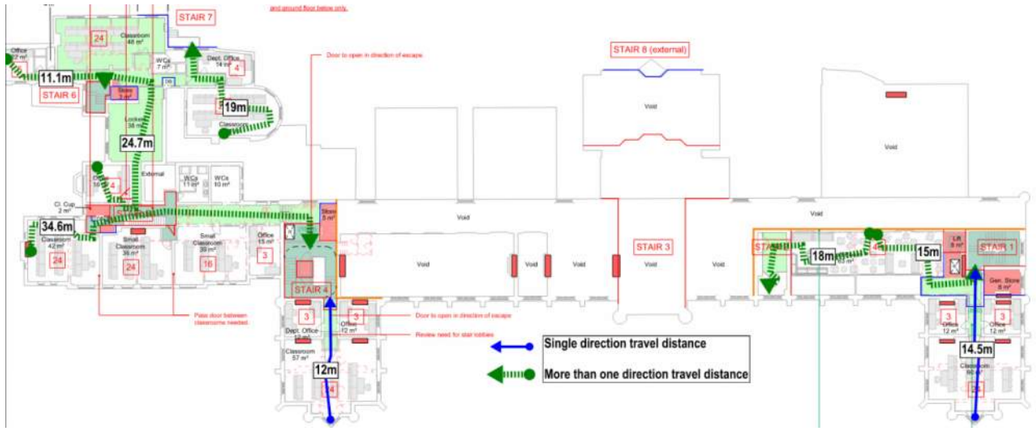


Figure 4-3: First Floor Travel Distances

4.2.7. Main building – Second floor

The travel distance aligns with the guidelines outlined in BS 9999, and single-direction travel distances from the classroom areas are within the recommended limits. It's important to note that classrooms near Stair 3 directly open into the stair. To enhance safety, it is advised to implement lobby protection for the stair, considering that the same stair will be used by occupants from sleeping accommodations. While a protected lobby within the classroom may not be feasible, it is recommended to install a fire and smoke curtain at the door to Stair 3. This curtain, in conjunction with the fire door, will offer lobby protection to the stair. Emergency retract buttons will be incorporated into these fire and smoke curtains for occupant and firefighter access during emergencies. The primary escape route for occupants of these classrooms will be via spiral stairs. A similar arrangement is proposed for the Drama room opposite these classrooms, which also directly opens into Stair 3. Additionally, there will be a secondary escape from the Drama room leading to the common corridor. A protected lobby for the stairs within the corridor is not proposed, as no rooms directly open into the stairs. It is assumed that the existing walls and doors will maintain their inherent smoke rating.

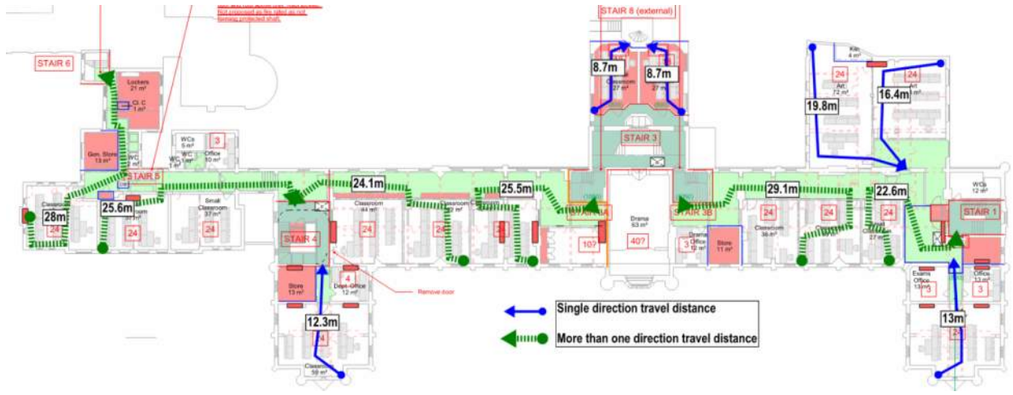


Figure 4-4: Second floor Travel Distances

4.2.8. Main building – Third floor

The third floor is designated for sleeping accommodation, and the travel distances on this level comply with the recommendations outlined in BS 9991. The single-direction travel distance is achieved within 9m of the farthest bedroom entry door. The corridor leading to the stair will have a 30-minute fire-resisting rating, as suggested by BS 9991. The two-way travel distance limitations are within the recommended 35m limit. Each cluster's corridor will be 30 minutes fire-resisting. A separate common room, distinct from the sleeping accommodation, has an exit towards Stair 03 without passing through any sleeping areas. Considering the location of the common room and the assumption that occupants in such areas will be awake and familiar with the room, single-direction travel distance limitations from BS 9999 are considered. Although a secondary escape via a spiral stair is available from this common room, it is recommended not to utilize the spiral stair from this level. A compliant single-direction travel distance with a protected lobby to Stair 03 can be provided. This arrangement will reserve the spiral stair for limiting the number of occupants (i.e., occupants of level 02 classrooms and level 04 bedrooms).

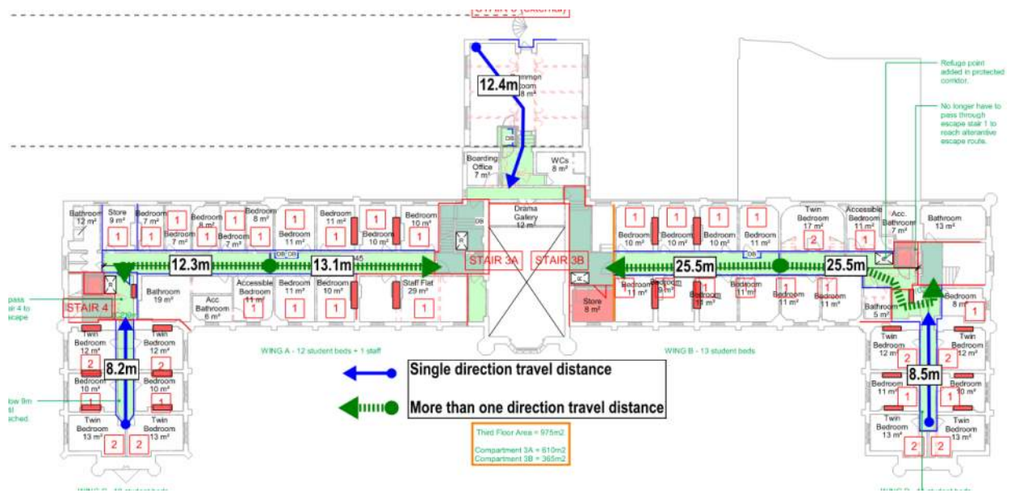


Figure 4-5: Third Floor Travel Distances

4.2.9. Main building – Fourth floor

The travel distance on the third floor currently exceeds the limits outlined in BS 9991, as the single-direction travel distance in the student accommodation surpasses the 9m limit. However, there is a secondary escape available from the single staff room via an external spiral stair. Despite the limited use of a spiral stair in the means of escape, given the existing condition of the building, it is considered reasonable. Additionally, to address the travel distance issue from the student accommodation, it is proposed to incorporate an internal protected corridor within the staff accommodation. Since this is staff accommodation, they will be able to assist in the evacuation of children's bedrooms. This proposal has been discussed and agreed upon with the building control.

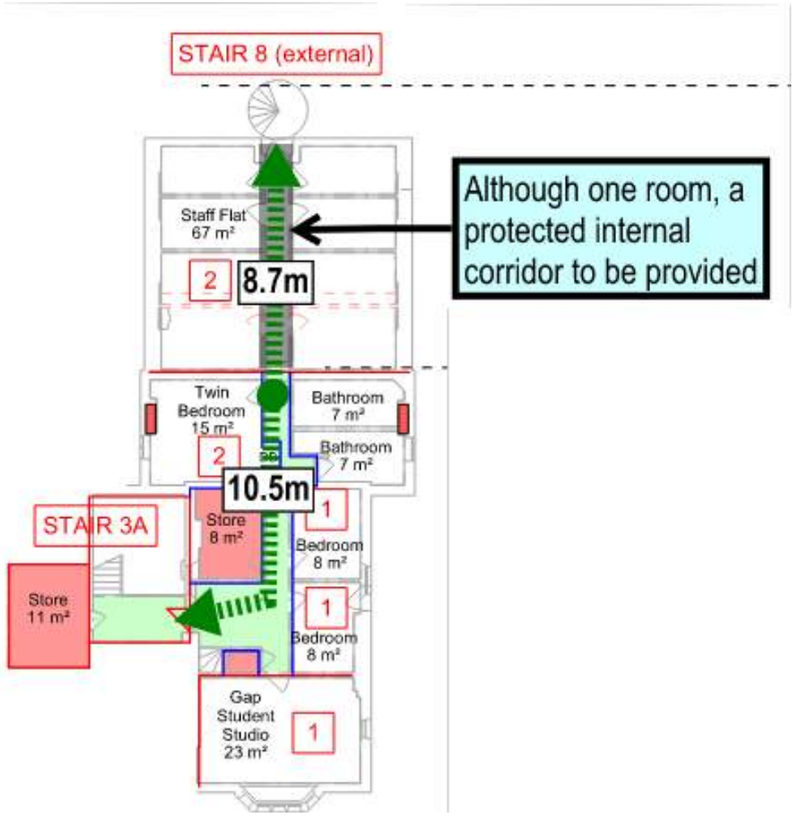


Figure 4-6: Fourth floor Travel Distances

4.2.10. **Library**

Travel distances within all levels of Library are in line with the recommended limits from BS 9999.

Figure 4-7: Library – Basement Travel Distances

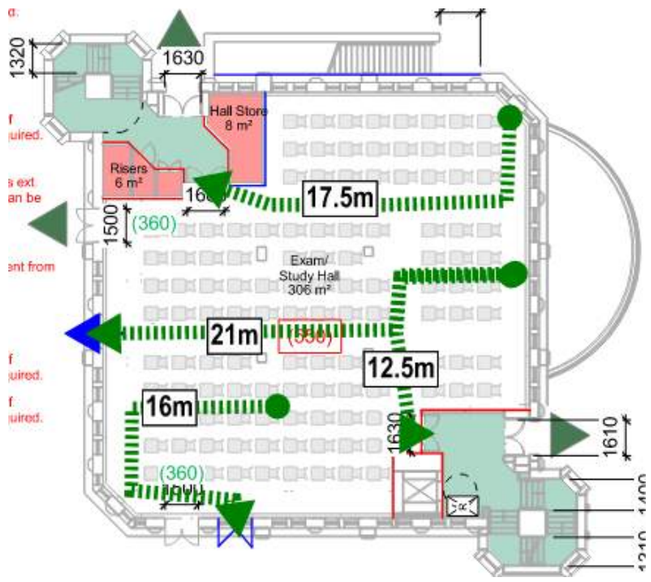


Figure 4-8: Library – Ground floor Travel Distances

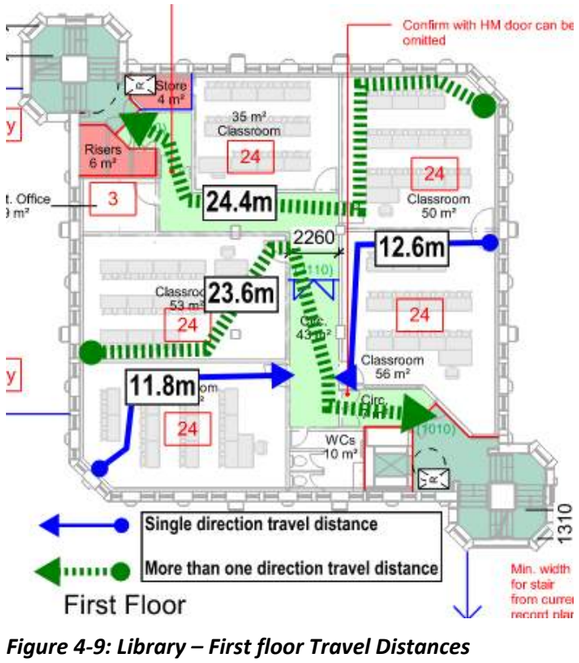


Figure 4-9: Library – First floor Travel Distances

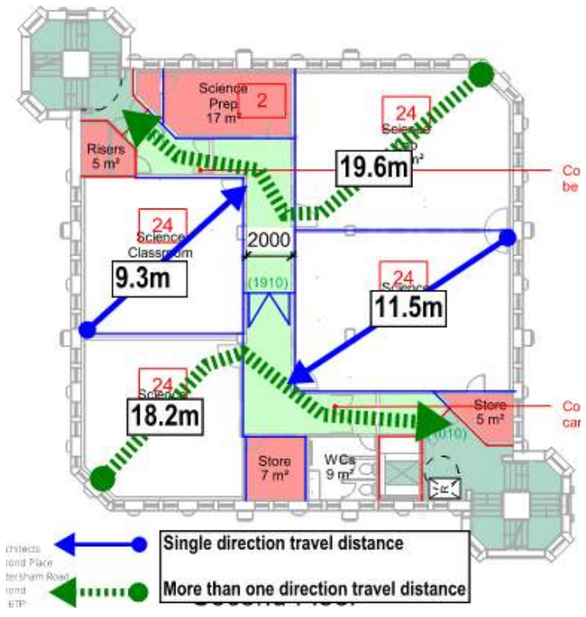


Figure 4-10: Library – Second floor Travel Distances

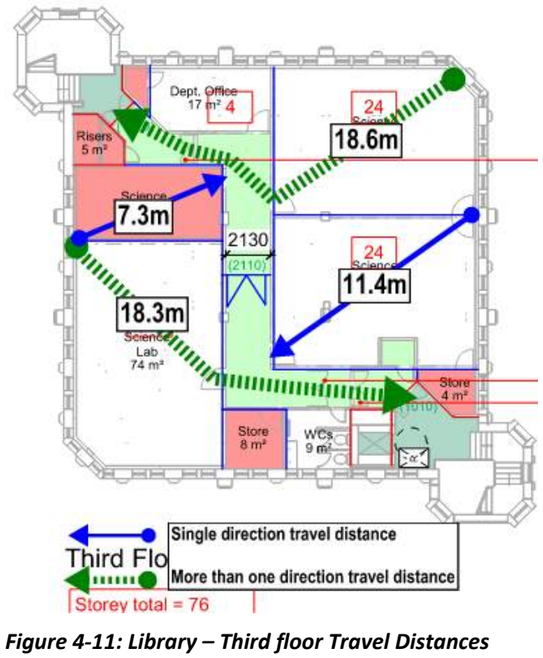


Figure 4-11: Library – Third floor Travel Distances

4.2.11. **Longley House**

Travel distances within Longley house are in line with the recommended limits from BS 9999.

