ARDENLEA
FIRE CONSULTING LIMITED

Fire Strategy Report -

Haydon Drive Block C

For:

Hunters

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Date: September 2025
Version: **2.0**
N.B. Author and Reviewer are not related

Contents

Introduction

The details within this strategy report are provided to inform the fire design requirements for this project.

This fire strategy report seeks to build a sustainable fire safety design. Approved Document B Volume 1 has been used as the design standard.

This strategy will ensure:

- The design will facilitate compliance with the functional requirements of Building Regulations 2010 (as amended 2018) with specific attention given to Regulation 38 in this regard.

This strategy report is based upon a desk-based review of proposed plans, following extensive consultation with the principal designer and project team. This document should accompany the plans submission in respect of the Building Regulations application.

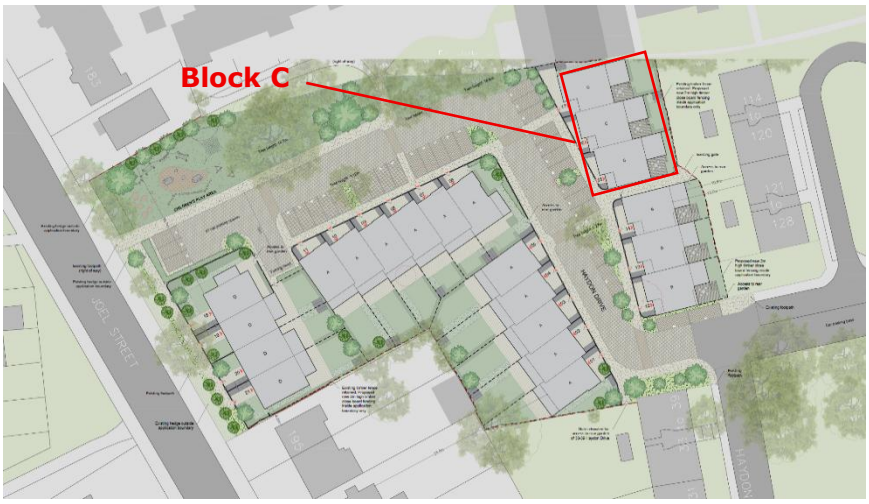
The construction is based on the classifications of Purpose Group 1(c); this being Residential (Dwellings) – A dwellinghouse with no upper floor more than 4.5m above ground.

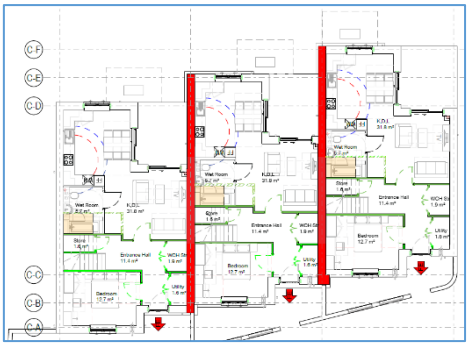
1. Premises Description.

Haydon Drive is a residential development of 21 affordable family homes on a 0.58 hectare site in Pinner, on behalf of the London Borough of Hillingdon.

This report refers only to Block C of this development, which is located towards the eastern boundary of the site. Block C is considered as one building containing three adjoining dwellinghouses; These are similar to the other terraced dwellinghouses on the development site.

Each block is accessed directly from Haydon Drive, which is a dead end road (with pedestrian access only to Joel Street).





The dwellinghouses within Block C will be of traditional masonry construction with a pitched tiled roof. Each dwelling house has an approximate footprint of 12m x 6m. The external walls of Plot 16 adjoin Plot 15 and 17 respectively on either side and provide a compartment wall between them. The Building layout is shown in figure opposite (ground floor only).

Plots 15, 16 and 17 are all three-bedroom dwellinghouses set across ground and first floor, with an independent entrance directly from outside.

Each dwellinghouse layout is identical; There is an entrance from outside directly into a staircase enclosure off which are located doors to a bedroom, two store cupboards and a utility cupboard and open plan living/kitchen/dining (LKD) room. A WC is accessed from the LKD and there is a final exit door on the rear elevation leading from the LKD into an enclosed private garden.

The staircase ascends to a first floor landing, off which are located a further two bedrooms (one en-suite) and family bathroom.

There are no balconies in the proposed design.

There is no basement for the building and no direct access to the external roof area; the dwellings have a concealed loft/roof void. There is an enclosed garden directly behind each Plot and allocated car parking along Haydon Drive.

