

**Developed Design
Means of Escape Fire Report
for
Old Municipal Chambers Building, Christchurch**

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Summary of Fire Report Requirements

NOTE: These recommendations are not suitable to be used as a specification for the fire requirements – it is intended as guidance for the key requirements, the user is to read the entire report. Protection of property, including the building structure and contents and tenants' property has not been incorporated. This is to be considered by the building owner, tenants' and their insurers. Evacuation Scheme requirements for buildings as detailed in section 21A (1) and (2) of the Fire Service Act 1975 have also not been addressed.

1. Fire Safety Systems

- 1.1. Upgrade existing Type 6 automatic sprinkler system to a Type 7 automatic sprinkler system with smoke detectors and manual call points as per NZS 4541 and NZS 4512.
- 1.2. System shutdown - when any smoke detection system is activated, it shall turn off all air-conditioning and mechanical ventilation '*plant*' (if any). This does not apply to individual heat pumps.
- 1.3. Ensure fire alarm panels and sprinkler valveset locations are co-ordinated with Fire Service in the event of any changes.

2. Means of Escape

- 2.1. All exit door-locking devices shall be:
 - a) Clearly visible, located where such a device would be normally expected, designed to be easily operated without a key or other security device, and allow the door to open in the normal manner. If the operation of a locking device is unusual, such as the pressing of a button close to the door, it shall have signage that complies with NZBC F8.3.1.
 - b) Not prevent or override the direct operation of panic fastenings fitted to any door, and
 - c) If they are of an electromechanical type, in the event of a power failure or door malfunction be either automatically switch to the unlocked (fail-safe) condition or be readily opened by an alternative method satisfying the requirements of (a) and (b).
- 2.2. The automatic sliding doors must in the event of a power failure or door malfunction either automatically slide open and remain open or be able to be pushed open by the building occupants in an emergency. Alternatively, they can be readily opened by a method satisfying the requirements of C/AS4/3.15.2a – If the operation of a locking device is unusual, such as the pressing of a button close to the door, it shall have signage that complies with NZBC F8 3.1.

3. Signs

- 3.1. Signs complying with NZBC F8 are required for the escape routes. They need to be placed above each external door and internal doors if the exit is not obvious. In the event of failure of the normal lighting, the visibility of the Exit signs shall be maintained by illumination (internal or external) powered by an alternative supply. Refer to the drawings in Appendix A for proposed locations of Exit signs (NOTE: Additional Exit signs may be required following fitouts).
- 3.2. Every doorset required to possess fire or smoke stopping capabilities shall have a sign fixed to both sides of the door leaf adjacent to the handle or push plate, stating "Fire Door, Please Keep Closed" or "Smoke Control Door, Please Keep Closed",, except that doors fitted with hold open devices shall

have a sign stating only "Fire Door", "Smoke Control Door". The sign shall comply with the requirements of NZBC F8 5.2.3.

- 3.3. For the lifts, a sign shall be provided on or adjacent to each landing call button plate. In letters at least 8.0mm high it shall read "DO NOT USE LIFT IN EVENT OF FIRE" or "IN EVENT OF FIRE – DO NOT USE LIFT." Signs shall be safety red on a white background.

4. Visibility in Escape Routes

- 4.1. Emergency lighting is required as per NZBC F6. For the building, it is required at every change of level in an escape route, and wherever the travel distance to reach ONE Exit is over 20m. Detailed design by others.

5. Fire/Smoke Separations

- 5.1. The west stairs will be rebuilt as is, reusing as much of the existing heritage fabric as possible and the existing stairs. The west stair is to be a fire separated safe path stairs from the rest of the building. A fire separation of (30)/30/- and fire door with FRR -/30/- sm is required on the second floor. A smoke lobby with -/-/- sm smoke doors is required for the first floor access to the safe path stairs in addition to the fire rated wall (30)/30/- and fire rated door -/30/-sm. A fire door with FRR -/30/- sm is required at the ground floor to create the safe path stairs. Refer to Appendix A.
- 5.2. Smoke separations with -/-/- sm smoke doors are required in the vestibule on the ground floor and the landing on the first floor to create a separation from the rest of the floors. Refer to Appendix A.
- 5.3. Penetrations in fire/smoke separations need to be sealed to the same rating as the fire/smoke barrier.
- 5.4. Recessed luminaires (downlight) if provided shall be either meet the compliance as per AS/NZS 60598.2.2 or be installed with clearances from building elements including insulation of 100mm and if installed in a fire separation shall be appropriately fire rated.

