

Powerhouse

Fire Strategy Report

033870

17th February 2015

Revision 02

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1 Introduction

1.1 Aim and Basis of Design

This report outlines the concept Fire Strategy for the Powerhouse development.

In order to comply with the statutory functional life safety requirements of the Building Regulations 2000, the following guidance document has been used as a basis for design:

- BS 9999, 'Code of practice for fire safety in the design, management and use of buildings', 2008.

1.2 Building Description

The Powerhouse development is comprised of refurbished building that will be converted to form either; a music venue, or restaurant. In addition, a modern extension is proposed to house a café, and energy centre. The ground floor is divided in three sections: the Energy Centre, the Café area, and the Main Hall (restaurant or music venue). The basement will comprise of WCs and a potential plant area, and will be access via a stair from the main hall area. The first floor level which comprises of a small office, toilet and gas booster room, will be accessed via a stair leading from the ground floor of the energy centre. The main access to the development is via the ground floor, the basement depth is approximately 3.3m below finish floor level on the ground floor and 2.8m below access level.

The event space will have a B2 risk profile for occupants who are awake but unfamiliar with the building and a medium fire growth rate. This allows travel distances of 20m single direction and 50m with a choice of directions.

2 Means of Escape

2.1 Evacuation Strategy

The building will evacuate simultaneously upon activation of the alarm. The detection and alarm will be a class L2 system. This type of system consists of detectors installed only in defined parts of the protected building (a category L2 system should include the coverage required of a category L3 system). The detection system is to utilise a double-knock strategy to activate the alarm where two or more detectors are provided to a space, and to minimise the risk of alarms.

2.2 Occupancy Load & Travel Distances

The Main Hall will have an occupancy of 316 people in the worst-case situation, this is when people are standing in the venue, and is based on the architects predictions.

After discounting the largest exit from the main hall area, there are 1700mm, and 900mm exits available, therefore using 4.1mm/person exit width for a B2 risk profile allows a capacity of 634 people. As such all the potential occupants will be accommodated, with just above 50% contingency.

From the café, discounting the largest exit, leaves a 2100mm wide exit available, which has the potential to accommodate 512 people, which is in well in excess of the 60 people maximum occupancy as predicted by the architect.

The Energy Centre has three 2200mm wide exits that will accommodate the occupants in this area.

Travel distances within the Main Hall are restricted to 20m when only one direction of travel is available, and 50m when more than one direction of travel is available. Travel distances in this area are code compliant.

Travel distances in the Café/Bar area are 18m when only one exit is available, and 45m when more than one exit is available. Travel distances in this area are code compliant. See Figure 2—2.

Travel distances in the Energy Centre are restricted to 18m when only one exit is available, and 45m when more than one exit is available. This is for occupants who are awake and aware of their surroundings and assuming a fast fire growth rate. Travel distances in this area are also code compliant.

Travel distance within the first floor level, which also forms part of the Energy Centre, are restricted to 18m when only one exit is available, and 45m when more than one exit is available. One way travel distance measured from inside the office on the mezzanine floor to the bottom of the stairs, at which point multiple exits are available. The distance to the bottom of the stairs is below 18m therefore compliant, see Figure 2—3.

Travel distance within the Basement plant room is compliant with code recommendations on the basis that the plant contained in this space is low risk, or the space is used as storage. In this case the maximum travel distance permitted is 25m, this will need to be approved by Building Control. If this area becomes a high risk plant area then the maximum travel distance will be reduced to 9m. See Figure 2—4

2.3 Mobility Impaired Persons

It is recommended that an appropriate Personal Emergency Evacuation Plan (PEEP) is put in place to enable staff to be aware of disabled occupants within the building and be trained on how to assist in evacuating them to safety. This should be detailed in the Management Strategy. An eternal refuge is available outside of the north-western door from the main hall. All other exits will require the use of evacuation chairs to evacuate disable occupants to safety.