The only service to the dwellinghouses is electricity; heating and cooling is provided by an Air Source Heat Pump. The electrical connection to the plot is on the front elevation directly into the utility cupboard along with the incoming water.

Solar panels will be provided on the roof of each dwellinghouse.

2. Review of proposed plans.

The following sections follow the functional requirements of Building Regulations 2010: B1 through to B5. The comments are based upon a review of drawings provided by Hunters.

Drawing Number	Drawing Description
M10029-HUN-BC-ZZ-DR-A-05-2501	Ground and First Floor
M10029_APL006	Site plan

Table 1 Drawing register

3. Means of Warning and Escape (B1)

3.1 Evacuation Strategy

The primary objective of an evacuation strategy is to ensure that in the event of a fire, the occupants of a building can reach a place of ultimate safety outside the building. The evacuation strategy must not rely on external assistance (e.g. from the Fire and Rescue Service).

If a fire occurs in a dwellinghouse all occupants are expected to evacuate immediately and call the fire service.

"Get out – Stay out" - and call the Fire Service out.

3.2 Fire detection and alarm systems

BS 5839 Part 6 provides specific recommendations for fire alarm systems for dwellings (new build and existing properties). The category of system that is appropriate depends primarily on the fire risk. These categories are shown in Figure 1 below.

Figure 1 Fire alarm coverage for dwellings

The provision of a BS 5839 Part 6 coverage Type LD2 Grade D1 standard fire alarm is recommended in all Plots. This will comprise hardwired and interlinked smoke detection in the staircase at ground and first floor levels respectively, along with heat and smoke detection in the LKD.

The fire alarm system in each Plot should be standalone (i.e. not interconnected to any other fire alarm systems) and it must only sound within the affected Plot when activated.

3.2 Means of escape.

The fire design is based upon that for a dwellinghouse with upper storey less than 4.5m above ground level.

At both floors, all habitable rooms are accessed via a protected staircase (REI 30) which extends to a final exit and this is a suitable arrangement for means of escape.

There is no restriction on stair width in each Plot, other than to meet any requirements of Part M.

The cooking facilities should be located such that they do not prevent exit if they are involved in a fire. ADB does not provide clear direction in terms of distance from the potential fire source. However, the location of the cooking equipment in each dwellinghouse should provide at least 1.8m horizontal distance between the cooking appliance and the escape route. This 1.8m distance draws similarities to recommendations related to final exits and the need for them to be sited such that they are clear of immediate risk from radiated heat. This appears to the case in the proposed Plot designs.

Doors on egress routes should remain readily openable with simple fastenings on the side where a person is seeking egress. The operation of these fastenings should be readily apparent, without the use of a key and without having to manipulate more than one mechanism.

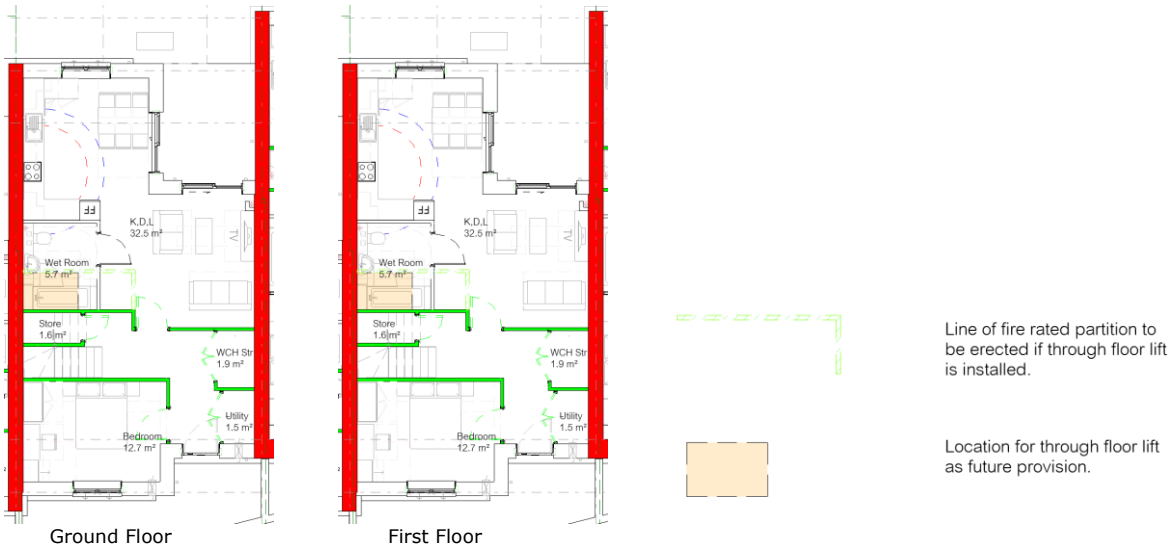
3.3 Means of Escape for persons at special risk

There is no lift in any of the Plots. Therefore, it is reasonable to assume that wheelchair users or persons with significant mobility impairments will not be able to access the upper floor of these dwellinghouses. Therefore, no specific provisions are required.