6. Interior Surface Finishes

- 6.1. New interior surface finishes for the building must meet the requirements of the table below. Pay attention to any exposed insulation.

C/AS4 – Risk Group CA - Surface finish requirements for walls, ceilings, ducts and insulation.

Surface Finish requirements specified

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	<i>Exitways (west staircase area)</i>	Crowd spaces (display areas, the Chamber, foyers and vestibule): wall linings	Crowd spaces (display areas, the Chamber, foyers and vestibule): ceiling linings	All other <i>occupied spaces: wall and ceiling linings</i>	Ducts for HVAC systems: internal surfaces ¹	Ducts for HVAC systems: external surfaces ¹
Maximum permitted Group Number						
Sprinklered	2	3	2	3	2	3

NOTE 1: Surfaces of rigid and flexible ductwork for HVAC systems are considered as Group Number 1-S if the ductwork complies with the fire hazard properties set out in AS 4254.

C/AS5 – Risk Group WB (offices, stores, staff kitchen, library) - Surface finish requirements for walls, ceilings, ducts and insulation.

Surface Finish requirements specified

Column 1	Column 2	Column 3	Column 4	Column 5
	<i>Exitways (west staircase area)</i>	<i>All other occupied spaces</i>	<i>Ducts for HVAC systems: internal surfaces¹</i>	<i>Ducts for HVAC systems: external surfaces¹</i>
Maximum permitted Group Number				
Sprinklered	2	3	2	3

NOTE 1: Surfaces of rigid and flexible ductwork for HVAC systems are considered as Group Number 1-S if the ductwork complies with the fire hazard properties set out in AS 4254.

Critical radiant flux requirements

<i>Area of Building</i>	<i>Minimum critical radiant flux when tested to ISO 9239-1</i>
	<i>Buildings protected with a fire sprinkler system</i>
Exitways in all buildings – west stairs	2.2kW/m ²
Firecells Accommodating more than 50 people	1.2kW/m ²
All other Occupied spaces	1.2kW/m ²

- 6.2. Any suspended flexible fabrics shall, within all occupied spaces including exitways have a flammability index no greater than 12 (and no greater than 5 when used as underlay to roofing or exterior cladding exposed to view).
- 6.3. If foamed plastics building materials or exposed combustible materials form part of a wall, ceiling or roof system, the complete system shall achieve a group number as detailed above and they shall comply with the flame propagation criteria as specified in AS1366 for the materials being used.

Notes:

- **The NZ Fire Service, Fire Safety and Evacuation of Buildings Regulations may require fire extinguishers although fire hose reels are generally acceptable as well.**
- **Emergency lighting requirements are only the minimum to meet the New Zealand Building Code. However, for the purposes of providing for Health & Safety of staff within the building, security or for operational purposes this may not be sufficient.**
- **Insurance companies and other regulations may have fire safety requirements as well.**
- **If intumescent paint is used to provide a fire rating, the limiting temperatures of each structural element to be obtained from the structural engineer and particular attention required to ensure compatibility of steel preparation, primer, intumescent paint and any topcoat proposed.**

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Developed Design Means of Escape Fire Report for Old Municipal Chambers

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1.0 Scope Limitations

This report does not cover NZBC Clause F3 Hazardous Substances & Processes that is separate and the HSNO Act applies.

Protection of property, including the building structure and contents and tenants' property has not been incorporated. This is to be considered by the building owner, tenants' and their insurers.

Evacuation Scheme requirements for buildings as detailed in section 21A(1) and (2) of the Fire Service Act 1975 and the NZFS Fire Safety & Evacuation of Buildings Regulations have not been addressed.

2.0 Purpose of Report

The purpose of this report is to satisfy Council that after the proposed alterations the building will comply with the provisions of the building code for means of escape from fire as nearly as is reasonably practicable.

This report is a performance document intended to be used by other consultants (such as architect, structural engineer, electrical engineer, mechanical engineer, etc.) to prepare documentation (such as drawings and specifications) for consent, tender and construction purposes. It is not a detailed specifications document for tender or construction purposes. The consultants whose documentation is required to incorporate the requirements of this report are expected to have read this report, understood the implications to their scope of work and incorporated the relevant requirements into their documentation.