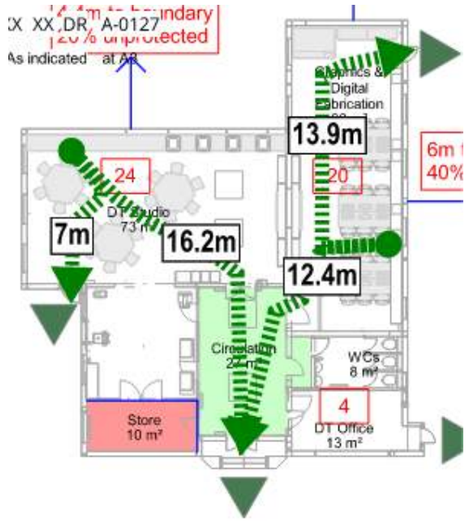


Figure 4-12: Longley house – Ground floor Travel Distances

4.2.12. **Red House**

Travel distances within Red house are in line with the recommended limits from BS 9999.

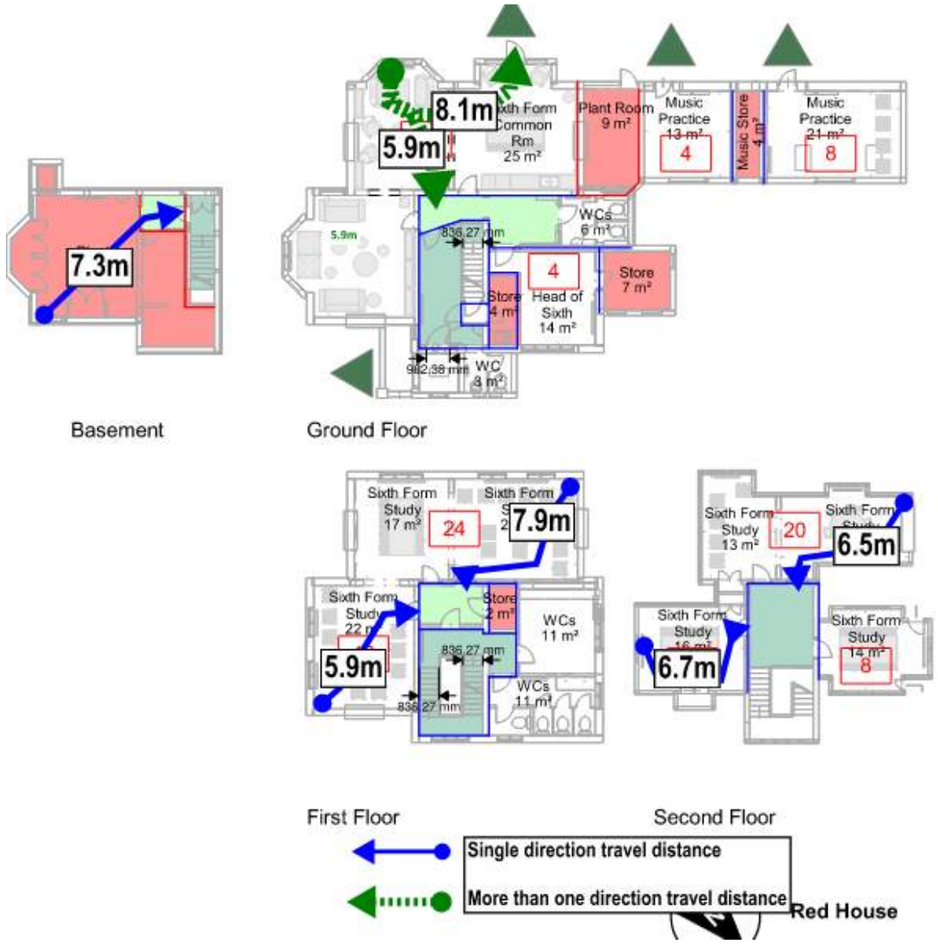


Figure 4-13: Red house –Travel Distances

4.3. Occupancy

The table below outlines the calculated occupancy of each level based on the information provided in the architectural drawings.

Floor	Use	Occupancy
Main Building		
Lower ground	Music tech classroom	24
	Music classroom	24
	Music Office	4
	Dance	24
	Gym	16
	Staff changing	4
	Changing	16
	Changing	16
Lower ground Floor Occupancy		**128**
Ground	Kitchen	10
	Laundry	1
	Catering club room	24
	IT Office	4
	Classroom	24
	Music Practise	8
	Music practise	2
	Music practise	2
	Music practise	2
	Hybrid dining	60
	Hybrid dining	60
	Dining	75
	Café	25
	Drama	34
	Reception office	4
	Medical office	2
	Classroom	24
	Dept office	3
	Classroom	24
	Office	2
	PA	2
	Office	1
	Office	1
	Interview room	2
	Office	2
Ground Floor Occupancy		**398**
First	office	5
	Classroom	24
	Dept office	4

Floor	Use	Occupancy
	Classroom	24
	Office	4
	Classroom	24
	Small classroom	24
	Small classroom	16
	Office	3
	Dept office	3
	Office	3
	Classroom	24
	Staff room	40
	Office	3
	Office	3
	Classroom	24
First Floor Occupancy		**225**
	Classroom	24
	Small classroom	24
	Small classroom	24
	Office	3
	Dept office	4
	Classroom	24
Second	Classroom	24
	Classroom	24
	Classroom	24
	Unnamed room	10
	Drama	40
	Drama office	3
	Small classroom	18
	Small classroom	18
	Classroom	24
	Classroom	24
	Small classroom	24
	Art	24
	Art	24
	Exam's office	3
	Office	3
	Art	24
Second Floor Occupancy		**414**
Third	Bedrooms	**48**
Fourth	Bedrooms	**7**
Total Main Building Occupancy		**1220**
Library Building		
Basement	Assembly Hall	200
	Plant rooms	3

Floor	Use	Occupancy
Basement Occupancy		**203**
Ground floor	Exam/Study Hall	**550**
First floor	Classroom	24
	Classroom	24
	Classroom	24
	Classroom	24
	Classroom	24
	Dept office	3
First Floor Occupancy		**123**
Second floor	Science Classroom	24
	Science Classroom	24
	Science Lab	24
	Science Lab	24
	Science Pre room	2
Second Floor Occupancy		**98**
Third floor	Science Lab	24
	Science Lab	24
	Science Lab	24
	Dept office	4
Third Floor Occupancy		**76**
Total Library building occupancy		**1050**
Longley House		
Ground floor	DT Studio	24
	Graphics and digital fabrication	20
	DT office	4
Total Longley house occupancy		**48**
Red House		
Basement	Plant	**1**
Ground floor	Sixth form common room	60
	Head of sixth form	4
	Music practise	4
	Music practise	8
Ground floor occupancy		**76**
First floor	Sixth form study	24
	Sixth form study	12
First floor occupancy		**36**
Second floor	Sixth form study	20
	Sixth form study	8
	Sixth form study	8
Second floor occupancy		**36**
Total Red House occupancy		**149**

Table 4-3: Building Occupancy

4.4. Number of Escape Routes

The number of escape routes and exits within the building is dependent on the number of occupants in each room or storey and the travel distance. The minimum number of escape routes provided should be in accordance with below.

Maximum number of persons	Minimum number of escape routes/exits
60	1
600	2
More than 600	3

Table 4-4: Minimum number of escape routes and exits from a room, tier or storey

The building has sufficient number of escape routes/exits. It should be ensured that the occupant load of east wing of level 01 that serves single escape stair does not exceed 60 persons.

4.5. Storey Exits

BS 9999 allows a reduction in storey exit width per person of 15% where there is clear benefit from enhanced fire detection and alarm. (The fire detection and alarm system in place being superior to that required by guidance to Part B of the Building Regulations).

Where a door achieves a clear width of less than 1050mm, the capacity of the exit is taken as 500/(minimum door width per person). Based on utilising the 15% reduction in the minimum storey exit width per person in Table 12 of BS 9999:

- 3.06mm per person (3.6 x 0.85 = 3.06) of exit width is required for A2 risk profiles.

The minimum width of a storey exit used for escape must be not less than 800mm. This must be increased to 850m where unassisted wheelchair access is necessary.

Where doors open against the direction of escape, the capacity of these is limited to 60 occupants.

Where a single exit is provided from a room/floor, this limits the capacity of the room/floor to 60 occupants.

Where double doors are provided the width of one of the leaves should be not less than 800 mm.

Given the proposed plans, different cases for the most critical areas have been taken into account to check the storey exit capacities. It is noted that few of the existing doors provide a clear width of 750mm. since this is an existing condition, it is considered reasonable. These doors will have a capacity of 500/3.06 = 163 persons each.

4.5.1. Main Building

Lower ground:

The lower ground level is equipped with two means of escape. One escape route leads through the courtyard, extending to an external corridor situated in the northwest, while the other route leads directly outside through an internal corridor located in the northeast. Although stairs are available on this level, they are not intended for use as a means of escape. It is acknowledged that the external corridor in the northwest further connects to the internal corridor on the ground floor. This reflects an existing condition that remains unchanged. However, there is a proposed update to the layout of the final exit on the ground floor to ensure separation between the occupants of the ground floor and those on the lower ground level. This design alteration is currently under consideration and has not been incorporated into the proposed plans. Further details can be found in the comments provided to the design team. The doors will achieve the minimum clear width required as per the guidance.

Regarding the total occupant load capacity, the lower ground floor accommodates 128 persons. There are two exit doors, one measuring 1660mm leading to the outside in the northeast wing and another measuring 1700mm leading to the courtyard and northwest open corridor. By discounting one exit, a door clear width of 1660mm remains, which is sufficient to accommodate 128 occupants.

As previously mentioned, the northwest open corridor requires occupants to re-enter the corridor on the ground floor. As the design is currently under consideration, it should be ensured that the door clear width is a minimum of 1050mm.

Ground Floor:

The ground floor is equipped with multiple means of escape, most of which necessitate passing through the escape stairs that discharge from upper levels to the outside. In light of this, stair capacity is calculated, treating the ground floor as a serving storey for the stair, rather than conducting merging flow calculations. The doors on the ground floor have a minimum clear width, at least equivalent to the stair clear width. It has been observed that the final exit door width for stair 4 is too narrow and would be inadequate to accommodate occupants using the stair. Consequently, a revised discharge arrangement is being proposed to allow occupants using the stairs from upper levels and the ground floor to directly discharge outside.

The hybrid dining rooms are currently proposed to accommodate 85 occupants. However, as only one escape route is available from each room, the maximum occupancy for these rooms should be limited to 60 persons, as outlined in the occupant load table in section 4.3. Regarding the dining area and café, with a combined total occupant load of approximately 100 persons, the doors from this area should swing in the direction of escape but they swing in the opposite direction to the means of escape. Despite this, since there are at least three doors provided from this room, discounting one, will maintain two additional escape routes for occupants. Each door swinging in the opposite direction to the means of escape may accommodate 60 persons. Therefore, this area can have a total capacity of 120 occupants. This arrangement has been discussed and agreed upon with building control.

The door leading to stair 6 from the kitchen area swings in the direction opposite to the means of escape. Therefore, it should be ensured that the total occupant load using this door does not exceed 60 persons.

Overall, it is noted that discounting one exit from each wing leaves sufficient clear width to accommodate occupants present in the space.

First floor:

The first floor is divided into the west wing and east wing. The west wing has access to three escape stairs: Stair 4, Stair 6, and Stair 7. Stair 5, existing in the current configuration, is proposed to be eliminated in the refurbishment. Since the occupant load of this wing exceeds 60 persons, it will be ensured that all doors leading to the stairs swing in the direction of means of escape, especially for Stair 4. Door widths leading to the stairs are as per the existing conditions, measuring 750mm for Stairs 6 and 7, and 1050mm for Stair 4. Discounting the largest exit leaves sufficient capacity for occupants present in the west wing. The classroom and office area located at the southwest have access to only one stair (Stair 4). As the single-direction travel distance aligns with the recommended distances and the occupant load of this portion does not exceed 60 persons, access to a single means of escape is considered

reasonable. Due to the single means of escape, it will be ensured that a protected lobby is provided between the stair and the accommodation.

The east wing comprises a staff room and a classroom. Although the staff room has access to a spiral stair, it is considered an accommodation stair from the staff room and not an escape stair from this level. This wing primarily has access to one escape stair (Stair 1). As the single-direction travel distance is in line with the recommended distances and the occupant load of this portion does not exceed 60 persons, access to a single means of escape is considered reasonable. Due to the single means of escape, it will be ensured that a protected lobby is provided between the stairs and the accommodation.

Second floor:

The second floor is divided into two wings: the west wing and the east wing, connected via a common stair, Stair 3. The west wing has access to three stairs (Stair 3, Stair 4, and Stair 6), and the east wing has access to two stairs (Stair 1 and Stair 3). Door widths are measured at 1050mm for Stairs 1, 3, and 4, and 820mm for Stair 6. As the occupant load of both wings exceeds 60 persons, access to two means of escape is available. Additionally, the doors will swing in the direction of means of escape. Discounting one exit leaves sufficient capacity for occupants present in each wing.

Similar to level 01, classrooms and offices are present in both the west and east wings, with access to a single means of escape. The door swing to Stair 4 from this area in the west wing also swings in the direction opposite to escape. Since the single-direction travel distance is in line with the recommended limit and the occupant load does not exceed 60 persons from these areas, access to a single means of escape is considered reasonable. It will be ensured that a protected lobby is provided between the stair and the accommodations, owing to the single escape.