However, these are considered to be 'adaptable flats' and consequently a break out panel in the floor has been included within the design for future provision of a lift.

It is recognised that this aspect is not part of the current fire design/building regulation submission for these dwellings but it is important to consider these aspects to future proof the design from a Fire Safety perspective.

The primary means of escape within Building C – set over ground and first floors – is for the persons to use the staircase for means to escape. Therefore the breakout panel has been included within the footprint of the staircase enclosure such that, along with provision of a secondary power supply, it will provide suitable fire design adaptation for the future. This arrangement is shown in the figures below:



Ground Floor First Floor

4. Internal fire spread – linings (B2)

Although unlikely to be the first materials to ignite, wall and ceiling linings of an enclosure such as a room can have a dramatic effect on the development of a fire and, in particular, the time it takes for the room to become completely involved.

Surface finishes and floor coverings should not comprise of materials that might contribute to the surface spread of flame and/or fire or adversely affect the means of preventing such propagation. A painted plastered finish is generally the easiest method of complying with this standard.

The recommendations from ADB in relation to the surface spread of flame are extracted in Table 4.1 below.

Table 4.1 Classification of linings

Location	Classification
Small rooms of maximum internal floor area of 4m²	D-s3, d2
Garages (as part of a dwellinghouse) of maximum internal floor area of 40m²	
Other rooms (including garages)	C-s3, d2
Circulation spaces within a dwelling	
Other circulation spaces (including the common areas of blocks of flats)	B-s3, d2[1]

NOTE:

1. Wallcoverings which conform to **BS EN 15102**, achieving at least class C-s3, d2 and bonded to a class A2-s3, d2 substrate, will also be acceptable.

5. Compartmentation (B3)

5.1 General

It is important that the structure and key construction elements of a building remain fully functional for a reasonable period during a fire. It is obviously beneficial if these elements remain in a serviceable condition after the fire for ease of reinstatement. In addition, a fire should be contained by fire resisting elements of the building to prevent it spreading to other parts of the building. This containment should include voids and cavities that could provide a path for fire.

With an upper storey less than 5m above access level, the structural fire resistance requirement for load bearing elements of structure is REI 30.

Provision of a compartment floor is the standard for a two storey dwellinghouse. It should provide a fire resistance specification of R 30 EI 15.

Each Plot should be separated from the adjacent dwellinghouse by (compartment) walls of REI 60 fire resisting standard.

There do not appear to any places of special fire hazard in these plots which fall within the ADB definition below and would require fire compartmentation.

Place of special fire hazard A room such as any of the following.

- Oil-filled transformer room.
- Switch gear room.
- Boiler room.
- Storage space for fuel or other highly flammable substance(s).
- Room that houses a fixed internal combustion engine.

Definition for Place of Special Fire Hazard (ADB Appendix A)

The fire resisting performance of compartment walls and floors (or any other parts of the building which are required to prevent fire spread) should be not less than that specified below when tested in accordance with the relevant part of BS 476: Parts 20 to 24 or classified in accordance with BS EN 13501 Parts 2, 3 or 4.

This applies to:

- Load-bearing walls, for load-bearing capacity, integrity and insulation from either side.
- Non-load-bearing walls and partitions, for integrity and insulation from either side.
- Fire doors for integrity from either side, with the exception of doors to lift wells where performance is in respect of exposure of the landing side only.
- Floors, for load-bearing capacity, integrity and insulation with respect to exposure of the underside only.

5.2 Sprinklers

There is no compliance requirement for domestic sprinklers based on British Standard 9251, although their installation is recommended to enhance means of escape and resilience.

5.3 Cavities

There do not appear to be any significant cavities in the proposed design although this should be confirmed.

The void in the roof space of each Plot is less than 20m in any direction, therefore no cavity barriers are required in this area. A compartment wall or other suitable cavity barrier should separate the roof void between each individual Plots.