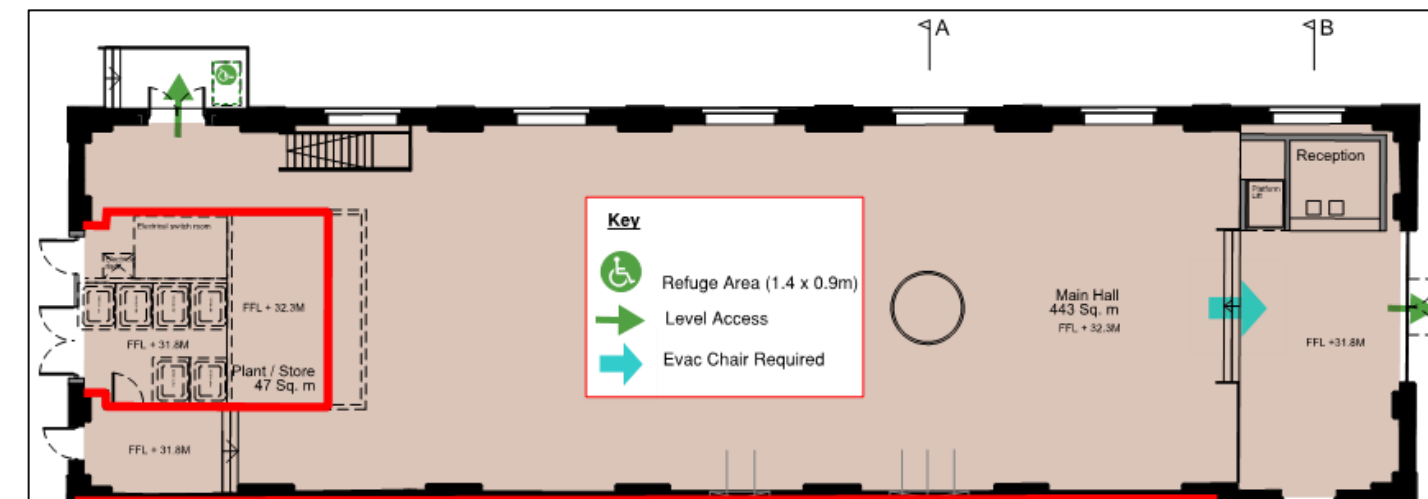


Figure 2—1 MoE Mobility Impaired Persons

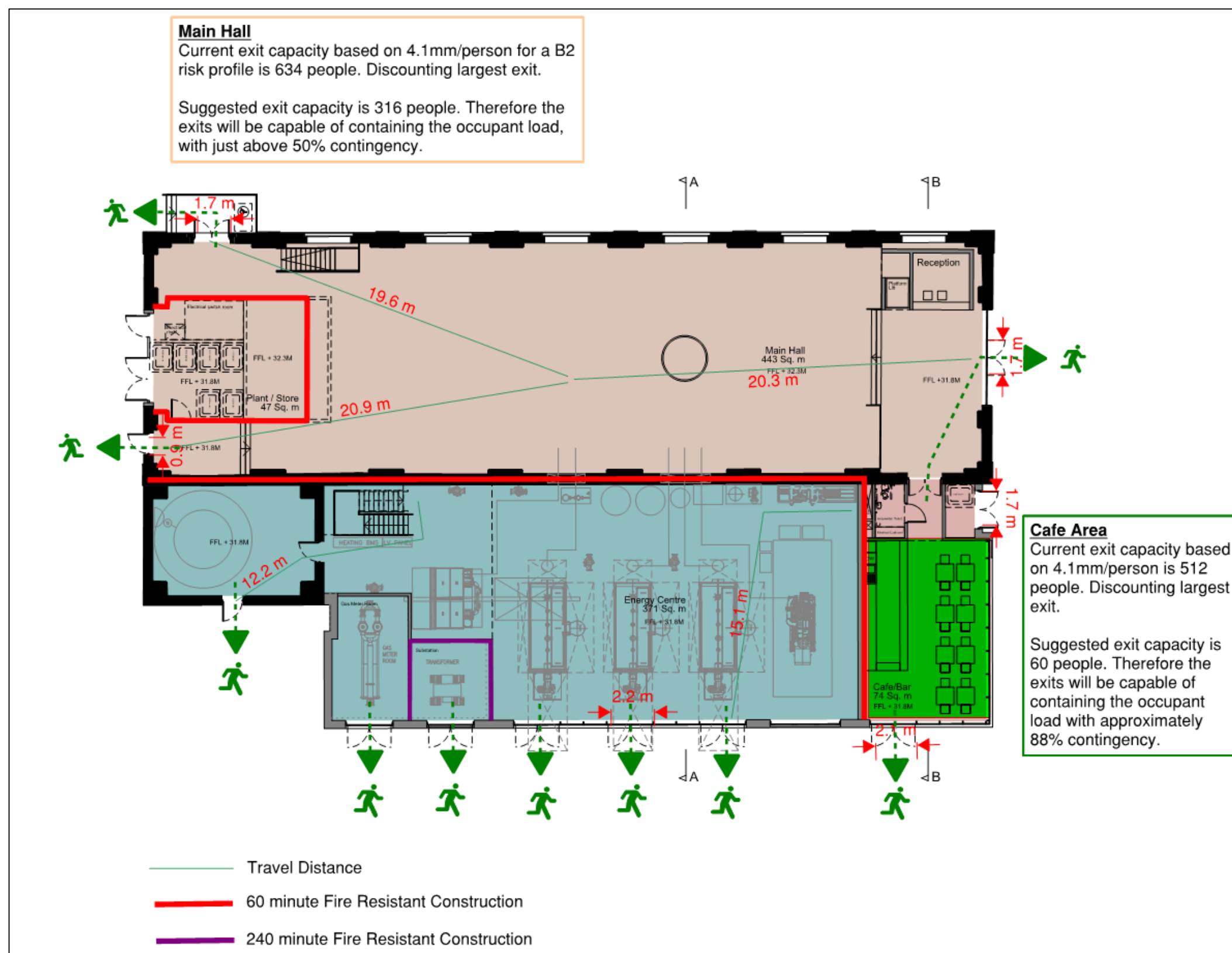


Figure 2—2 Ground Floor Plan

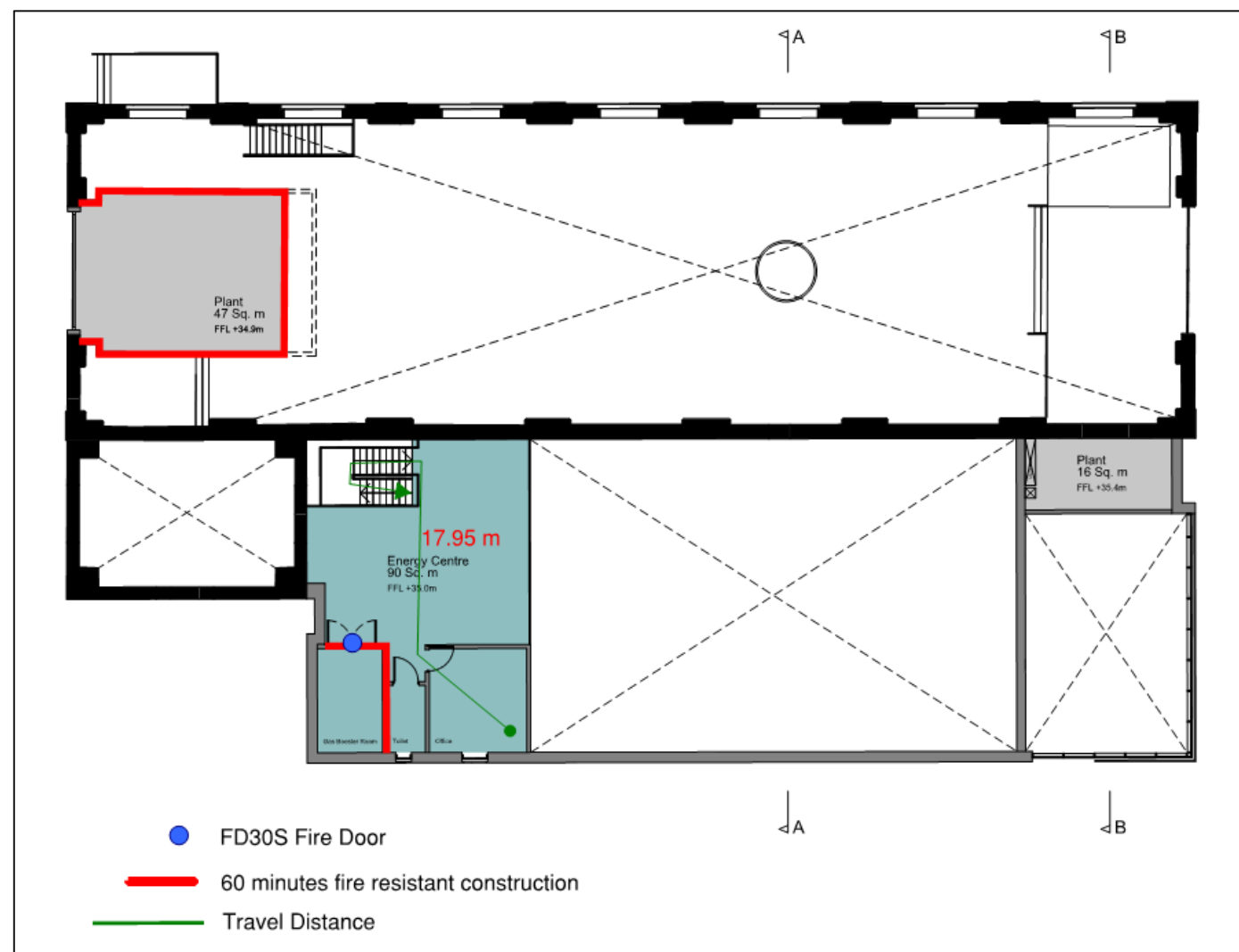


Figure 2—3 First Floor Plan

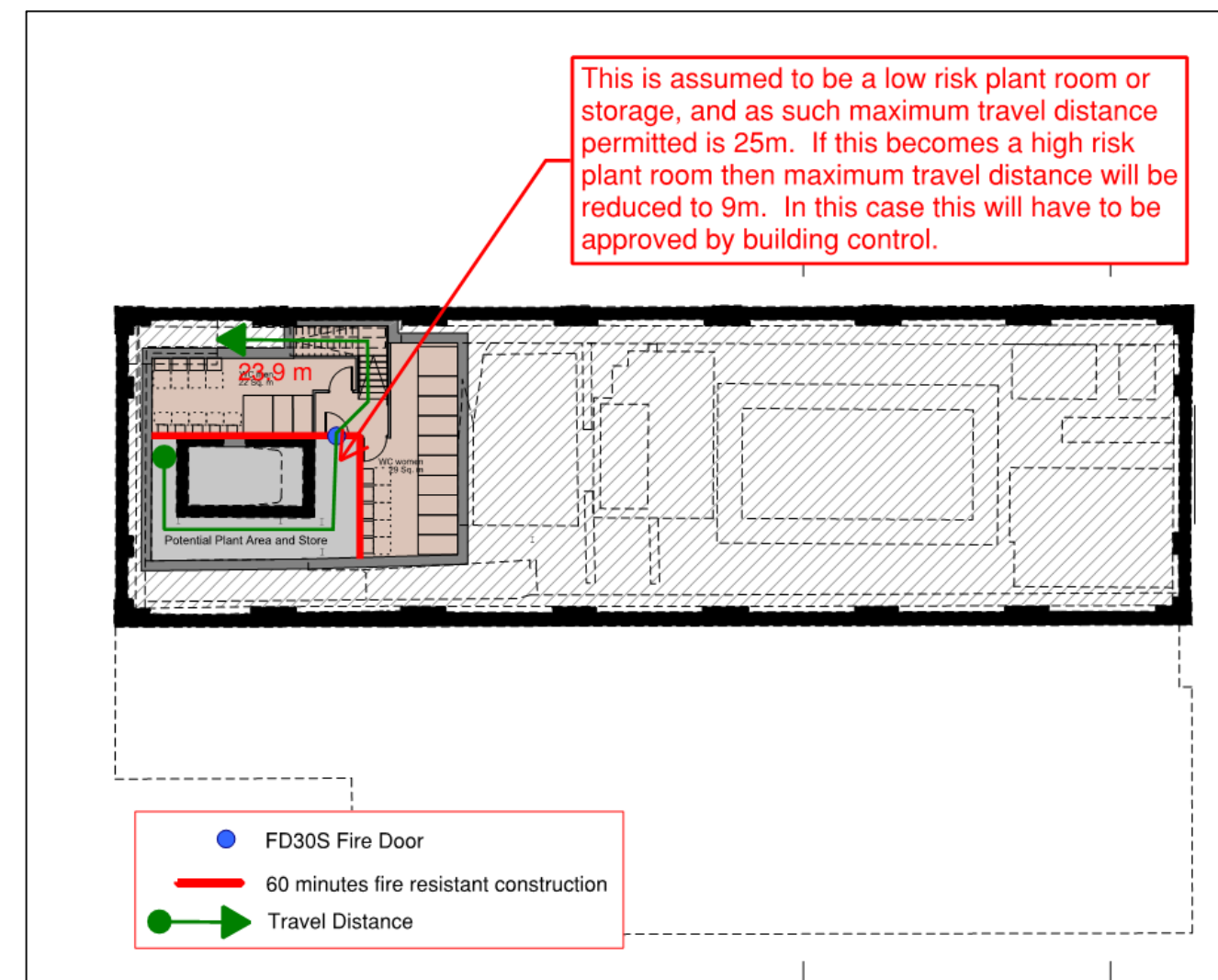


Figure 2—4 Basement Floor Plan

3 Fire Fighting Access, Facilities and Systems

The recommended fire safety systems and facilities for fire service access are summarised in the table and diagrams below:

System Type	Level of Coverage
Emergency Lighting	Throughout Means of Egress
Escape signage	In accordance with BS 5499, locations to be determined by architect and coordinated with general way finding.
Fire Alarm and Detection including: - Automatic Detection - Manual Call Points - Voice Alarm/ Communication System - Notification Devices	Throughout to L2
Two-way Communication Systems	At disabled refuge points and in fire fighting cores
Fire Extinguishers	Throughout
Vehicle Access	To 18% of the perimeter, therefore compliant, see Figure 3—1