Furthermore, small classrooms and a drama room directly open into Stair 3. As this stair also serves the sleeping accommodations from levels above, it is recommended not to have any accommodation directly opening within the stair enclosure. Therefore, it is proposed that a fire and smoke curtain, in addition to a fire door, be provided at these entrances. These fire curtains will be equipped with emergency retract buttons for the use of occupants or firefighters in case of an emergency. It should be noted that the primary escape route for the small classroom will be via external spiral stairs, and for the drama room, it will be via a common corridor located in the west wing. A protected lobby to the stairs is not proposed in the west or east wing (except for single escape provision) considering that the existing walls and doors will have inherent smoke-resisting properties to prevent smoke spread within the corridor. This strategy has been discussed and agreed with the building control.

Third floor:

The third floor provides access to Stair 3 and Stair 4 in the west wing, and access to Stair 1 and Stair 3 in the east wing. Stair 3 serves as a common accessible point, connecting both wings. This level is exclusively dedicated to bedrooms, with a central common room that has no direct connection to the sleeping areas/bedrooms. Bedrooms in each wing have access to at least two escape stairs. In certain portions of each wing, occupants may need to travel in a single direction. However, the single direction escape route is within the recommended limits of BS 9991, as it does not exceed 9m.

Access to all stairs is provided via a protected corridor. A separate lobby between the protected corridor and the stairs is not proposed, given the simultaneous evacuation regime and the proposed L1 detection and alarm system. However, a protected lobby is suggested between the common room and Stair 3. While access to the spiral stair is available from this common room, it is crucial to limit the occupants using the spiral stair (as occupants from level 4 and level 01 will also use this spiral stair). Considering the possibility of providing a protected lobby between Stair 3 and the common room, with an occupant load of less than 60 persons and a single-direction travel distance within the limits of BS 9999, a single means of escape is considered reasonable from the common room on this level. The door to the external spiral stair may be discontinued.

Although the occupant load of both wings is less than 60 persons, the door will swing in the direction of means of escape. Door clear widths are measured to be 850mm for Stair 1 and 1000mm for Stairs 3 and 4.

Fourth floor:

The fourth floor is limited in extent and provides access to Stair 3 and external spiral stairs. This floor is designated for student bedrooms and a staff room. As the single-direction travel distance exceeds the limits outlined in BS 9991, it is proposed to introduce a protected corridor leading to the external spiral stair. This arrangement ensures access to two escape stairs from this level.

The secondary escape route via spiral stairs for students is deemed reasonable due to the presence of staff accommodation at the same level. Staff members can assist in the evacuation of students. This is an existing condition which is not made any less satisfactory. The use of spiral stairs for the sleeping accommodation has been discussed and agreed upon with the building control.

4.5.2. Library Building

Note that Fire escape strategy has been designed for school users only (i.e. A2 risk profile). External lettings of the space has not been provided for.

Basement:

In the basement, two means of escape stairs are provided. An internal escape stair, serving upper levels of the building, discharges to the ground floor, and an external stair directly discharges outside at the ground floor. The assembly hall is expected to accommodate a maximum of 200 occupants, while the rest of the plant room areas will have an occupancy of three persons, resulting in a total occupant load of 203 individuals. The two escape doors leading to the stairs have a clear width of 1650mm, and by discounting one exit, there is sufficient capacity for the occupants at this level.

It is recognized that a cross-corridor fire door will be necessary, as the length of the corridor exceeds 12m. To meet occupant capacity, this door should provide a clear width of at least 1050mm and swing in both directions. The corridor within this basement is considered a protected corridor, eliminating the need for a protected lobby to the stairs.

Ground floor:

On the ground floor, there are four escape doors—two leading directly to the outside and two leading to the escape stairs serving upper floors, as illustrated in Figure 4-14. Notably, door 3 and door 4 are positioned too closely, potentially creating a scenario where a single fire could block both exits simultaneously. This arrangement, along with the merging flow calculation presented later in this report (Section 4.6.1), suggests that the proposed occupant load of 550 persons may be excessive.

To address this concern, relocating door 3 to ensure that a single fire does not block two exits simultaneously could accommodate the proposed occupant load after discounting the largest exit.

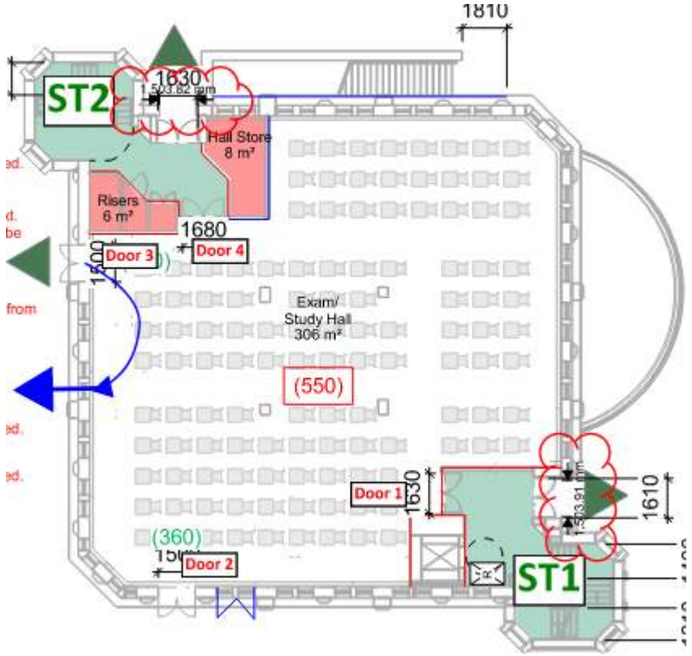


Figure 4-14: Library Building – Ground floor storey exits

It has been discussed with the design team that when the basement and ground floor levels have full occupancy, the upper levels will not contain any occupants, enhancing escape provisions for those present at the basement and upper levels. Similarly, the basement and ground floor will not reach full occupancy when the upper levels are occupied. Additional details on merging flow calculations can be found in the later sections (Section 4.6.1) of this report.

First floor:

The total occupancy for the first floor is calculated to be 123 persons. Two separate means of escape, leading to two distinct stairs, are provided on this level. Each door has a clear width of approximately 1475mm. After discounting one storey exit, there is ample escape capacity for the occupants present on this level.

Second floor:

The total occupancy for the second floor is calculated to be 98 persons. Two separate means of escape, leading to two distinct stairs, are provided on this level. Each door has a clear width of approximately 1475mm. After discounting one storey exit, there is ample escape capacity for the occupants present on this level.

Third floor:

The total occupancy for the third floor is calculated to be 76 persons. Two separate means of escape, leading to two distinct stairs, are provided on this level. Each door has a clear width of approximately 1475mm. After discounting one storey exit, there is ample escape capacity for the occupants present on this level.

4.5.3. Longley House

Longley House comprises only the ground floor. In addition to the escape route towards the main entrance, every room is equipped with a secondary means of escape. Therefore, the provided capacity is deemed sufficient for the occupants within the building.

4.5.4. Red House

Basement:

The basement exclusively houses the plant room, which has access to a single escape stair via a protected lobby. A single means of escape from the basement aligns with the recommendations of BS 9999.

Ground Floor:

The ground floor includes the sixth form common room, head of sixth form room, and music practice rooms. While music practice rooms have direct access to escape towards the outside, the sixth form common room and head of sixth form room require escaping through the main entrance, where the sole escape stair discharges. As the number of occupants using the final exit door would be more than 60, it is recommended that the final exit door swings in the direction of means of escape (currently, the door swings in the direction opposite to means of escape). Following the recommendations from BS 9999, a protected lobby is provided for the stair at this level.

First Floor:

The first-floor occupant load is calculated to be 36 persons. The building is equipped with a single escape stair in line with BS 9999 recommendations. Since the single-direction travel distance is within the guidance and the occupant load of this level does not exceed 60 persons, a single means of escape is considered reasonable. The door swinging in the direction opposite to means of escape is also considered compliant as the occupant load serving the door is less than 60. Following the recommendations from BS 9999, a protected lobby is provided for the stair at this level.

Second Floor:

The second-floor occupant load is calculated to be 36 persons. The building is provided with a single escape stair in line with BS 9999 recommendations. Since the single-direction travel distance is within the guidance and the occupant load of this level does not exceed 60 persons, a single means of escape is considered reasonable. The door swinging in the direction opposite to means of escape is also considered compliant as the occupant load serving the door is less than 60. Owing to being the top storey, a protected lobby would not be required at this level.

4.6. Stair Capacity

Stairs within buildings to be refurbished are shown in the ***Figure 4-15*** to ***Figure 4-17***. Note that the stair 2 and stair 5 in main building are not mentioned as stair 2 is being used as a communication /accommodation stair and the stair 5 is proposed to be eliminated.

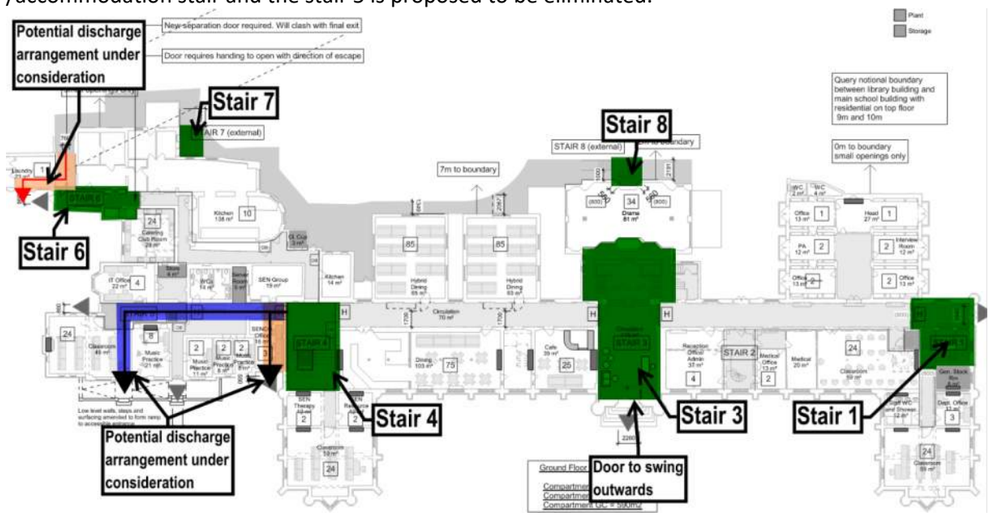


Figure 4-15: Stair location – Ground Floor – Main Building

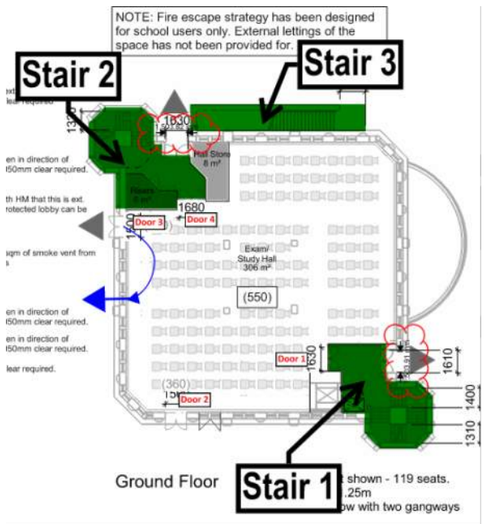


Figure 4-16: Stair location – Ground Floor – Library Building

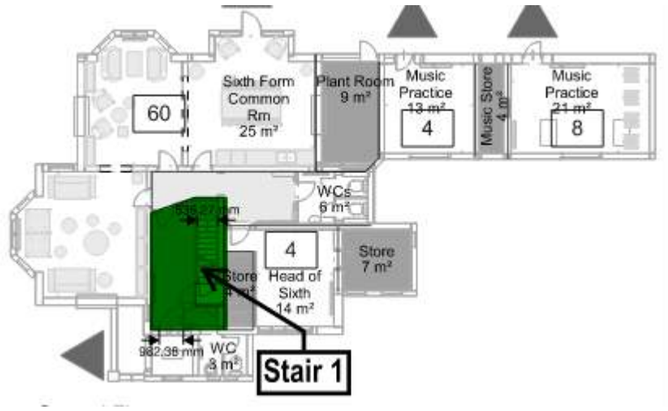


Figure 4-17: Stair location – Ground Floor – Red House

Stairs are measured from the provided PDF drawings.

Main building is served by total 6 umber of stairs, Library building is served by two stairs from upper levels and two stairs from basement. The arrangement of the stairs is tabled below.

Building	Stair number	Access to the levels	Stair clear width (mm)
Main Building	Stair 1	00,01,02,03	1350
	Stair 3	00,02,03,04	1000
	Stair 4	00,01,02,03	1000
	Stair 6	00,01,02	860[a]
	Stair 7	01	900[a]
	Stair 8	02,04	1000[b]
Library Building	Stair 1	01,02,03	1000[c]
	Stair 2	01,02,03	1000[c]
	Stair 3	01	1425
Red House	Stair 1	00,01,02	835[a]

Table 4-5***: Exit stairs serving levels and widths***

(a) While the minimum stair width required by BS 9999 is 1000mm, the existing clear width of stairs 6 and 7 in main building and stair 1 in Red house building is measured to be 860mm and 900mm respectively. This is considered reasonable based on existing condition not made any less satisfactory.

(b) Stair 8 is an external spiral stair within main building which is used in means of escape from level 02 and level 04 only. Being a spiral stair, it is ensured that the number of occupants using the spiral stairs are kept minimum. Therefore, stair 08 will not be counted in the overall building capacity calculation.

(c) Although the stair clear widths are provided more than 1000mm, minimum clear width of 1000mm is considered to support the merging flow calculation.