From a heritage perspective, for the interior of the building, the existing main stairs are of highest heritage significance on the ground floor. For the first floor The Chamber, The Library and main stairs are of highest heritage significance. The west replacement stairs are of significance to maintain and reuse the existing stairs and not create a replica.

The building will be reinstated as galleries/display space in the ground. The first floor will have meeting rooms/office and offices on the second floor.

3.0 Background

The Council is unable to issue a building consent, unless they are satisfied that the proposed building would satisfy the requirements of the current NZBC. This is due to s112 of the Building Act 2004, which says in part:

"s112 A building consent authority must not grant a building consent for the alteration of an existing building, or part of an existing building, unless the building consent authority is satisfied that, after the alteration, the building will-

(a) comply as nearly as is reasonably practicable with the provisions of the building code that relate to-

(i) means of escape from fire: and....."

The following drawings and information were used in preparing this fire report.

- Drawings by Opus Architecture

Dwg #	Title	Date	Rev #
AE1.02	Ground Floor Plan	1/03/17	A
AE1.03	First Floor Plan	1/03/17	A
AE1.04	Second Floor Plan	1/03/17	A
AE1.05	Roof Plan	1/03/17	A
AE2.01	North Elevation	1/03/17	A
AE2.02	East Elevation	1/03/17	A
AE2.03	South Elevation	1/03/17	A
AE2.04	West Elevation	1/03/17	A
AF1.02	Proposed Altered Toilet Layout	-	-

4.0 Design Philosophy

New Zealand Building Code compliance is demonstrated using the as nearly as is reasonably practicable.

- *C/AS4 Acceptable Solution for Buildings with Public Access and Educational Facilities (Risk Group CA), Amendment 4, 1 January 2017*
- *C/AS5 Acceptable Solution for Buildings used for Business, Commercial and Low Level Storage (Risk Group WB) Amendment 4, 1 January 2017*
- *Compliance Documents for NZBC Clause F6 Visibility in Escape Routes – Third Edition, Amendment 4, 1 January 2017*
- *Compliance Documents for NZBC Clause F7 Warning Systems – Fourth Edition 10 April 2012*
- *Compliance Documents for NZBC Clause F8 Signs – Second Edition, Amendment 4, 1 January 2017*

Should changes in the building design/use be considered desirable, the fire design can be assessed differently to support any proposed use of the building.

5.0 Building Description

The building is a three storey building with a small basement storage area. The ground floor contains display areas and an office, and has two means of egress. The first floor is an intermediate floor to the ground floor and contains an office/meeting room, The Library and The Chambers. It also has two means of egress; west safe path stairs and central stairs. The second floor is used as offices and only has one means of egress; the west safe path stairs. There is a basement area with a single means of egress to the ground floor that is used for storage.

NOTE: The south stairs is used as the sprinkler valve room and cannot be used for egress.

5.1 Risk Group, Occupant Load and Importance Level

The risk group is based on C/AS4/Table 1.1 & C/AS5/Table 1.1. The occupant loads are calculated from occupant densities provided in C/AS4/Table 1.2 & C/AS5/Table 1.2. The occupant loads are shown in the table below. The Chamber is permitted to have a maximum of 100 people and when that occurs the Library and other rooms on the floor will not be used. So there is a maximum on the floor of 100 people and maximum in the building of 150 people.

Table 1: Risk Group and Occupant Load

Area	Risk Group	Occupant Density (m ² /p)	Gross Area (m ²)	Occupant Load (p)
Basement ¹	WB	100	24	1
			Subtotal	0
Ground Floor				
Display Area 1, 2, 3 – G1, G2, G3, G8, G10, G11	CA	4	160	
Office – G4, G5	WB	10	18.1	
Store – G6	WB	Note 2	10.4	-
			Subtotal	43³
First Floor (Intermediate Floor)				
The Chamber – 1.2	CA		123.2	100 ³
Library – 1.1	WB	2.5	54.6	22
Office – 1.7/1.9	WB	10	45.8	5
Staff Kitchen – 1.8	WB	Note 2	7.5	Note 2
Lobby ¹ and Landing ¹ – 1.3, 1.4	-	1	22.8	-
			Subtotal	100
Second Floor				
Office – 2.1 to 2.7	WB	10	66.7	7
Store – 2.3, 2.4	WB	Note 2	24	-
Staff Kitchen and Cafeteria ¹ – 2.8, 2.9	WB	Note 2	26.9	-
			Subtotal	7

Note 1: Spaces used for intermittent activities (e.g. toilet facilities and common passageway) are not assessed for occupant load.