Table 3—1 Recommended Fire Safety Systems and Facilities

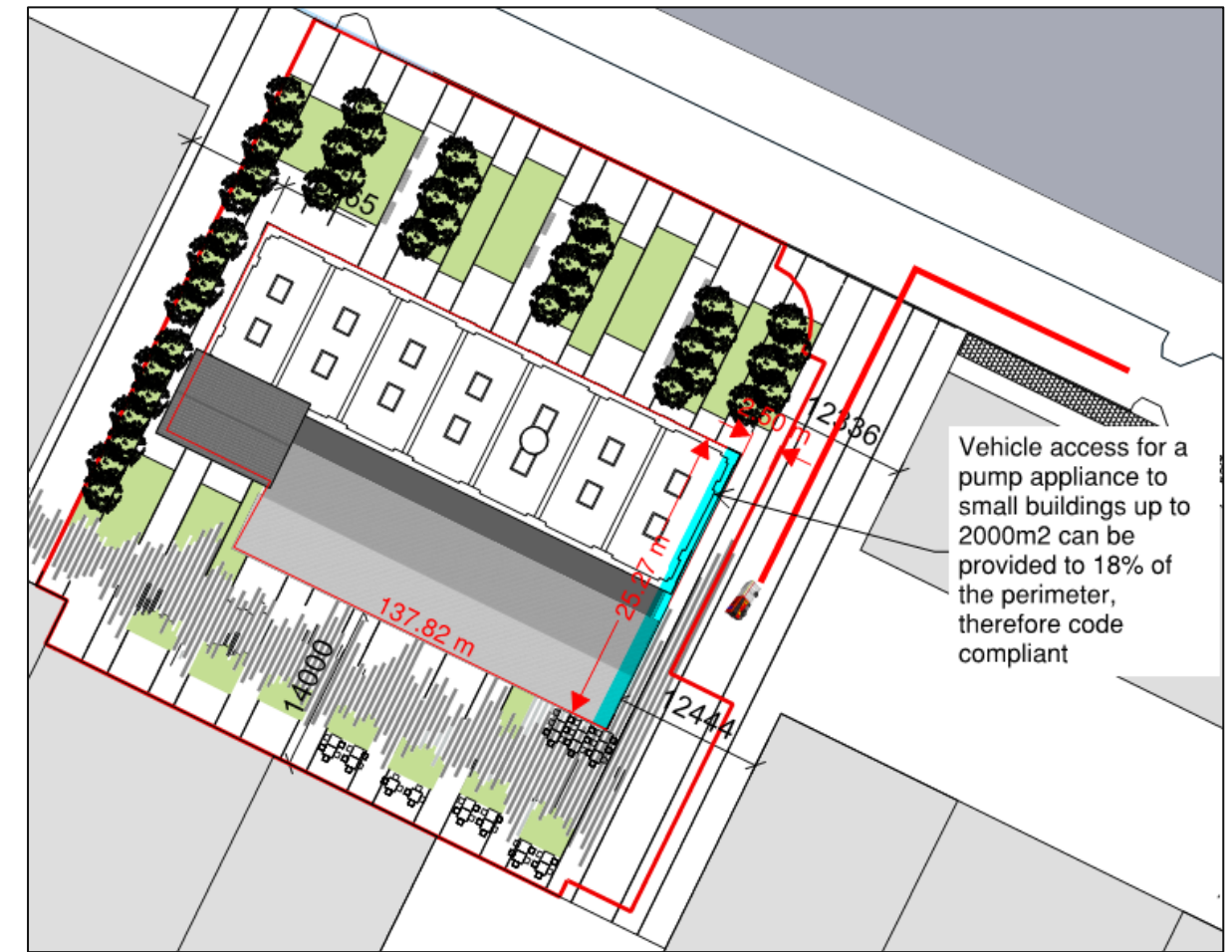


Figure 3—1 Fire Pump Appliance Access

4 External Fire Spread

External fire spread is typically assessed in accordance with BR187 "External fire spread : building separation and boundary distances. This takes a simplistic approach of assuming that a fire compartment is fully involved in a post-flashover fire simultaneously at all levels of the compartment. The main areas of concern is the glazed curtain walling the façade of the Café area, and the steel framed double glazed windows to the main entrance of the existing building to the east façade, see Figure 4—1.

A notional boundary was established between the buildings, this was deemed acceptable as the client owns the free-hold for the entire plot. The red line on figure 4-1 illustrates the application area, and not the site boundary. The notional boundary has been drawn precisely in the middle of the buildings, 6.22m from the façade in question.

After performing external fire spread analysis using the Enclosing Rectangle Method as per BR187, it was determined that the maximum allowable unprotected percentage for the Café façade is 100% based on an enclosing rectangle measuring 5.1 x 9.13m and a boundary distance of 6.22m.

For the Façade of the existing building, for an enclosing rectangle measuring 9.93 x 4.8m and with a boundary distance of 6.22m the maximum allowable unprotected percentage for the Existing entrance façade is 100%.

For calculation please refer to Appendix A.