Table 13 of BS 9999 provides capacity factor for the stairs based on the number of floors it serve. BS 9999 allows a reduction in stair widths of 15% where there is clear benefit from enhanced fire detection and

alarm. (The fire detection and alarm system in place is superior to that required by guidance to Part B of the Building Regulations). Therefore, the table shows the reduced capacity numbers.

Stair	Width (mm)	Number of storeys Served	Capacity factor (mm/person)*	Capacity (persons)	Total calculated occupant load
Main Building					
~~Stair 1~~	~~1350~~	~~4~~	~~2.33~~	~~579~~	
Stair 3	1000	4	2.33	429	
Stair 4	1000	4	2.33	429	
Stair 6	860	3	2.76	311	
Stair 7	900	1	3.8	56[a]	
			Total	**1225**	**1092[b]**
Library Building					
~~Stair 1~~	~~1000~~	~~3~~	~~2.76~~	~~362~~	
Stair 2	1000	3	2.76	362	
				362	**297[c]**
Red House					
Stair 1	835	3	2.33	**302**	**148**

Table 4-6: Exit stairs serving levels and widths

(a) In continuation of the previously mentioned in this report, it was highlighted that the northwest corridor from the lower ground of the main building converges with the ground floor corridor. The door within this corridor is identified as an 850mm clear wide door, accommodating a maximum of 163 occupants (calculated at 500/3.06mm per person). Out of these, 64 occupants (half of 128) from the lower ground floor, and 43 occupants (36 from level 02 and 7 from level 04) discharging via spiral stairs, will utilize this door. Consequently, the remaining capacity for stair 7 is calculated to be 56 persons (163 - (64 + 36 + 7)).

(b) This count excludes occupants from the lower ground floor, as they have independent exits. Ground floor occupant load is incorporated into this capacity calculation, eliminating the need for merging flow calculations for the main building.

(c) Considerations are limited to occupants on levels 01, 02, and 03.

4.6.1. Merging flow calculation

A merging flow calculation is conducted for occupants converging at the ground floor within the library building. Specifically, occupants merge within Stair 01 from the ground floor and basement. In the case of Stair 02, only occupants from the ground floor merge in the stairs. Following discussions with the design team and building control, it is understood that simultaneous use of assembly halls and study halls at the basement and ground floors implies no occupants on the upper floors. Conversely, when upper levels have occupants, the presence of individuals within the basement and ground floor assembly and study halls is limited.

Given that the distance from the ground floor door to the final exit door exceeds 2m, the second equation from figure 6c) for stair 01 and figure 6a) for stair 02 from BS 9999 is applied to perform the merging flow calculation. Notably, although the final exit width for both stairs measure approximately 1610mm, a pinch point occurs just outside the final exit door, measured to be approximately 1503mm. Therefore, the final exit width is considered to be 1503 in both cases instead of 1610mm.

The merging flow calculation below is conducted to ascertain the maximum occupancy of the ground floor. It's important to emphasize that, in all cases, the clear width of Stair 1 and Stair 2 is considered at 1000mm, meeting the minimum required width.

Calculation for Stair 1

Scenario – Fire at upper level – When upper levels are occupied $W_{FE} = BX+NX+0.75S_{up}$ 1503 = 101(3.06)+N(3.06)+0.75(1000) 1503 = 309.06+N(3.06)+750 N = 443.94/3.06 N = 145	Scenario – Fire at upper level - When upper levels are **not** occupied. $W_{FE} = BX+NX+0.75S_{up}$* 1503 = 101(3.06)+N(3.06) 1503 = 309.06+N(3.06) N = 1193.94/3.06 N = 390
Scenario – Fire at Basement level blocking external stair - When upper levels are occupied. $W_{FE} = BX+NX+0.75S_{up}$ 1503 = 203(3.06)+N(3.06)+0.75(1000) 1503 = 621.18+N(3.06)+750 N = 131.82/3.06 N = **43**	Scenario – Fire at Basement level blocking external stair - When upper levels are **not** occupied. $W_{FE} = BX+NX+0.75S_{up}$* 1503 = 203(3.06)+N(3.06) 1503 = 621.18+N(3.06) N = 881.82/3.06 N = **288**

*$0.75S_{up}$ can be ignored - this equation is not part of the guidance and is only considered to carry out the merging flow calculation in this scenario.

Calculation for Stair 2

Scenario – Fire at upper level
$W_{FE} = NX+0.75S_{up}$
1503 = N(3.06)+0.75(1000)minimum width
N = **246**

Based on the above calculation ground floor occupancies are identified as noted below.

Ground floor occupancy - When upper floors are occupied (reference shall be made to Figure 4-14)

Door 1 = 43 maximum based on merging flow
Door 2 = 1500 = 1500/3.06 = 490
Door 3 = 1500 = 1500/3.06 = 490
Door 4 = 246 maximum based on merging flow

Considering the proximity of Doors 3 and 4, a single fire incident could block both exits. Consequently, discounting the combined exit capacity of 490 + 246, the total ground floor capacity is determined to be 533 persons (490 + 43). However, implementing a management procedure to limit the number of occupants using Door 1 to less than 43 individuals poses a challenge. To address this, it is recommended to disregard Door 1 and cap the occupancy at 533 persons, based on the remaining capacity of Door 2.

The initially proposed occupancy of 550 persons exceeds the suggested limit and should be revised to 533 persons.

Alternatively, Door 3 can be relocated (refer to the suggested location in the blue arrow in Figure 4-14) to prevent a single fire incident from blocking both doors simultaneously. In such a scenario, the proposed ground floor occupancy of 550 would be acceptable, as only one door would be discounted. However, it is recommended to still disregard Door 1 to prevent excessive occupants (i.e., more than 43) using this door.

Ground floor occupancy - When upper floors are <u>not</u> occupied (reference shall be made to Figure 4-14)
Door 1 = 288 maximum based on merging flow
Door 2 = 1500 = 1500/3.06 = 490
Door 3 = 1500 = 1500/3.06 = 490
Door 4 = 246 maximum based on merging flow

Due to the close proximity of Doors 3 and 4, a single fire incident could block both exits. After discounting the combined exit capacity of 490 + 246, the total ground floor capacity is calculated to be 288 + 429 = 717 persons. However, restricting Door 1 and Door 2 to respective capacities of 288 each, the total occupant load for the ground floor could be limited to 576 persons, aligning with the proposed 550 occupants.

In summary, the following suggestions are put forth to accommodate the proposed occupancy on the ground floor.

1. Relocate door 3 to the suggested location indicated by the blue arrow in Figure 4-14 and
2. Exclude door 1 as a designated means of escape from the ground floor. In both scenarios (whether upper floors are occupied or not), the remaining two doors will provide sufficient capacity to accommodate 550 persons if the third exit is impacted by fire.

4.7. Final Escape Routes from Stairs

4.7.1. Width of Final Exit from Stairs

BS 9999 recommends that final exits from escape stairs must discharge to outside or to outside via a protected corridor and that the final exit from an escape stair must be at least as wide as the stair it serves.

BS 9999 also recommends that if the occupants of ground and lower-level merge with the exit stair discharge the final exit width should be in accordance with the recommendations from BS 9999. This calculation has been carried out separately and the final exit widths are found to be in compliance with the recommendations.

4.7.2. Other Final Exit Provisions

Final exits are to be sited to:

- ensure rapid dispersal of persons from the vicinity of the building so that they are no longer in danger from fire and smoke or falling debris
- provide direct access to a street, passageway, walkway or open space
- ensure the route clear of the building is well defined, and if necessary, suitably guarded
- provide space for a wheelchair user to move

4.8. Corridors and Exit Routes

4.8.1. Locking Systems

All doors on escape routes should either not be provided with a securing device or be provided with a securing device that is easily openable without the use of a key and without having to manipulate more than one mechanism. The escape provisions should be coordinated with the security / access design. Locked escape route doors used by more than 60 people should be fitted with panic fastenings in accordance with BS EN 1125.

Any electrically powered locks should return to the unlocked position in the following conditions:

- On operation of the fire alarm;
- On loss of power or system error; and
- On activation of a manual door release unit.

Doors fitted with an electronic latch (e.g. operated by a swipe card reader) on the unsecure side (e.g. leading to plant areas, etc.) should have door latches operated by a handle on the secure side (so people inside the room will always be able to escape).

4.8.2. Hold Open Devices

Any fire doors fitted with hold-open devices should be designed in accordance with BS EN 1155 and BS 5839-3 and should release:

- Automatically upon actuation of the fire alarm system;
- Manually upon operation or operation of a hand-operated switch fitted in a suitable position, if necessary; and
- Automatically upon failure of the electrical supplies.

4.8.3. Exit Route Dimensions

A clear height of 2.0m will be maintained throughout the escape routes. Doorways are exempt from this minimum height.

Horizontal escape routes should have a minimum width of 800mm in all cases and should not narrow down in the direction of escape. Note that Part M of The Building Regulations may require routes to be wider than this for use by mobility impaired persons (See Section 4.5).

The width of corridors cannot be less than 1200mm. This may be reduced to 1000mm where the corridor is not accessible to wheelchair users. The width of a door in a corridor should be not less than the corridor width (required width) minus 150mm.

A door opening towards a corridor, or a stairway should be sufficiently recessed to prevent its swing from encroaching on the effective width of the stairway or corridor.

While the majority of areas in the Thomas' London Day School development meet the minimum corridor width requirement of 1200mm, certain sections, such as the west wing at levels 01 and 02 in the Main Building, have widths measuring around 880mm. This deviation is deemed acceptable, taking into account its status as an existing condition that has not been rendered less satisfactory.

4.9. Inner Rooms

Inner rooms are rooms where the only escape route from the room is through another room, which is called the access room. Inner rooms exist in the building (e.g., Store, Control Room, etc.).

For compliance, the following must be provided for inner rooms in Thoms' London Day School development:

- A suitably sited vision panel not less than 0.1m^2 is located in the door or walls of the inner room; or,
- The access room is protected by an automatic smoke detector that operates an alarm that is immediately audible in the inner room.

4.10. Provisions for Persons of Reduced Mobility (PRM)

It is the responsibility of the tenant to operate their own policy on providing assistance to occupants who cannot negotiate stairs unaided and for ensuring that hearing and visually impaired occupants are notified of a fire and assisted to an evacuation point. This must form part of their internal procedures.

Every escape stair in a building must be provided with a disabled refuge at each level. Each refuge must be provided with a 2-way intercommunication device designed in accordance with BS 5839-9 to allow disabled users to communicate with the building management and the fire brigade at the fire alarm panel. To accommodate the wide variety of wheelchairs in use, the space provided for a wheelchair in a refuge should be not less than 900mm × 1400mm allowing for manoeuvring. To enable wheelchair users to manoeuvre themselves into the refuge, the door width should have a clear opening of not less than 850mm.

In consideration of the existing structure, refuge points will be strategically positioned within the building wherever feasible. In instances where this isn't viable, a comprehensive Personal Emergency Evacuation Plan (PEEP) will be developed. This plan specifically addresses the needs of occupants requiring assistance during evacuation. Integration of PEEPs into the overall building management strategy ensures a comprehensive approach to emergency procedures.

5. Active Fire Safety Systems

5.1. Sprinkler System

Due to the height and existing nature of the building, sprinklers are not required to be fitted.

5.2. Fire Detection and Alarm

5.2.1. Detection

The minimum level of automatic fire detection system needed to comply with the recommendations of BS 9999 for buildings with A2 risk profile is a Category M system. A category M system consists of manual call points suitably located near to the exits from the building. However, it is understood that the development will be provided with a category L1 detection and alarm system throughout.

The system that is installed should be of the analogue addressable type. It is recommended that a main panel be installed at a suitable location to be agreed with the fire and rescue service.

5.2.2. Alarm

The fire alarm system should be installed in accordance with BS 5839-1 incorporating sufficient sounders to be clearly audible throughout.

Flashing beacons are also recommended to be provided in areas where people with hearing impairment may be in relative isolation (e.g., toilets) or where ambient noise levels are high (>90dbA).

5.3. Emergency Lighting

Suitable lighting should be provided to all premises to enable the safe movement of persons along escape routes to a place of relative or ultimate safety. Emergency escape lighting should be provided in accordance with Table 5-1, BS 5266-1, and BS EN 1838.

Occupancy Characteristic	Area Requiring Emergency Lighting
A	Underground or windowless accommodation. Stairways in a central core or serving storey(s) more than 18m above ground level. Internal corridors more than 30 m long Open-plan areas of more than 60 m^2
B	All escape routes (except in shops of three or fewer storeys with no sales floor more than 280 m^2 provided that the shop is not a restaurant or bar)
A&B	All sanitary accommodation with a floor area over 8m^2 Windowless sanitary accommodation with a floor area not more than 8m^2 Electricity and generator rooms Switch room/battery room for emergency lighting system

Table 5-1: Emergency Lighting Requirements

5.4. Exit Signage

Every doorway or other exit providing access to a means of escape, other than exits in ordinary use (e.g., main entrances), will be distinctively and conspicuously marked by an exit sign in accordance with BS ISO 3864-1 and BS 5499-4.

6. Internal Fire Spread

6.1. Structural Fire Resistance

Main Building

The topmost occupied floor is considered to be lower than 18m above entrance level, as such the structural fire resistance must achieve 60 minutes. The lower ground is less than 10m deep. Therefore, the basement should be separated from the upper level by 60 minutes fire resisting construction. Owing to the sleeping accommodation, compartment floors are required within the main building. The compartment floor should achieve 60 minutes fire resisting construction.

Library Building

The topmost occupied floor is considered to be lower than 18m above entrance level, as such the structural fire resistance must achieve 60 minutes. The basement is less than 10m deep. Therefore, the basement should be separated from the upper level by 60 minutes fire resisting construction.

Longley House

The Longley house is a single storey building. Height of the building is assumed to be less than 5m. Therefore, the structural fire resistance should achieve 30 minutes.

Red house

The topmost occupied floor is considered to be lower than 18m above entrance level, as such the structural fire resistance must achieve 60 minutes. The basement is less than 10m deep. Therefore, the basement should be separated from the upper level by 60 minutes fire resisting construction.