Note 2: Occupants accounted for elsewhere

Note 3: Client designated maximum

Based on the use and total occupant load, the importance level of the building is 2.

6.0 F3 Hazardous Substances & Processes

This report does not cover NZBC Clause F3 Hazardous Substances & Processes, that is separate and the HSNO Act applies.

7.0 Fire Safety Systems

This section specifies the appropriate requirements for the building based on C/AS4/Part 2 & C/AS5/Part 2: *Requirements for Firecells, fire safety systems and fire resistance ratings* unless stated otherwise.

7.1 Firecell Floor Area

For a sprinkler protected firecell, the firecell floor area may be unlimited. Therefore the building complies with the requirement.

7.2 Specification of Fire Safety Systems and Fire Resistance Ratings

The respective minimum fire safety systems and fire resistance ratings for the building are shown in the table below:

Table 2: Fire Safety Systems and Fire Resistance Ratings

Area	Risk Group	Occupant Load (p)	Escape Height (m)	Fire Safety System	Fire Resistance Rating	
					Life Rating (min)	Property Rating (min)
Building	CA/WB	<250	<25	Type 4, 9, 18	60 (30)	120 (60)

The above table indicates the following:

- **4:** Automatic fire alarm system with smoke detectors and manual call points as per NZS 4512.
- **9:** Smoke control in air handling system as per AS/NZS 1668.1.
- **18:** Fire hydrant system as per NZS 4510 is required where the Fire Service hose run distance, from the Fire Service vehicular access to any point on any floor, is greater than 75m. Not applicable for existing buildings.
- **Life Rating:** A fire resistance rating of 60 minutes is required to control internal fire and smoke spread.
- **Property Rating:** A fire resistance rating of 120 minutes is required to control external fire spread.

7.3 Fire Safety Systems Existing or to be Installed

The following fire safety precautions are to be installed in the building:

- Upgrade existing Type 6 automatic sprinkler system to a Type 7 automatic sprinkler system with smoke detectors and manual call points throughout the building as per NZS 4541 and NZS 4512.
- Confirm emergency lighting is existing or install as per NZBC F6.

NOTE: As the building will have a Type 7 automatic sprinkler system installed, the life and property rating will be 30 and 60 minutes respectively.

Notes:

- **The NZ Fire Service, Fire Safety and Evacuation of Buildings Regulations may require fire extinguishers although fire hose reels are generally acceptable as well.**
- **An Evacuation Scheme is required for buildings detailed in section 21A (1) and (2) of the Fire Service Act 1975. In general evacuation schemes are required where 100 or more people can gather in a common venue or place of assembly, facilities for employment for more than 10 people, accommodation provided for more than 5, storage or processing of hazardous substances, and care facilities.**

8.0 Means of Escape

Referenced paragraphs are from C/AS4/Part 3 & C/AS5/Part 3: *Means of Escape* unless stated otherwise.

8.1 Number of Escape Routes

Based on C/AS4/Table 3.1 and C/AS5/Table 3.1, the building is required to have a minimum of two escape routes for any occupied space with occupant load more than 50 people. The escape routes are required to be separated by no less than 8m. The ground floor and first floor have two means of egress.

The building complies with the requirements, except for the basement and the second floor.

The second floor is allowed to have a single escape route as the occupant load is less than 50 people, the building is sprinklered with an escape height of less than 25m and the open path length does not exceed the limit as specified in Section 8.5. as a single means of escape it would require the lower levels of the stair if used for egress to have a smoke lobby in front of the entrance to the stairs. On ground floor it is not used for egress from the ground floor. On the first floor, the egress route is not directly from The Chamber. The egress into the west stairs is the fire door from the north. The building is provided with a full Type 7 system that exceeds the minimum fire requirements of a Type 4 and the smoke lobby. The sprinklers are controlling the fire and hence smoke production. It is considered as nearly as is reasonably practicable to accept the design as presented with no smoke lobby on the first floor.