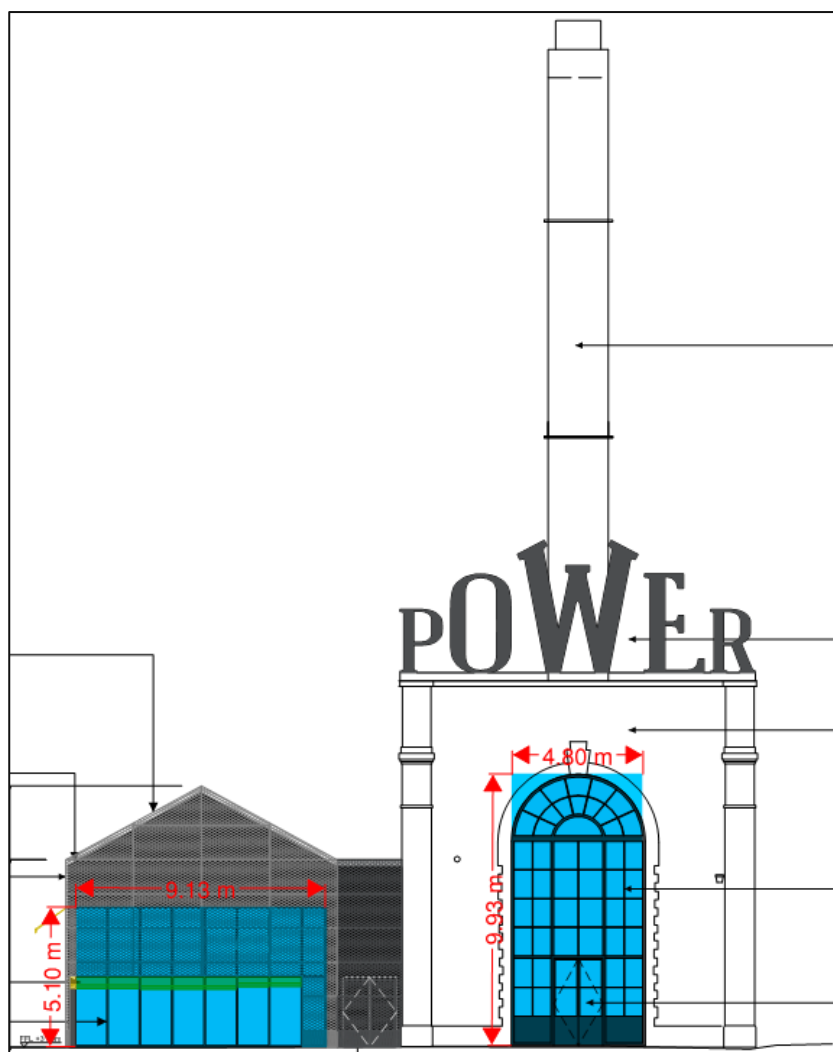


Figure 4—1 Areas Requiring External Fire Spread

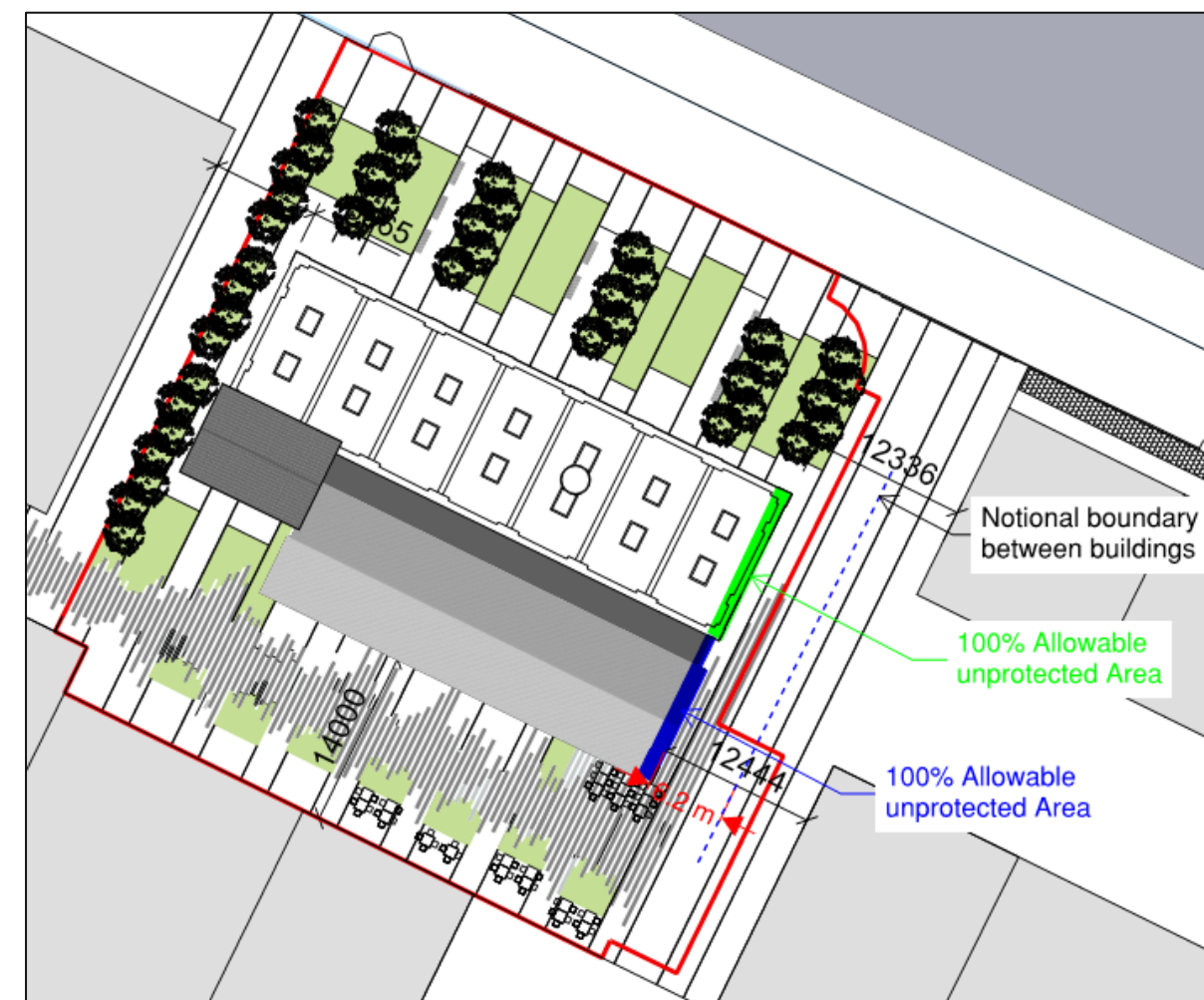


Figure 4—2 Maximum Allowable Percentages

Appendix A – External Fire Spread Calculations

	Project	Powerhouse	Sheet No	1
	Area of Project	East Façade (Existing Entrance)	Revision	0
	Elevation Description		Prepared by date	15/12/2014
			Checked by date	

input cell

Design Assumptions

- In accordance to BR187 using the Enclosing Rectangle Method
- If sprinklers are taken into account, unprotected area or boundary distance is doubled, whichever is more beneficial

☐ Calculate allowable boundary distance
☒ Calculate allowable unprotected area

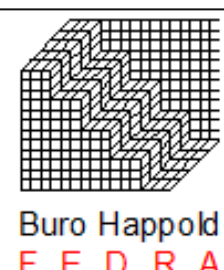
Input

Building purpose <i>for Shop and commercial, industrial, Storage or Other non-residential purposes enter 1</i> <i>for Residential, Office or Assembly and recreational purposes enter 2</i>	2
Is building sprinklered? <i>Enter Y if yes and N if No</i>	N
Height of enclosing rectangle	9.93 (m)
Width of enclosing rectangle	4.8 (m)
Distance to the boundary	6.22 (m)

Allowable percentage and area of façade unprotected

Tables Method	100%	48 (m²)
Appendix A Method	100%	48 (m²)

Figure 4—3 External Fire Spread for Existing Entrance

	Project	Powerhouse	Sheet No	1
	Area of Project	East Façade (Café/Bar)	Revision	0
	Elevation Description		Prepared by date	15/12/2014
			Checked by date	

input cell

Design Assumptions

- In accordance to BR187 using the Enclosing Rectangle Method
- If sprinklers are taken into account, unprotected area or boundary distance is doubled, whichever is more beneficial

☐ Calculate allowable boundary distance
☒ Calculate allowable unprotected area

Input

Building purpose <i>for Shop and commercial, industrial, Storage or Other non-residential purposes enter 1</i> <i>for Residential, Office or Assembly and recreational purposes enter 2</i>	2
Is building sprinklered? <i>Enter Y if yes and N if No</i>	N
Height of enclosing rectangle	5.1 (m)
Width of enclosing rectangle	9.13 (m)
Distance to the boundary	6.22 (m)

Allowable percentage and area of façade unprotected

Tables Method	100%	47 (m²)
Appendix A Method	100%	47 (m²)

Figure 4—4 External Fire Spread for Café/Bar Area

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