6.2. Compartmentation

6.2.1. Floors

The height of the main building is less than 30m and simultaneous evacuation will be employed within the building, therefore, the floors are not required to be compartment floors per BS 9999 recommendations. However, since sleeping accommodations are present within the same building, the floor should be compartment floors achieving at least 60 minutes of fire resistance.

Library building and Red House only require compartment floors between the ground floor and the basement.

6.2.2. Different Risk Profiles

Construction separating the two different risk profiles (risk profile A and Cii) should achieve a fire resistance of at least 60 minutes in the Main building. Risk profiles in all other buildings are considered to be A2 throughout.

6.2.3. Shafts

Any shafts (stairs, lifts, and risers) must be designed as protected shafts achieving 60 minutes fire resistance in the main building. Shafts withih the library and red house building penetrating basement floors should be constructed as a protected shaft with 60 minutes of fire resistance.

6.2.4. Protected lobby

The lobbies Infront of the stairs and lifts must be designed as protected lobbies at the basement/lower ground levels. in case of single escape, protected lobbies should be provided between the stairs and accommodation. As the stair capacity calculation is carried out based on discounting one stair, protected lobbies to the stair in other instances would not be required.

The protected lobbies should achieve at least 30 minutes fire resistance.

6.2.5. Fire Doors

Fire doors are required to be provided in accordance with Table 30 of BS 9999. A detailed markups showing fire resistance of rooms and doors will be provided as the design progresses.

6.2.6. Subdivision of corridors

If a corridor provides access to alternative escape routes, there is a risk that smoke will spread along it and make both routes impassable before all occupants have escaped. To avoid this, every corridor more than 12 m long which connects two or more storey exits should be subdivided by self-closing fire doors (and any necessary associated screens), so that the fire door(s) and any associated screen(s) are positioned approximately mid-way between the two storey exits.

In both the Main Building and the Library Building, the installation of cross corridor fire doors (FD30S) is required due to corridor lengths exceeding 12 meters. An exception arises on the ground floor of the Main Building, where it is not feasible to provide a cross corridor. This is deemed reasonable, taking into account the existing conditions, which is not made any less satisfactory. Additionally, this specific corridor features a double-height ceiling, fire separated from level 01, serving as a designated smoke reservoir. This arrangement has been discussed and agreed upon with the building control authorities.

6.2.7. Plant and Ancillary Areas

Plant rooms and ancillary areas must be enclosed in fire resisting construction in accordance with Table 29 of BS 9999, shown in Figure 6-1.

Table 29 **Structural fire protection of areas of ancillary accommodation**

	Area of ancillary accommodation	Type of construction needed to separate ancillary accommodation from other parts of the building
1	Storage areas greater than 1 m² in area but not greater than 450 m² (other than refuse storage areas).	Robust construction having a minimum standard of fire resistance of 30 min [A]
2	Repair and maintenance workshops where flammable or highly flammable liquids are not used or stored	
3	Kitchens (separately or in conjunction with an associated staff restaurant or canteen)	
4	Transformer, switchgear, and battery rooms for low-voltage or extra-low-voltage equipment	
5	Engineering services installation rooms (other than those covered by items 8, 15 and 19)	
6	Dressing rooms or changing rooms	
7	Cinema projection rooms [B]	
8	Storage areas greater than 450 m² (other than refuse storage areas)	Robust solid non-combustible construction having a minimum standard of fire resistance of 60 min [A]
9	Car parks within or adjoining the building and not greater than 450 m² in area	
10	Service installation rooms (other than those covered by items 4, 16, 17, 18, 19)	
11	Places classified as high fire risk areas	
12	Repair and maintenance workshops where flammable or highly flammable liquids are used or stored	
13	Covered loading bays and storage areas other than those covered in items 1 and 8	Robust solid non-combustible construction having a minimum standard of fire resistance equivalent to that required for the elements of construction of the building and in no case less than 60 min [A]
14	Car parks within or adjoining the building and greater than 450 m² in area	
15	Refuse storage areas	
16	Boiler rooms	
17	Fuel storage spaces	
18	Transformer and switchgear rooms for equipment above low voltage	
19	Rooms housing fixed internal combustion engine(s)	
20	Scene docks	
21	Any electrical substation or enclosure containing any distribution board, generator, powered smoke control plant, pressurization plant, communication equipment, and any other equipment associated with life safety and fire protection systems	Robust solid non-combustible construction having a minimum standard of fire resistance of not less than 120 min [C]

[A] Any openings in the required construction should be protected by doors having a similar standard of fire resistance.

[B] Attention is drawn to the Cinematograph (Safety) Regulations 1955 [47] in particular in respect of cellulose nitrate film.

[C] Any openings in the required construction should be protected by doors having a fire resistance not less than 60 min.

Figure 6-1: BS 9999: Plant and Ancillary Fire Resistance

6.3. Fire Stopping

All elements and services that penetrate a compartment wall, floor or other element of fire resisting construction is required to be fire stopped using a method appropriate to the element penetrated and the surrounding construction.

Typical fire stopping materials include:

- Cement mortar
- Gypsum-based plaster
- Cement-based or gypsum-based vermiculite/perlite mixes
- Glass fibre, crushed rock, blast furnace slag or ceramic-based products (with or without resin binders)
- Intumescent mastics

Systems used must be designed, installed, tested, and maintained in full accordance with the relevant BS 476 standard and should provide a level of fire resistance that is at least equal to that of the surrounding construction.

All ventilation duct work will also need to be fire stopped where it penetrates a fire separating element and provided with an appropriate means of preventing a potential route for fire spread through the duct, e.g., fire/smoke dampers.

Where a ventilation duct serves more than one part of a compartmented or fire separated protected escape route, smoke detector operated fire dampers must be provided where ductwork enters each fire separated or smoke separated section of the escape route.

All service ducts, pipes and shafts must be in accordance with Clause 32.5 of BS 9999.

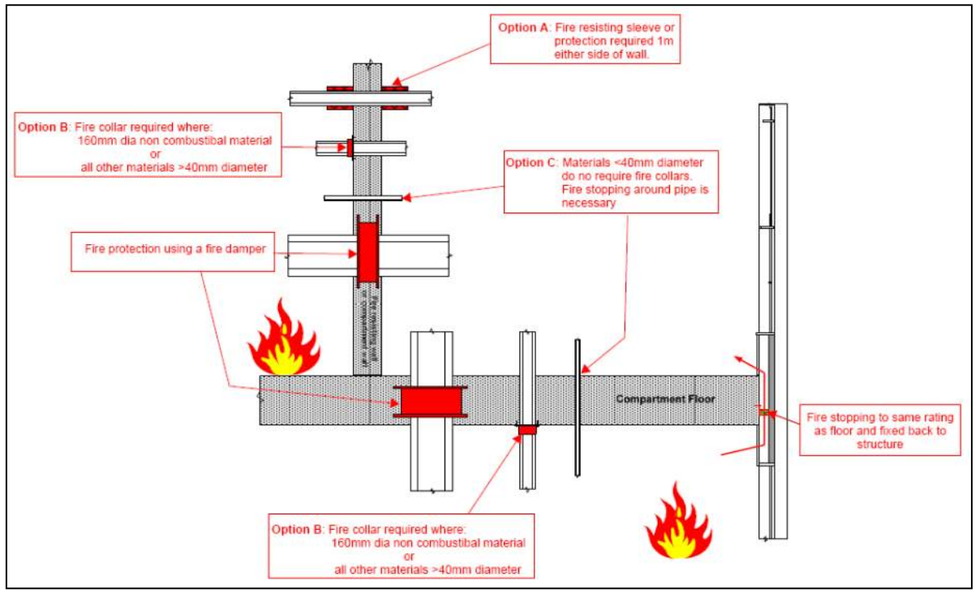


Figure 6-2: Fire Stopping

6.4. Concealed Spaces

The provision of cavity barriers has not been checked on site. The following is provided as guidance only.

Concealed spaces and cavities in the building can allow the rapid unseen spread of fire and smoke to areas remote from the place of origin.

The cavity barriers must provide a minimum of 30/15 minutes fire resistance period in terms of integrity and insulation respectively. Cavity barriers must be securely supported so as to guarantee integrity and insulations properties irrespective of the failure of un-rated components.

In accordance with BS 9999, cavity barriers must be provided as follows:

- All junctions between an external cavity wall and every compartment floor and compartment wall.
- All junctions between an internal cavity wall and every compartment floor, compartment wall, or other wall or door assembly which forms a fire-resisting barrier.
- For a protected escape route, i.e., protected corridor, a cavity that exists above or below any fire resisting construction must either be fitted with cavity barriers on the line of the enclosures to the protected escape route or for the cavities above the fire resisting construction, enclosed on the lower side by a fire resisting ceiling which extends throughout the building, compartment or separated part.
- Where the dimension of any uninterrupted extensive cavity is greater than 20m. The maximum dimensions of cavities must be not greater than 20m in any direction.

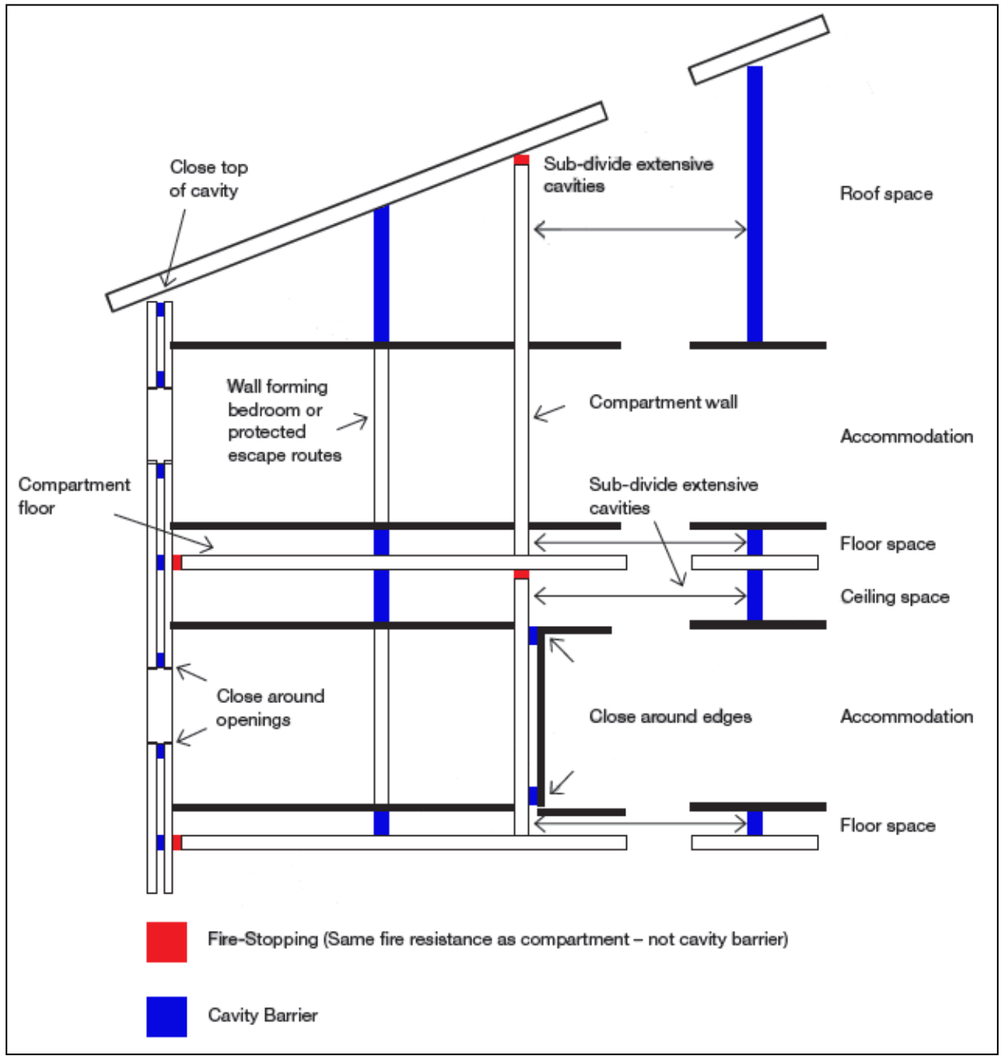


Figure 6-3: Fire Stopping and Cavity Barriers

6.5. Surface Linings

The spread of fire within the building must be restricted through appropriate provision of the internal linings (to partitions, walls, ceilings and internal structures, roof, lights, and lighting diffusers) such that they will:

- Adequately resist the spread of flame over their structure; and
- Restrict their release of heat in the event of fire.

Unless otherwise stated, the appropriate provisions of Table 33 in BS 9999 are applied in all areas (See Figure 6-4).

Location	National class [B]	European class [C], [D]
Small room of area not exceeding 4 m^2 in a residential building and 30 m^2 in a non-residential building and domestic garages not exceeding 40 m^2	3	D-s3, d2
Other rooms (including garages)	1	C-s3, d2
Circulation spaces within dwellings	1	C-s3, d2
Other circulation spaces [D] including the common areas of flats	0	B-s3, d2

NOTE Linings which can be effectively tested for "surface spread of flame" are rated for performance by reference to the method specified in BS 476-7:1987, under which materials or products are classified 1, 2, 3 or 4, with Class 1 being the highest.

Class 0 is better than Class 1. It is not identified in any BS test standard. A Class 0 product is either:

a) composed throughout of materials of limited combustibility; or

b) a material having a Class 1 surface spread of flame and which has a fire propagation index (I) of not more than 12 and a sub-index (i_1) of not more than 6.

The fire propagation index is established by reference to the method specified in BS 476-6.

European classifications are described in BS EN 13501-1.

[A] Recommendations are given in Clause **34** for linings of concealed voids.
[B] The national classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class, unless they have been tested accordingly.
[C] When a classification includes "s3, d2" this means that there is no limit set for smoke production and/or flaming droplets/particles.
[D] Large rooms such as open plan offices, shops display areas and factories need not be regarded as circulation spaces even though there are circulation routes in them.