Cavity barriers should be provided in other areas in accordance with Section 5.18 of ADB. For example, this will include around all openings in the external walls, such as windows, doors and service penetrations and at the top and bottom of the cavity. Cavity barriers should be provided around service penetrations through the external walls in accordance with Building Control Alliance (BCA) Technical Guidance Note 26.

Within external walls, cavity barriers should be provided in line with any locations where fire rated walls or floors meet the façade.

Cavity barriers in external walls should pass through all insulation and other materials within the external wall, forming a seal between the edge of the fire rated wall/floor and the inner face of the external cladding.

Cavity barriers should achieve a fire resistance of at least 30 minutes for integrity and 15 minutes for insulation. Alternatively, if located in a stud wall or partition, or provided around openings in the external wall, they may be formed of:

a) Steel at least 0.5mm thick;

b) Polythene-sleeved mineral wool, or mineral wool slab, in either case under compression when installed in the cavity; or

c) Calcium silicate, cement-based or gypsum based boards at least 12mm thick.

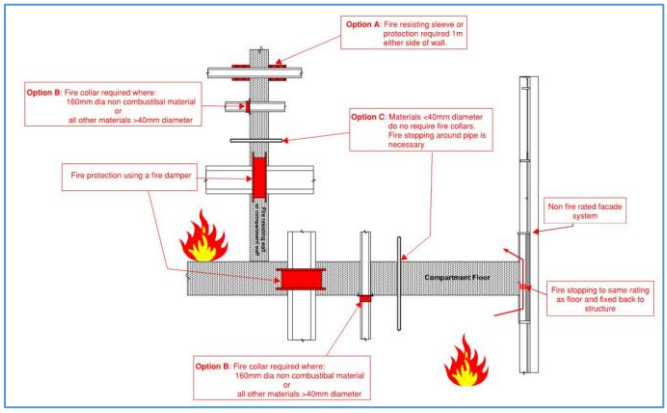
Fire stopping (the seal between the fire rated wall/floor and the external wall) should be of the same fire resistance as the fire rated wall/floor.

5.4 Protection of openings and fire stopping

Where pipework penetrates any protected shaft (staircase), compartment wall or floor then the openings must be suitably fire stopped.

Fire-stopping should be provided at the junction of fire-separating walls and external walls in order to maintain the fire resistance period of fire-separating walls and thereby prevent a fire from travelling around the junction and into the neighbouring space. Penetrations through lines of fire-resisting separation should be fire-stopped to achieve the same fire resistance as the separation.

All pipes, ductwork and services passing through fire-resisting separations should be either enclosed in fire-resisting construction (i.e. shafts) of matching fire resistance or provided with fire dampers of matching fire resistance. Certain small-diameter pipes require only fire-stopping around the pipe, dependent on pipe material and the type of fire-resisting barrier penetrated. Typical options are shown in the figure below:



6. External fire spread (B4)

6.1 Resisting fire spread over external walls

When a building is on fire, heat will radiate through non-fire-resisting openings in the external walls. This heat can be intense enough to set fire to adjoining buildings. To reduce the chance of this occurring, the Building Regulations place limits on the area of external elevation with no fire resistance. This area is known as the 'unprotected area' and is affected by such factors as distance from the boundary, use of the building and compartment size.

Where not required as compartment walls, it is recommended that external walls of the buildings should provide at least 30 minutes fire resistance from inside, subject to the unprotected area allowance where no fire resistance is necessary.

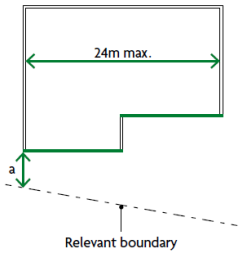
As the pitch of the roof on each Plot is less than 70 degrees, it is not considered as an external wall.

Boundary locations are taken as the centre of a public highway, the boundary of the site or a notional boundary mid-way between buildings on the same site (as Regulation B4 is concerned with the heat flux at half the distance between buildings).

The boundaries in relation to Block C are shown below:

As this building conforms with the definition of a small residential building in ADB 11.18 (extracted below), the following protected area allowance can be used. This applies for all boundary distances greater than 1m.