The basement can have a single means of escape because the occupant load is less than 50 people, the building is sprinklered and the basement is considered to be intermittently used.

NOTE: The enclosed west staircase will be restored and provide the single means of egress from the second floor. The stair is considered to be heritage fabric of the building and will be reused in the restoration.

NOTE: The south egress stairs is currently the sprinkler valve room and cannot be used for egress.

8.2 Height and Width of Escape Routes

The clear height of an escape route shall be no less than 2100mm across the full width.

The minimum width of an escape route in an open path is 850mm for horizontal travel and 1000mm for vertical travel.

The minimum width of an escape route in an open path is 700mm for horizontal travel and 850mm for vertical travel as the occupant load is less than 50 people.

If it is an accessible route, the minimum width of an escape route is 1200mm for horizontal travel and 1100mm for vertical travel.

NOTE: The width of the escape route for the stair located at the west of the building is less than the required minimum width of 1000mm. As per section 8.4 of this report, the widths are adequate for the required occupant load and it is not realistic to increase the size.

8.3 Height and Width of Doors

The clear height of any door opening shall be no less than 1955mm for the required width of the opening.

The minimum width of a door in an open path is 760mm and, when multi-leaf, has no single leaf less than 500mm. The minimum width may be reduced to 600mm if it is not an accessible route.

8.4 Capacity of Means of Escape

The capacity of the means of escape is determined by the size of the doors and escape routes. The table below shows the available capacities:

Table 3: Capacity of Escape

Area	Occupant Load	Exit / Width (mm)	Width/Person	Capacity
Basement	-	Exit to ground floor via stairs / 700	9mm /person	77
Second floor	7	Exit to west exit on ground floor via west staircase / 800	9mm /person	88
First floor	100	Exit to west exit on ground floor via west staircase / 800	9mm /person	88
		Exit to ground floor via internal staircase / 1100	9mm /person	122
Ground floor	43	Exit via east double doors / 1500	7mm /person	214
		Exit via south autoslider / 900	7mm /person	128

The capacity of means of escape for the building is sufficient for the occupant load.

8.5 Length of Escape Routes

The maximum escape route lengths are as shown in the table below:

Table 4: Length of Escape Routes

Area	Risk Group	Dead End Component of Open Path Length (m)		Total Open Path Length (m)	
		Allowed ⁴	Actual	Allowed ⁴	Actual
Basement					
Store ²	WB	50	43	120	-
Ground Floor					
Display Area 3	CA	50	19	120	-
Display Area 2	CA	50	34	120	-
First Floor					
Stair Lobby	CA	50	35 ³	120	-
Office	CA	50	12 ³	120	35 ²
The Library ¹	CA	50	13	120	46 ^{3,5}
Chambers	CA	50	17	120	66 ^{3,5}
Second floor (Office)	WB	75	32 ²	150	-

Note 1: The risk group with the shortest allowable length has been used.

Note 2: The 1.2 times increase for stairs has been factored in.

Note 3: 1.2 times increase for stairs and 1.5 times increase for intermediate floor have been factored in.

Note 4: The allowed travel distances reflect the Type 7 system.

Note 5: The distance to reach the exterior via the main smoke separate stairs

As shown above, the lengths of escape routes have been complied with.

8.6 Door Swing, Locking Devices

Doors on escape routes are required to open in the direction of escape if there are more than 50 occupants using the doors.

The Chamber is permitted up to 100 people. The doors into the main stairs can be double swing. The door into the west stair can swing in the direction of escape into the stairs. The other door to the west can swing in the direction of travel. The door from The Library is considered to be of high significance heritage value and will be left to swing into The Chamber. Therefore there are a number of possible escape routes. It is unlikely there will be more than 50 at any one door.

The automatic sliding doors must in the event of a power failure or door malfunction either automatically slide open and remain open or be able to be pushed open by the building occupants in an emergency. Alternatively, they can be readily opened by a method satisfying the requirements of C/AS4/3.15.2a or C/AS5/3.15.2a:

If the operation of a locking device is unusual, such as the pressing of a button close to the door, it shall have signage that complies with NZBC F8.3.1.