Figure 6-4: BS 9999: Wall and Ceiling Linings

7. External Fire Spread

7.1. Unprotected Areas

7.1.1. General

No alteration to the external wall of the building or unprotected area openings are proposed in the refurbishment. Therefore, the existing condition is considered compliant.

7.2. External Façades

No alteration to the external façade is proposed for the development.

8. Access and Facilities for the Fire and Rescue Service

8.1. Firefighting Facilities and Fire vehicle access

The height of the blocks to be refurbished to the topmost occupied storey is less than 18m. As such a firefighting shaft is not required for this development.

Fire mains are not provided within the buildings. As such, from BS9999 perspective, fire service vehicle access should be provided to cover the perimeter of the building based on the total floor area.

Total floor area of the building (m^2)[a]	Position of access (% of perimeter) [b]
<2000	Within 45m of every point on the projected plans or 15% whichever is less onerous
2000 to 8000	15%[C]
8000 to 16000	50%[C]
16000 to 24000	75%[C]
>24000	100%[C]
(a) The total floor area is the aggregate of the floor areas of all the storeys in the building. (b) "Perimeter" refers to the face of the total length of all exposed perimeter walls. (c) Any perimeter wall (elevation) to which vehicle access is provided should have a door, not less than 750 mm wide, giving access to the interior of the building.	

Table 8-1: Emergency Lighting Requirements

Main Building

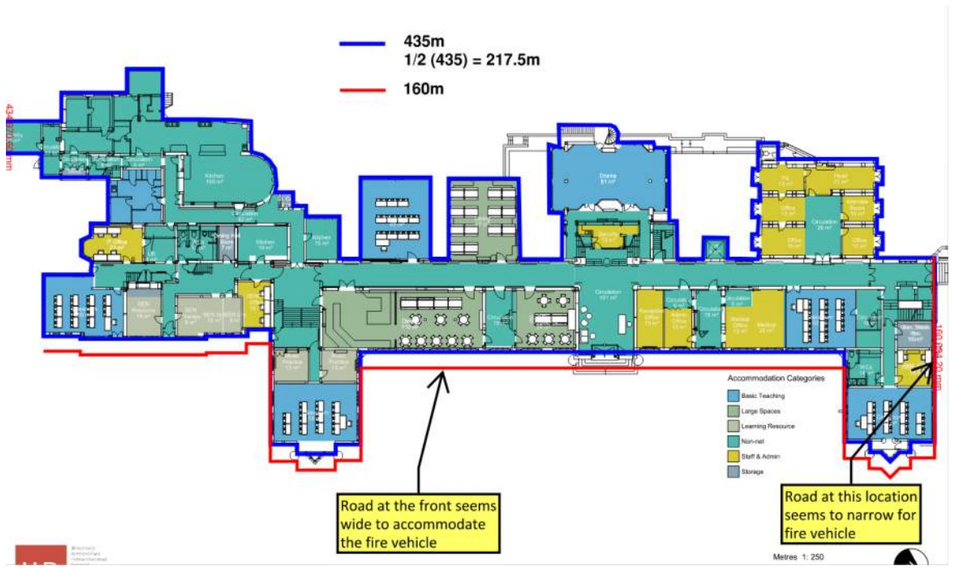


Figure 8-1: BS 9999: Main Building Fire service access

The main building's total floor area ranges from 8000 m2 to 16000 m2, necessitating 50% coverage for fire service access per BS9999. The building's perimeter, approximately 435m (blue line), requires 217.5m of coverage for fire vehicles. However, Google Maps indicates access from the front road (south) and a portion of the east road, totalling approximately 160m (red line), falling short of the required coverage. Also, the portion of east road seems to be too narrow (from google maps) for fire vehicle which will further reduce the coverage. Given the existing condition and no proposed alterations to the exterior affecting fire service access, it can be considered satisfactory.

Library Building

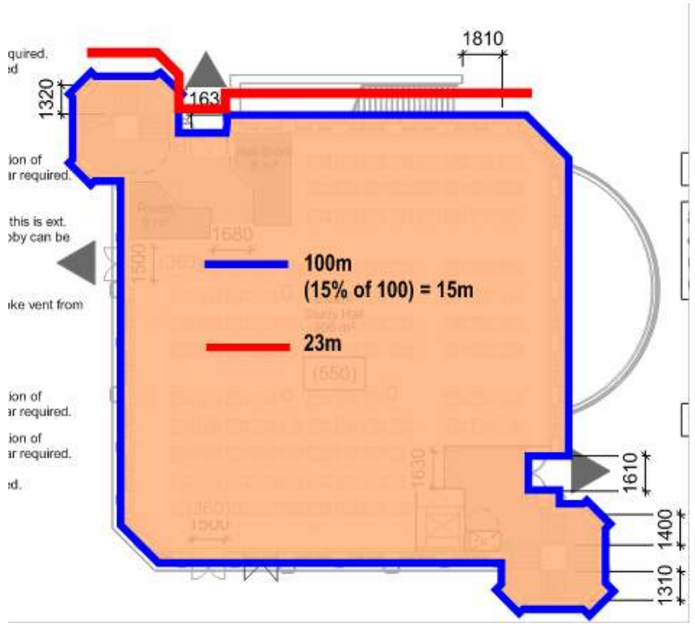


Figure 8-2: BS 9999: Library Building Fire service access

The library building, with a total area of less than 2000m2, necessitates 15% perimeter coverage as per BS 9999. The building's perimeter, measured at approximately 100m (blue line), requires 15m coverage by the fire service access vehicle. Currently, the existing fire service access road covers over 15m of the building perimeter, approximately 23m (red line). This arrangement is in compliance with regulations and is not proposed to be altered.

Longley House

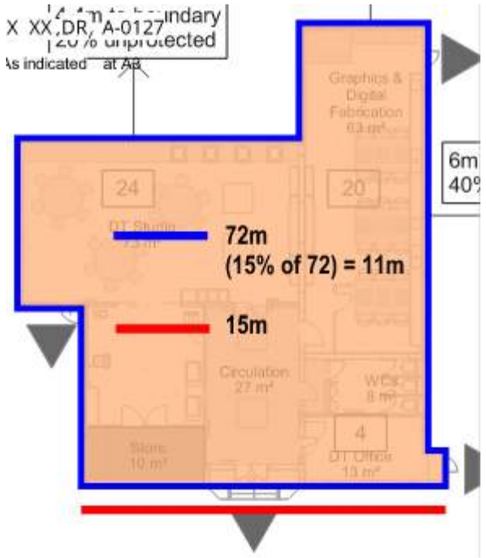


Figure 8-3: BS 9999: Longley House Fire service access

Longley House, with a total area of less than 2000m2, requires 15% perimeter coverage according to BS 9999. The building's perimeter, measured at approximately 72m (blue line), necessitates 11m coverage by the fire service access vehicle. Currently, the existing fire service access road covers more than 11m of the building perimeter, approximately 15m (red line). This configuration complies with regulations and is not proposed to be altered.

Red House

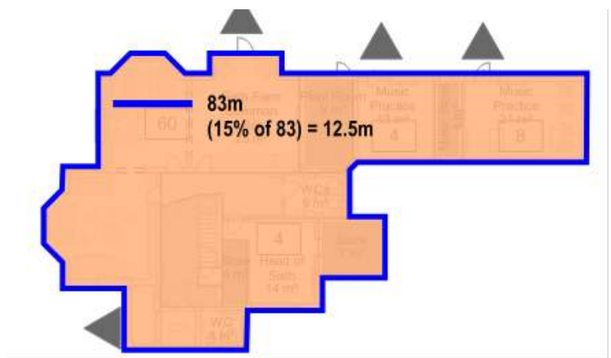


Figure 8-4: BS 9999: Red House Fire service access

Red House, with a total area of less than 2000m2, necessitates 15% perimeter coverage according to BS 9999. The building's perimeter, measured at approximately 83m (blue line), requires 12.5m coverage by the fire service access vehicle. The existing fire service access road is approximately 18m away from the Red House entrance. While the precise road location on the site plan is unknown, Google Maps is referenced. Based on available information, it is understood that more than 12.5m of the building perimeter is located within 45m of the existing fire service access road. See below for approximate measurements.

Figure 8-5: BS 9999: Red House Fire service access (reference – Google maps)

In all cases, the fire service access remains unchanged, and the existing arrangements are deemed reasonable for these buildings.

8.2. Fire Hydrant

BS 9990 recommends that existing fire hydrants must be provided within 90m to the entrance of the building and no more than 90m apart. Information related to the fire hydrant is not available at the time this report is prepared. This will be included as part of the design progress.

9. Managing Fire Safety

9.1. Management Levels

According to the nature of the occupancy of a building there is a varying requirement for the level of complexity in the fire management arrangements. BS 9999 identifies two levels of management as:

- Level 1 (enhanced) - the highest level of assurance conforming to a management system standard such as PAS 7.
- Level 2 (adequate) – adequate level of assurance conforming to requirements of legislation.

Risk Profile	Acceptable Management Level
A2	Level 2

Table 9-1: Minimum Management Levels

9.2. Duties and Responsibilities

Areas of control outlined in BS 9999 for consideration are:

- Planning for changes in risk profile
- Resources and authority
- Staffing level
- Fire training
- Work control (e.g., repairs to structure)
- Communications procedures
- Maintenance and testing of fire safety systems
- Liaison with fire and rescue service
- Contingency planning

Greater detail in addressing each of these points will need to be developed by the owner/occupier/tenant as part of the management strategy for the building.

To be included in the management strategy is the requirement for clear instructions to be followed with respect to means of escape.