See para 11.18



Minimum distance (a) between side of building and relevant boundary (m)	Maximum total area of unprotected areas (m²)
1	5.6
2	12
3	18
4	24
5	30
6	No limit

Diagram 11.7 Permitted unprotected areas in small residential buildings

The distances from each Building elevation to the relevant boundary appear to be as follows:

- Haydon Drive –> 6m, no restriction
- Rear Garden –> 1.9m, the maximum total permitted unprotected area should be 12m^2
- North –> less than 1m, the max total permitted unprotected area should be 5.6m^2
- South –> 2m, the maximum total permitted unprotected area should be 12m^2

These parameters should be confirmed by the Designer.

6.2 External wall coverings

On a building less than 11m in height, the external surfaces (i.e. outermost external material) of external walls should provide a Reaction to Fire Performance of Class B-s3, d2(2) or better where the building is less than 1000mm from the relevant boundary. This will be applicable on the walls adjoining Plot 16 from either side and the wall must be fire resisting from both sides with the surface material having a surface spread of flame classification of B-s3, d2 or better.

At this building height, there is no restriction on wall covering which is 1000mm or more from the relevant boundary.

Regulation 7(1A) of the Building Regulations 2010 prohibits the use of relevant metal composite materials in the external walls, and specified attachments, of all buildings of any height.

It would also be worth confirming with NHBC any requirements of the external wall materials for the purpose of warranty.

6.3 Resisting fire spread over roof coverings

Table 12.1 from ADB Vol 1, extracted below, sets out the requirements for type of roof covering based upon separation distance from the relevant boundary. It is likely that a $B_{ROOF(t4)}$ specification will be required but the Designer should confirm.

Table 12.1 Limitations on roof coverings

Designation[1] of covering of roof or part of roof	Distance from any point on relevant boundary			
	Less than 6m	At least 6m	At least 12m	At least 20m
$B_{ROOF(t4)}$	●	●	●	●
$C_{ROOF(t4)}$	○	●	●	●
$D_{ROOF(t4)}$	○	●[2][3]	●[2]	●
$E_{ROOF(t4)}$	○	●[2][3]	●[2]	●[2]
$F_{ROOF(t4)}$	○	○	○	●[2][3]

● Acceptable.
○ Not acceptable.

NOTES:

Separation distances do not apply to the boundary between roofs of a pair of semi-detached dwellinghouses and to enclosed/covered walkways. However, see Diagram 5.2 if the roof passes over the top of a compartment wall.

Polycarbonate and uPVC rooflights that achieve a class C-s3, d2 rating by test may be regarded as having a $B_{ROOF(t4)}$ designation.

1. The designation of external roof surfaces is explained in Appendix B.
2. Not acceptable on any of the following buildings.
   a. Dwellinghouses in terraces of three or more dwellinghouses.
   b. Any other buildings with a cubic capacity of more than 1500m^3.
3. Acceptable on buildings not listed in (2) if both of the following apply.
   a. Part of the roof has a maximum area of 3m^2 and is a minimum of 1500mm from any similar part.
   b. The roof between the parts is covered with a material rated class A2-s3, d2 or better.

There are no rooflights in the proposed design as the roof is a concealed void space.

6.4 Solar Panels

The Designer reports that PV panels will be installed on the roof. New rooftop PV installations, including panels and fixing systems, should not lower the fire performance/classification of the roof.

The design of PV installation should be undertaken in accordance with the IET PV Code of Practice and Microgeneration Certification Scheme (MCS) requirements.

The PV installations should be installed on non-combustible roofs meeting Class A1/A2 s1, d0 to BS EN 13501-1.

If the design cannot be classified as 'low voltage', then additional fire protection requirements/mitigations shall be incorporated into the design.

7. Access and Facilities for the fire service (B5)

To extinguish a fire within this building, it is important that the fire service can gain access to the premises. This section deals with the various facilities intended to aid the fire service access to the building and for fighting a fire in the building.

7.1 Firefighting access

Access for a fire service pumping appliance to the development is from the public highway. The Designer has confirmed that Haydon Drive, which serves Block C, is of a suitable width and has turning facilities in line with the requirements of ADB Vol 1. The requirements are extracted below from ADB Volume 1.