All exit door-locking devices shall be:

- a) Clearly visible, located where such a device would be normally expected, designed to be easily operated without a key or other security device, and allow the door to open in the normal manner. If the operation of a locking device is unusual, such as the pressing of a button close to the door, it shall have signage that complies with NZBC F8.3.1.
- b) Not prevent or override the direct operation of panic fastenings fitted to any door, and
- c) If they are of an electromechanical type, in the event of a power failure or door malfunction be either automatically switch to the unlocked (fail-safe) condition or be readily opened by an alternative method satisfying the requirements of (a) and (b).

All the exit doors are to remain clear at all times.

8.7 Signage

Signs complying with NZBC F8 are required for the escape routes. They need to be placed above each external door and internal doors if the exit is not obvious. In the event of failure of the normal lighting, the visibility of the Exit signs shall be maintained by illumination (internal or external) powered by an alternative supply. Some exit signs are existing but required to confirm if functional. New exit signs to be installed where required. Refer to the drawings in Appendix A for proposed locations of Exit signs. NOTE: Additional Exit signs may be required following fitouts.

For the lifts, a sign shall be provided on or adjacent to each landing call button plate. In letters at least 8.0mm high it shall read "DO NOT USE LIFT IN EVENT OF FIRE" or IN EVENT OF FIRE – DO NOT USE LIFT." Signs shall be safety red on a white background.

Every doorset required to possess fire or smoke stopping capabilities shall have a sign fixed to both sides of the door leaf adjacent to the handle or push plate, stating "Fire Door, Please Keep Closed" or "Smoke Control Door, Please Keep Closed",, except that doors fitted with hold open devices shall have a sign stating only "Fire Door", "Smoke Control Door". The sign shall comply with the requirements of NZBC F8 5.2.3.

8.8 Visibility in Escape Routes/Emergency Lighting

Visibility in Escape Routes is required as per Clause F6 or Emergency lighting is required as per NZBC F6. It is required:

- at every change of level in an escape route,
- in an escape route from the point where the initial open path travel distance exceeds 20 metres,

Final locations to be determined by others.

For the building, it is required for all the stairs, and wherever the travel distance to reach ONE Exit is over 20m. Confirm existing emergency lighting or install where required. NOTE: The travel distances noted on the drawing are not intended to be specific escape routes as described in NZBC F6.

The specific documentation requirements are noted below.

1.7 Documentation

1.7.2 As part of the building consent application, the owner of the proposed emergency lighting system must submit documentation that provides:

- (a) full technical justification of the design,
- (b) the method of checking the luminance of the completed design, and
- (c) the method of checking ongoing compliance for the life of the building.

9.0 Control of Internal Fire and Smoke Spread

Referenced paragraphs are from C/AS4/Part 2 & C/AS5/Part 2: *Fire Resistance Ratings* and C/AS4/Part 4 & C/AS5/Part 4: *Control of Internal Fire and Smoke Spread* unless stated otherwise.

9.1 Fire/Smoke Separations – Internal Separations

The main internal stairs along with first floor are part of the same firecell as the ground floor. The underside of each floor and its supporting elements have a FRR of 30/30/-. The west stairs is a separate firecell. The lift is enclosed within a separate protected shaft with a FRR of 30/30/-.

The ceiling of the basement is to be fire separated from the ground floor with a FRR of (30)/30/-.

The west stairs will be rebuilt as is, reusing as much of the existing heritage fabric as possible and the existing stairs. The west stairs is to be a fire separated safe path stairs from the rest of the building. A fire separation of (30)/30/- and fire door with FRR -/30/-sm is required on the second floor. A smoke lobby with -/-/- sm smoke doors is required for the first floor access to the safe path stairs as it is a single means of egress for the second floor. This is in addition to the fire rated wall (30)/30/- and fire rated door -/30/-sm. A fire door with FRR -/30/-sm is required at the ground floor to fire separate the west safe path stairs. Refer to Appendix A.

Smoke separations with -/-/- sm smoke doors are existing in the vestibule on the ground floor and the landing on the first floor. Existing smoke separations to be maintained. Refer to Appendix A.

NOTE: The fire separation for each fire cell has been reasonably achieved by the existing building construction and fire separation.