10. Fire strategy comments

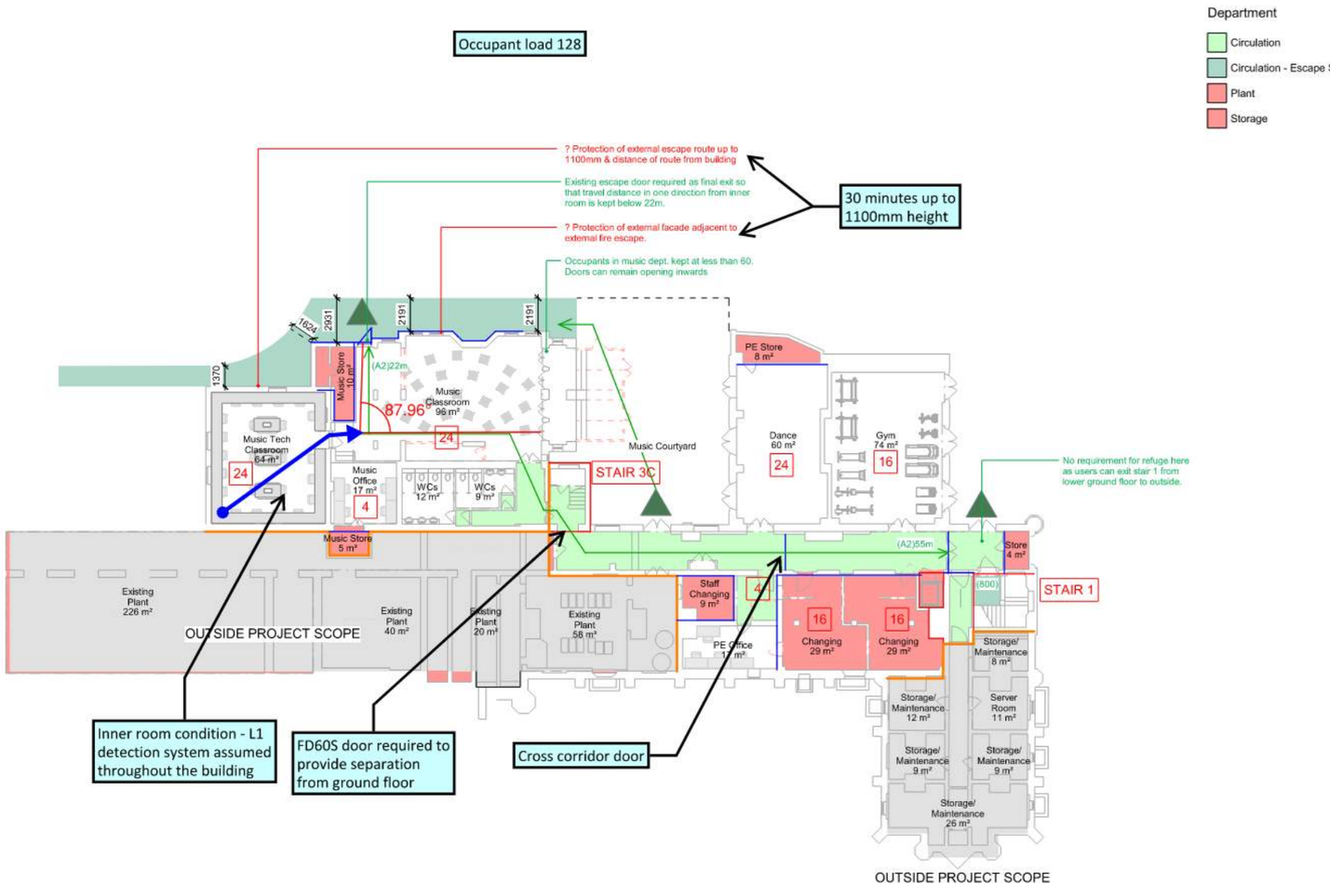
Main Building

Thomas's College

Fire Strategy - Lower Ground Floor Main Building

1714 IID XX XX DR A-0121

Scale: As indicated at A3



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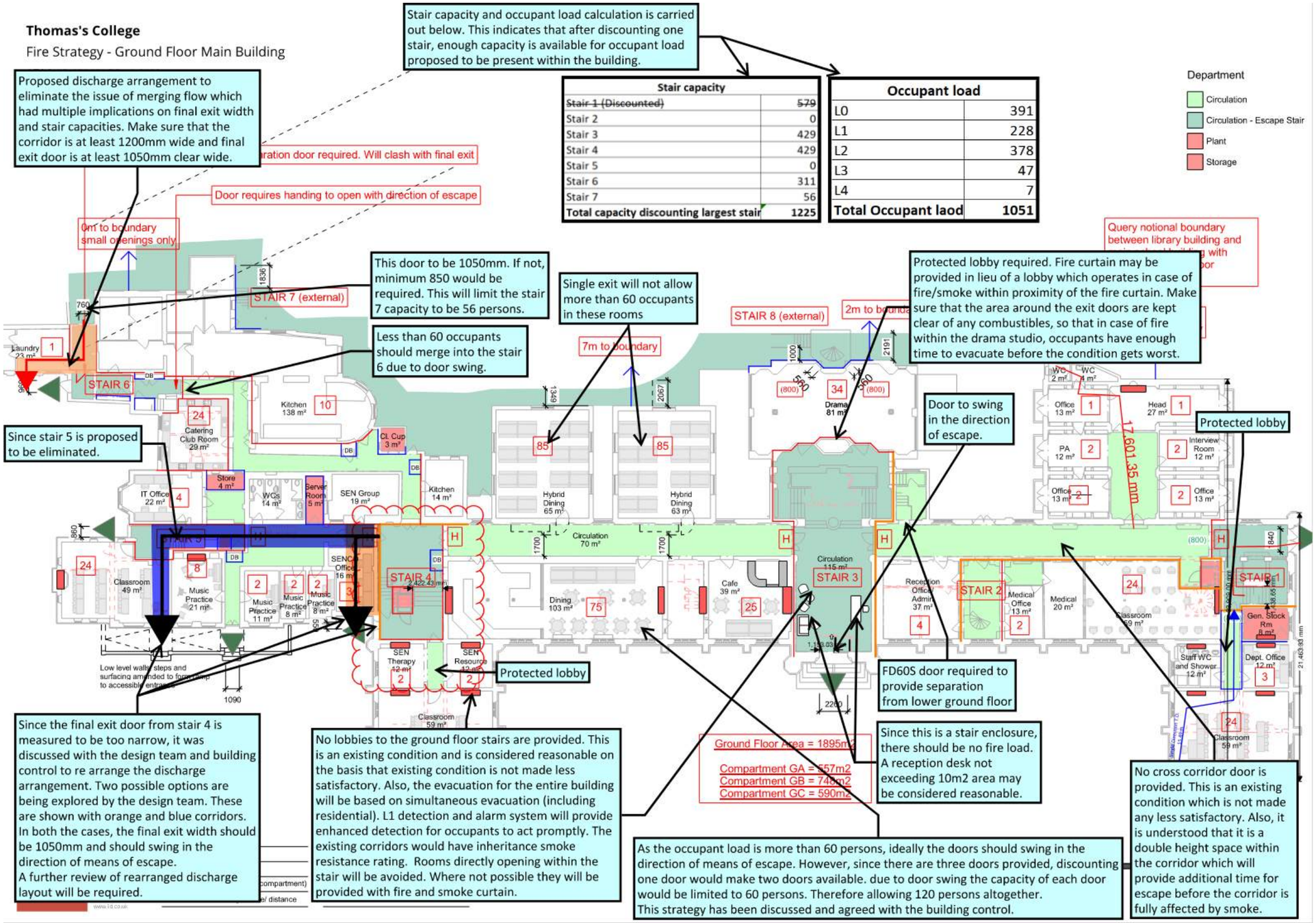
Legend

30 min FR	34 Occupancy
60 min FR	Final Exit
60 min FR (compartment)	
Escape route/ distance	

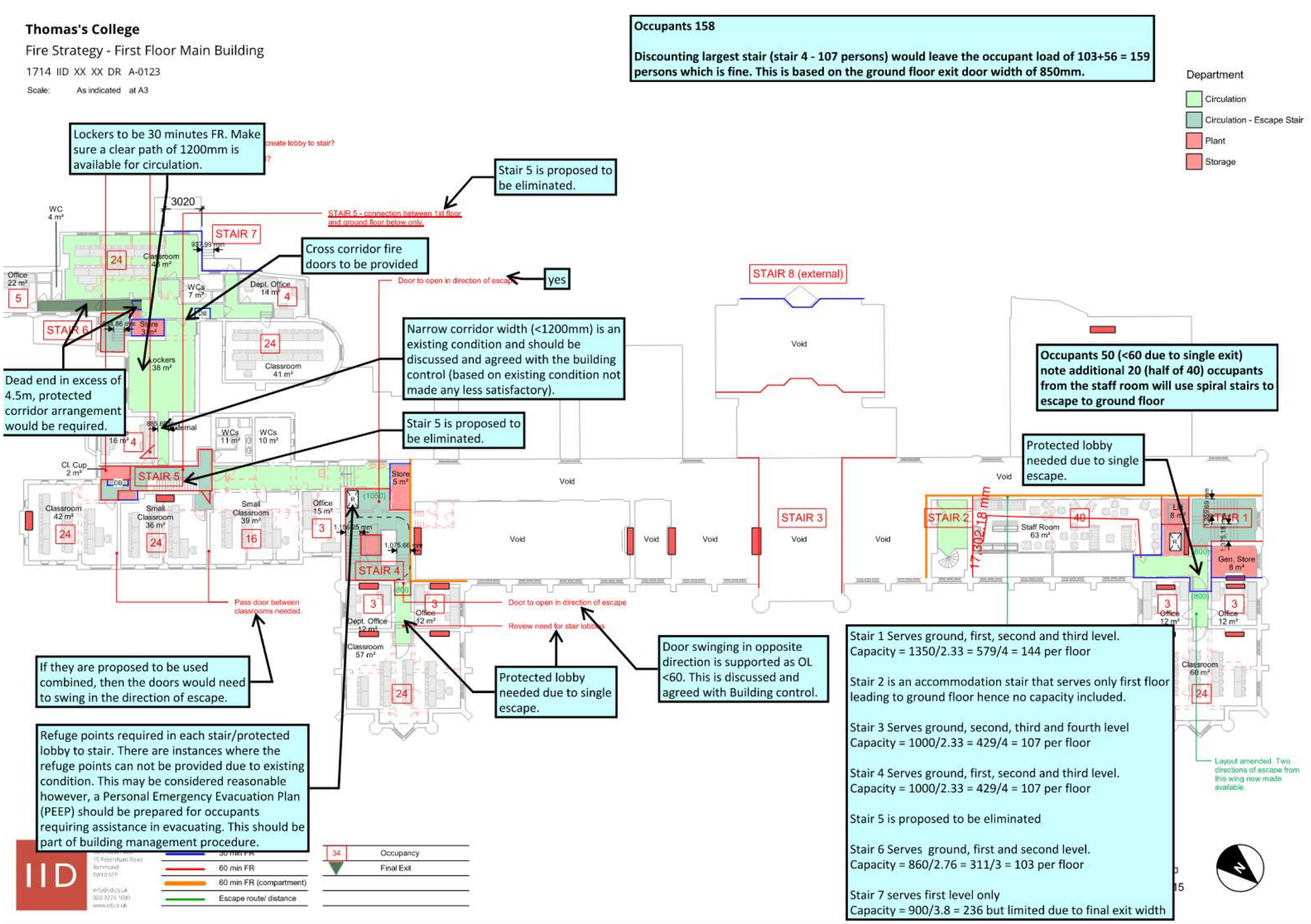
Metres 1: 250

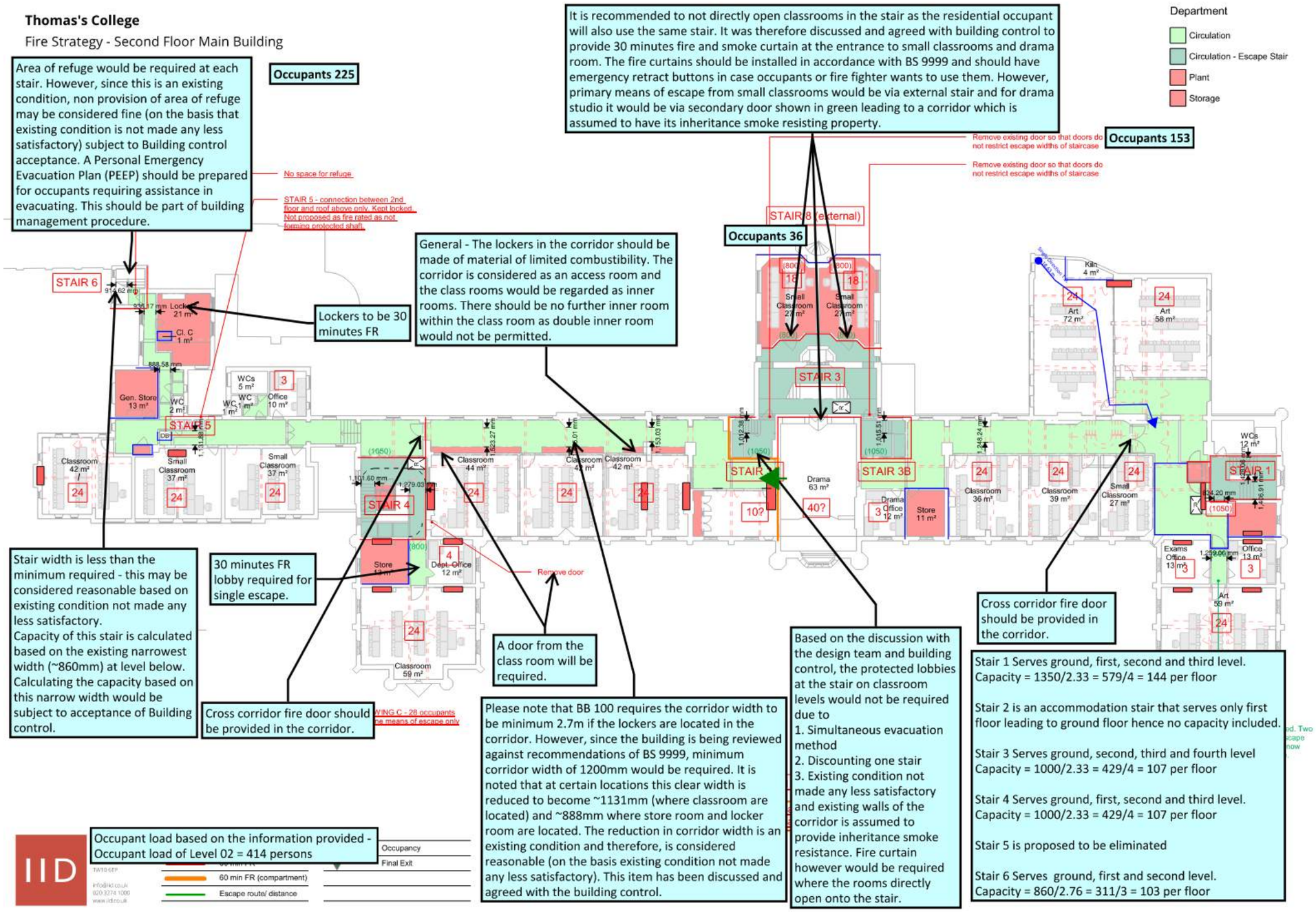
0 2.5 5 7.5 10 12.5 15

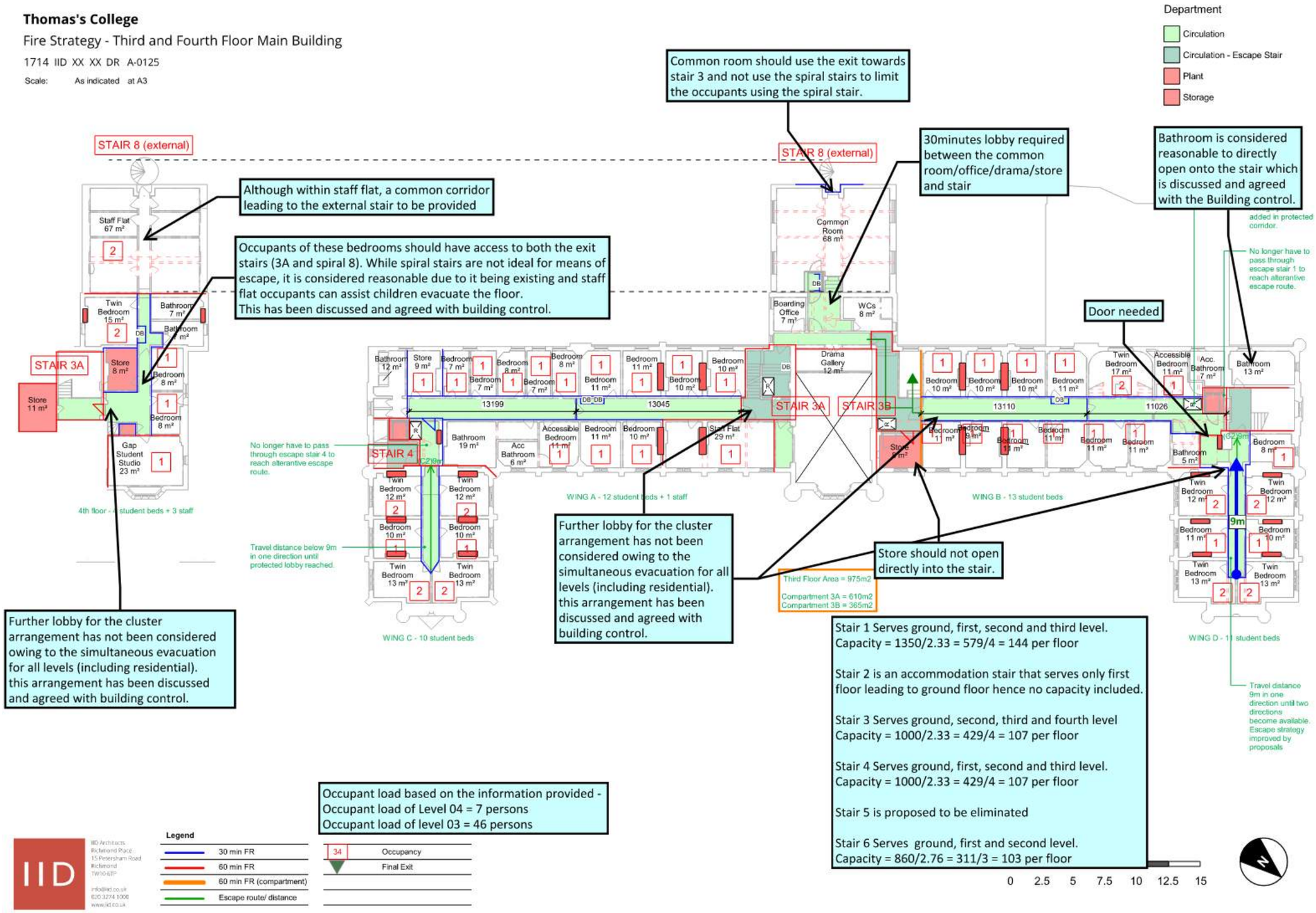


Stair capacity	
~~Stair 1 (Discounted)~~	~~579~~
Stair 2	0
Stair 3	429
Stair 4	429
Stair 5	0
Stair 6	311
Stair 7	56
Total capacity discounting largest stair	**1225**