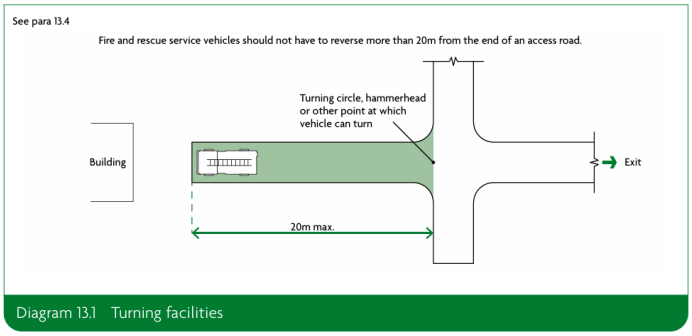


Diagram 13.1 Turning facilities

Table 13.1 Typical fire and rescue service vehicle access route specification

Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High reach	3.7	3.1	26.0	29.0	4.0	17.0

There is fire service pumping appliance access directly to the front of each plot and the distance for hose laying to the furthest point of the building is less than 45m. Again, this is suitable based on ADB Vol 1 guidelines.

7.2 Other

It should be confirmed that there is a public fire hydrant within 90m of the access point to the building.

8. Other Provisions

8.1 Emergency Lighting and Secondary power

There is no requirement for emergency lighting in a dwellinghouse.

8.2 Signage

There is no requirement for fire signage in a dwellinghouse.

8.3 Fire Emergency Plan

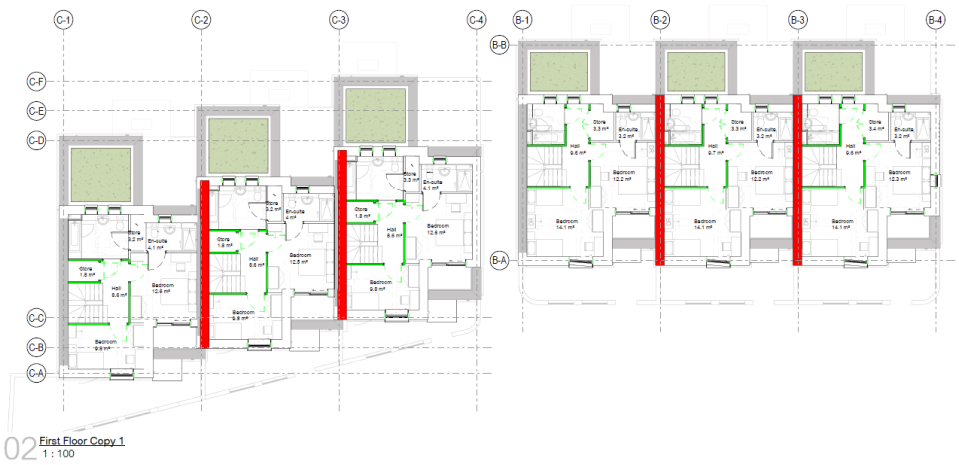
This will be based on the same principle as any other single private dwelling such that occupants if they suspect a fire, raise the alarm, get out of the building and summon the Fire Service.

Furthermore, it is advisable to provide fire safety information (based on government guidance documents that are available online) to all dwelling occupants.

8.5 Fire Fighting Equipment (FFE)

As set out in government fire safety guidance, there is no requirement or recommendation for FFE within single private dwellings.

Appendix 1 Proposed Plans



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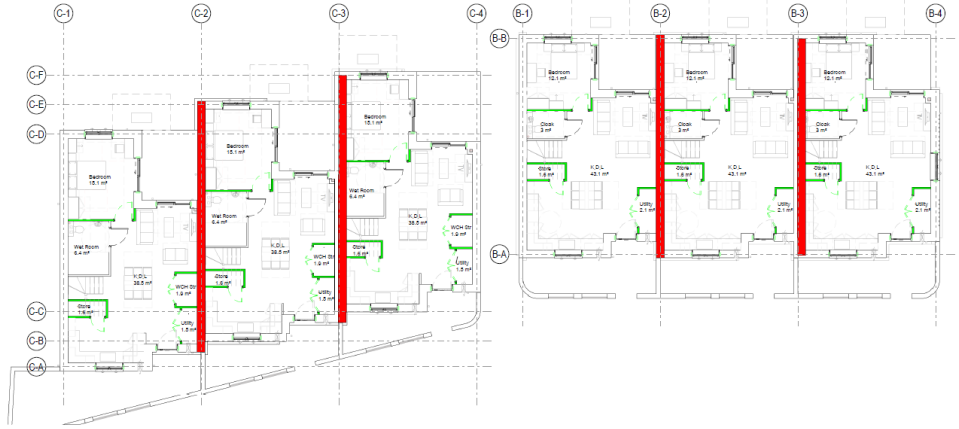

01 Ground Floor
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Haydon Drive

BC - Fire Strategy Plan

Block B & C

TENDER

M10029-HUN- BC- ZZ- DR- A- 05-2501

T01 Issued for Tender.