9.1 Intermediate Floor – Lobby and Landing on First floor

Intermediate floors shall satisfy the following conditions:

- a) If there are two or more separate intermediate floors, the levels of these floors above the firecell floors differ by no more than 1.0m, and
- b) The total combined occupant load on the intermediate floors is no greater than 100, and

- c) The total combined area of the intermediate floors is no greater than specified in Clause 9.3.1.

Clause 9.3.1 The maximum total combined area of the intermediate floors within the firecell shall be the lowest of:

- a) 20% of the area of the firecell floor not including the area of the intermediate floors if the intermediate floors are enclosed or partitioned and do not have an alarm system with smoke detection installed throughout the firecell, or
- b) 40% of the area of the firecell floor not including the area of the intermediate floors if the intermediate floors are either:
 - i. Completely open, or
 - ii. If enclosed or partitioned, a Type 4 system is installed, or
- c) The area that allows up to 100 occupants on the intermediate floors based upon the occupant density of the space.

Intermediate floors and stairs used as access and their supporting primary elements within the firecell shall have FRRs of at least 30 minutes. This is reasonably achieved by the existing construction.

An intermediate floor is not to exceed a maximum of 40% of the firecell area; the first floor is the same area as the ground floor and therefore does not comply with the area limitations in the Acceptable Solutions. We consider the intermediate floor acceptable on an ANARP basis given the following reasons:

- The proposed work does not affect the existing intermediate floor.
- The building will be upgraded to a Type 7 system. This will provide early warning of a fire automatically allowing time for the occupants to egress from the mezzanine floor. This is an improvement on the current fire features.
- Travel distance for the intermediate floor is within the allowable distances
- The intermediate floor is provided with a second means of escape using the west safe path stairs
- There are existing smoke separations on the ground and first floor that will be maintained.

To make it complying would require blocking off part of the intermediate floor to reduce the area to below 40% or to fire rate access to the central stairs. Neither of these two options are considered realistic to provide.

Therefore the 'sacrifice' is large compared to the 'benefit', thus it is deemed 'as nearly as is reasonably practicable' to accept the intermediate level as another means of escape.

9.2 Fire/Smoke Separation Construction/Penetration Fire/Smoke Stopping

Penetrations in fire/smoke separations need to be sealed to the same rating as the fire/smoke barrier.

Firecell and smokecell effectiveness shall be maintained by ensuring continuity of fire and smoke separations at separation junctions, and around joints where doorsets, protected shafts and penetrations occur. Where fire separations meet other fire separations or rated parts of external walls, they shall be bonded together or have the junction fire stopped over its full length.

Vertical fire separations and external walls shall terminate as close as possible to the external roof cladding and primary elements providing roof support, with any gaps fully fire stopped.

Fire stops shall have a fire resistance rating of no less than that required for the fire separation within which they are installed. The methods of installation shall be identical with those of the prototype used in tests to establish their FRR. The material selected shall be approved as appropriate for the type and size of the gap or penetration, and for the type of material and construction used in the fire separation.

NOTE: For any non-standard situation, technical support is to be obtained from the product manufacturer prior to installation.

9.3 Downlights

Recessed luminaires (downlight) if provided shall be either meet the compliance as per AS/NZS 60598.2.2 or be installed with clearances from building elements including insulation of 100mm. If they are installed in a fire separation, they shall be appropriately fire rated.

9.4 Concealed Spaces

The spread of fire in concealed spaces and cavities shall be avoided by ensuring that extensive voids do not pass from one firecell to another. Any concealed space and cavities within internal walls or floors which are fire separations, or within external walls, shall have cavity barriers or be fire stopped at all common junctions.

The building complies with the requirements with sprinklers.

10.0 Building Service Plant

10.1 System Shutdown

When any smoke detection system is activated, it shall turn off all air-conditioning and mechanical ventilation '*plant*' (if any). This does not apply to individual heat pumps.

11.0 Surface Finishes

The interior and exterior surface finishes for the building must meet the requirements of C/AS4 & C/AS5 with respect to inhibiting the spread of fire.

11.1 Interior Surfaces

Surface finish requirements for new walls, ceilings, ducts, floorings and suspended flexible fabrics:

C/AS4 – Risk Group CA – New surface finish requirements for walls, ceilings, ducts and insulation.