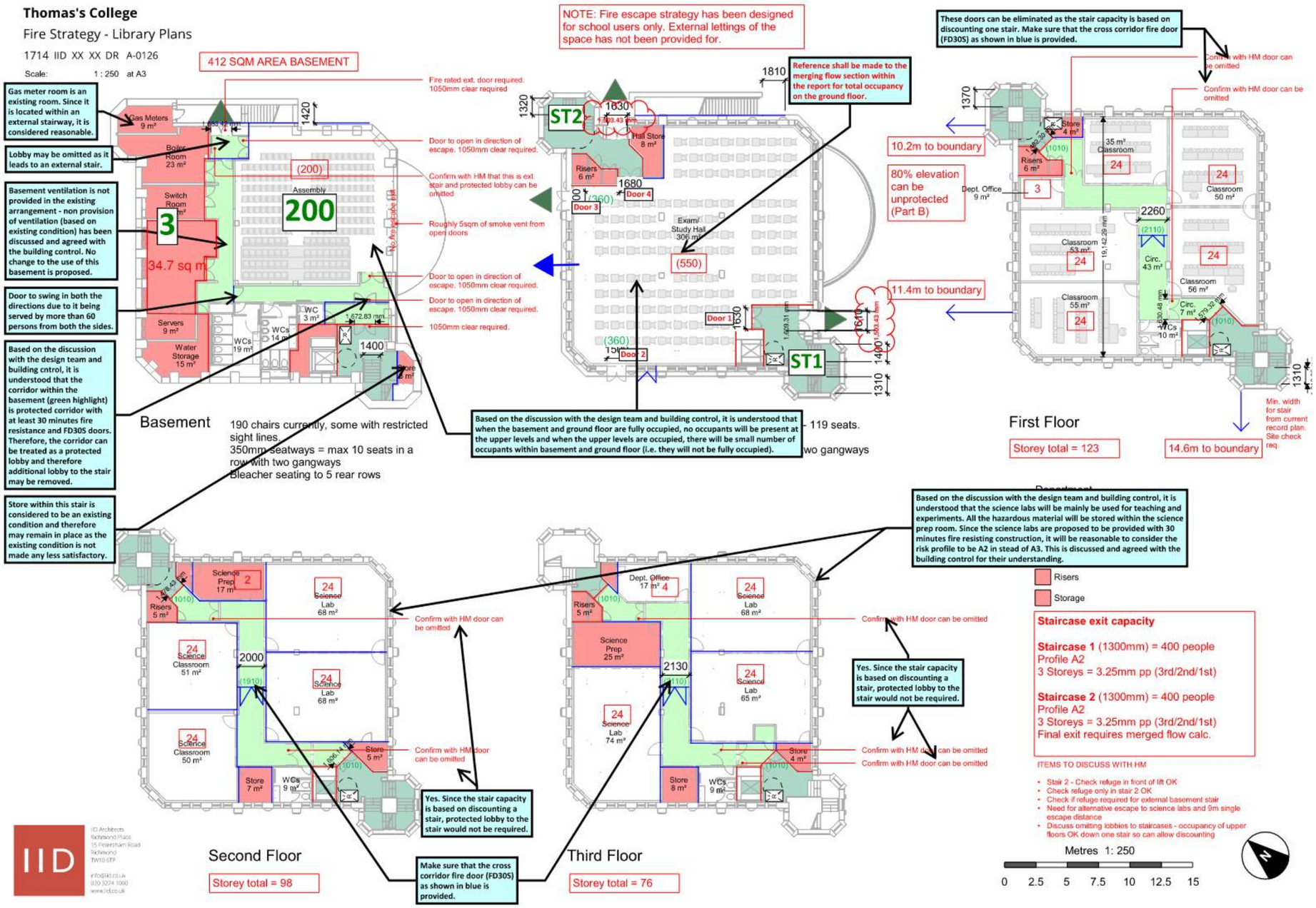
Occupant load	
L0	391
L1	228
L2	378
L3	47
L4	7
Total Occupant laod	**1051**


Thomas's College
Fire Strategy - First Floor Main Building
1714 IID XX XX DR A-0123
Scale: As indicated at A3
Occupants 158
Discounting largest stair (stair 4 - 107 persons) would leave the occupant load of 103+56 = 159 persons which is fine. This is based on the ground floor exit door width of 850mm.
Department
Circulation
Circulation - Escape Stair
Plant
Storage
Lockers to be 30 minutes FR. Make sure a clear path of 1200mm is available for circulation.
Stair 5 is proposed to be eliminated.
Cross corridor fire doors to be provided
yes
Narrow corridor width (<1200mm) is an existing condition and should be discussed and agreed with the building control (based on existing condition not made any less satisfactory).
Stair 5 is proposed to be eliminated.
Dead end in excess of 4.5m, protected corridor arrangement would be required.
STAIR 8 (external)
Void
Occupants 50 (<60 due to single exit) note additional 20 (half of 40) occupants from the staff room will use spiral stairs to escape to ground floor
Protected lobby needed due to single escape.
STAIR 7
STAIR 6
STAIR 5
STAIR 4
STAIR 3
STAIR 2
STAIR 1
Pass door between classrooms needed.
If they are proposed to be used combined, then the doors would need to swing in the direction of escape.
Refuge points required in each stair/protected lobby to stair. There are instances where the refuge points can not be provided due to existing condition. This may be considered reasonable however, a Personal Emergency Evacuation Plan (PEEP) should be prepared for occupants requiring assistance in evacuating. This should be part of building management procedure.
Door to open in direction of escape
Review need for stair lobbies
Protected lobby needed due to single escape.
Door swinging in opposite direction is supported as OL <60. This is discussed and agreed with Building control.
Stair 1 Serves ground, first, second and third level.
Capacity = 1350/2.33 = 579/4 = 144 per floor
Stair 2 is an accommodation stair that serves only first floor leading to ground floor hence no capacity included.
Stair 3 Serves ground, second, third and fourth level
Capacity = 1000/2.33 = 429/4 = 107 per floor
Stair 4 Serves ground, first, second and third level.
Capacity = 1000/2.33 = 429/4 = 107 per floor
Stair 5 is proposed to be eliminated
Stair 6 Serves ground, first and second level.
Capacity = 860/2.76 = 311/3 = 103 per floor
Stair 7 serves first level only
Capacity = 900/3.8 = 236 but limited due to final exit width
Layout amended. Two directions of escape from this wing now made available.
30 min FR
60 min FR
60 min FR (compartment)
Escape route/ distance
Occupancy
Final Exit
IID


Thomas's College
Fire Strategy - Second Floor Main Building
Area of refuge would be required at each stair. However, since this is an existing condition, non provision of area of refuge may be considered fine (on the basis that existing condition is not made any less satisfactory) subject to Building control acceptance. A Personal Emergency Evacuation Plan (PEEP) should be prepared for occupants requiring assistance in evacuating. This should be part of building management procedure.
Occupants 225
No space for refuge
STAIR 5 - connection between 2nd floor and roof above only. Kept locked. Not proposed as fire rated as not forming protected shaft.
It is recommended to not directly open classrooms in the stair as the residential occupant will also use the same stair. It was therefore discussed and agreed with building control to provide 30 minutes fire and smoke curtain at the entrance to small classrooms and drama room. The fire curtains should be installed in accordance with BS 9999 and should have emergency retract buttons in case occupants or fire fighter wants to use them. However, primary means of escape from small classrooms would be via external stair and for drama studio it would be via secondary door shown in green leading to a corridor which is assumed to have its inheritance smoke resisting property.
Department
Circulation
Circulation - Escape Stair
Plant
Storage
Remove existing door so that doors do not restrict escape widths of staircase
Occupants 153
Remove existing door so that doors do not restrict escape widths of staircase
STAIR 8 (external)
Occupants 36
General - The lockers in the corridor should be made of material of limited combustibility. The corridor is considered as an access room and the class rooms would be regarded as inner rooms. There should be no further inner room within the class room as double inner room would not be permitted.
Lockers to be 30 minutes FR
STAIR 6
STAIR 5
STAIR 4
STAIR 3
STAIR
STAIR 3B
STAIR 1
Stair width is less than the minimum required - this may be considered reasonable based on existing condition not made any less satisfactory.
Capacity of this stair is calculated based on the existing narrowest width (~860mm) at level below.
Calculating the capacity based on this narrow width would be subject to acceptance of Building control.
30 minutes FR lobby required for single escape.
Remove door
A door from the class room will be required.
Cross corridor fire door should be provided in the corridor.
Cross corridor fire door should be provided in the corridor.
Please note that BB 100 requires the corridor width to be minimum 2.7m if the lockers are located in the corridor. However, since the building is being reviewed against recommendations of BS 9999, minimum corridor width of 1200mm would be required. It is noted that at certain locations this clear width is reduced to become ~1131mm (where classroom are located) and ~888mm where store room and locker room are located. The reduction in corridor width is an existing condition and therefore, is considered reasonable (on the basis existing condition not made any less satisfactory). This item has been discussed and agreed with the building control.
Based on the discussion with the design team and building control, the protected lobbies at the stair on classroom levels would not be required due to
1. Simultaneous evacuation method
2. Discounting one stair
3. Existing condition not made any less satisfactory and existing walls of the corridor is assumed to provide inheritance smoke resistance. Fire curtain however would be required where the rooms directly open onto the stair.
Stair 1 Serves ground, first, second and third level.
Capacity = 1350/2.33 = 579/4 = 144 per floor
Stair 2 is an accommodation stair that serves only first floor leading to ground floor hence no capacity included.
Stair 3 Serves ground, second, third and fourth level
Capacity = 1000/2.33 = 429/4 = 107 per floor
Stair 4 Serves ground, first, second and third level.
Capacity = 1000/2.33 = 429/4 = 107 per floor
Stair 5 is proposed to be eliminated
Stair 6 Serves ground, first and second level.
Capacity = 860/2.76 = 311/3 = 103 per floor
Occupant load based on the information provided -
Occupant load of Level 02 = 414 persons
Occupancy
Final Exit
60 min FR (compartment)
Escape route/ distance
IID


Thomas's College
Fire Strategy - Third and Fourth Floor Main Building
1714 IID XX XX DR A-0125
Scale: As indicated at A3
Department
Circulation
Circulation - Escape Stair
Plant
Storage
Common room should use the exit towards stair 3 and not use the spiral stairs to limit the occupants using the spiral stair.
30minutes lobby required between the common room/office/drama/store and stair
Bathroom is considered reasonable to directly open onto the stair which is discussed and agreed with the Building control.
Door needed
Although within staff flat, a common corridor leading to the external stair to be provided
Occupants of these bedrooms should have access to both the exit stairs (3A and spiral 8). While spiral stairs are not ideal for means of escape, it is considered reasonable due to it being existing and staff flat occupants can assist children evacuate the floor.
This has been discussed and agreed with building control.
STAIR 8 (external)
STAIR 3A
STAIR 4
STAIR 3B
Staff Flat 67 m²
Common Room 68 m²
Boarding Office 7 m²
WCs 8 m²
Drama Gallery 12 m²
Store 11 m²
Store 8 m²
Gap Student Studio 23 m²
Staff Flat 29 m²
4th floor - 4 student beds + 3 staff
WING A - 12 student beds + 1 staff
WING B - 13 student beds
WING C - 10 student beds
WING D - 11 student beds
No longer have to pass through escape stair 4 to reach alterantive escape route.
Travel distance below 9m in one direction until protected lobby reached.
Further lobby for the cluster arrangement has not been considered owing to the simultaneous evacuation for all levels (including residential). this arrangement has been discussed and agreed with building control.
Further lobby for the cluster arrangement has not been considered owing to the simultaneous evacuation for all levels (including residential). this arrangement has been discussed and agreed with building control.
Store should not open directly into the stair.
Third Floor Area = 975m2
Compartment 3A = 610m2
Compartment 3B = 365m2
Stair 1 Serves ground, first, second and third level.
Capacity = 1350/2.33 = 579/4 = 144 per floor
Stair 2 is an accommodation stair that serves only first floor leading to ground floor hence no capacity included.
Stair 3 Serves ground, second, third and fourth level
Capacity = 1000/2.33 = 429/4 = 107 per floor
Stair 4 Serves ground, first, second and third level.
Capacity = 1000/2.33 = 429/4 = 107 per floor
Stair 5 is proposed to be eliminated
Stair 6 Serves ground, first and second level.
Capacity = 860/2.76 = 311/3 = 103 per floor
Occupant load based on the information provided -
Occupant load of Level 04 = 7 persons
Occupant load of level 03 = 46 persons
Legend
30 min FR
60 min FR
60 min FR (compartment)
Escape route/ distance
34 Occupancy
Final Exit
0 2.5 5 7.5 10 12.5 15
Travel distance 9m in one direction until two directions become available. Escape strategy improved by proposals
added in protected corridor.
No longer have to pass through escape stair 1 to reach alterantive escape route.

Library Building



Other Buildings