Table 5: Surface Finish requirements specified

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	<i>Exitways (west staircase area)</i>	Crowd spaces (display areas, the Chamber, foyers and vestibule): wall linings	Crowd spaces (display areas, the Chamber, foyers and vestibule): ceiling linings	All other occupied spaces: wall and ceiling linings	Ducts for HVAC systems: internal surfaces ¹	Ducts for HVAC systems: external surfaces ¹

Maximum permitted <i>Group Number</i>						
Sprinklered	2	3	2	3	2	3

NOTE 1: Surfaces of rigid and flexible ductwork for HVAC systems are considered as Group Number 1-S if the ductwork complies with the fire hazard properties set out in AS 4254.

C/AS5 – Risk Group WB (offices, stores, staff kitchen, library) – New surface finish requirements for walls, ceilings, ducts and insulation.

Table 6: Surface Finish requirements specified

Column 1	Column 2	Column 3	Column 4	Column 5
	<i>Exitways (west staircase area)</i>	All other <i>occupied spaces</i>	Ducts for HVAC systems: internal surfaces ¹	Ducts for HVAC systems: external surfaces ¹
Maximum permitted <i>Group Number</i>				
Sprinklered	2	3	2	3

NOTE 1: Surfaces of rigid and flexible ductwork for HVAC systems are considered as Group Number 1-S if the ductwork complies with the fire hazard properties set out in AS 4254.

Table 7: Critical radiant flux requirements for flooring

<i>Area of Building</i>	<i>Minimum critical radiant flux when tested to ISO 9239-1</i>
	<i>Buildings protected with a fire sprinkler system</i>
Exitways (<i>west staircase area</i>)	2.2kW/m ²
Firecells Accommodating more than 50 people	1.2kW/m ²
All other Occupied spaces	1.2kW/m ²

Existing surface finishes

The existing interior surface finishes in the building are:

Area	Surface Finish
Walls	<ul style="list-style-type: none"> • Plaster • Bricks • GIB
Ceiling	<ul style="list-style-type: none"> • Ceiling boards
Floor	<ul style="list-style-type: none"> • Carpet • Vinyl • Timber • Tiles

The interior surface finishes are either non-combustible or commonly used products, and are considered to achieve the requirements on reasonable grounds.

If foamed plastics building materials or exposed combustible materials form part of a wall, ceiling or roof system, the complete system shall achieve a Group Number as detailed above and they shall comply with the flame propagation criteria as specified in AS1366 for the materials being used.

Any suspended flexible fabrics shall, within all occupied spaces including exitways have a flammability index no greater than 12 (and no greater than 5 when used as underlay to roofing or exterior cladding exposed to view).

12.0 Fire Fighting

Ensure fire alarm panels and sprinkler valveset locations are co-ordinated with Fire Service in the event of any changes.

13.0 Compliance Schedule/Maintenance

Building work on an existing building requiring a building consent which results in alteration, addition or removal of items from the building must have the provisions of the compliance schedule. The compliance schedule identifies those fire items in the building requiring maintenance. The owner is responsible to ensure these items are maintained. Maintenance is generally in accordance with the applicable standard.

The compliance schedule for the fire protection features from this report have been noted on the attached compliance schedule (refer to Appendix B – Fire Compliance Schedule Items).

14.0 Conclusions

We believe the proposed building will satisfy the fire safety requirements of the New Zealand Building Code if the fire requirements provided in this report are implemented. These are noted in the summary and the drawings.

15.0 Staged Work Effect on Fire Systems

15.1 Staged Restoration

The staged restoration is to provide minimum structural restoration and make safe works. The make safe being both from a structural standpoint as well as heritage fabric and fire safety.

At the completion of the Staged Restoration the building is presumed to be unused. Therefore, there are no requirements for the smoke detection system, intact fire and smoke separations, Exit signs or emergency lighting.

For the staged restoration, the building will need to be provided with a functioning sprinkler system and manual call point/sounder system. Due to the structural requirements, the existing valveset will need to be relocated from its current location. A new temporary water supply will be required to supply the temporary location of the valveset. This may ultimately require a backflow preventor to be installed on the sprinkler system.

In addition, the fire alarm panel will need to be relocated as the wall it is in will be affected – AS1.02.

Elsewhere in the building the sprinkler system will need to be adjusted due to new walls being installed. In addition, to access the walls ceilings will need to be removed which will affect the sprinkler system.

15.1 Full Restoration

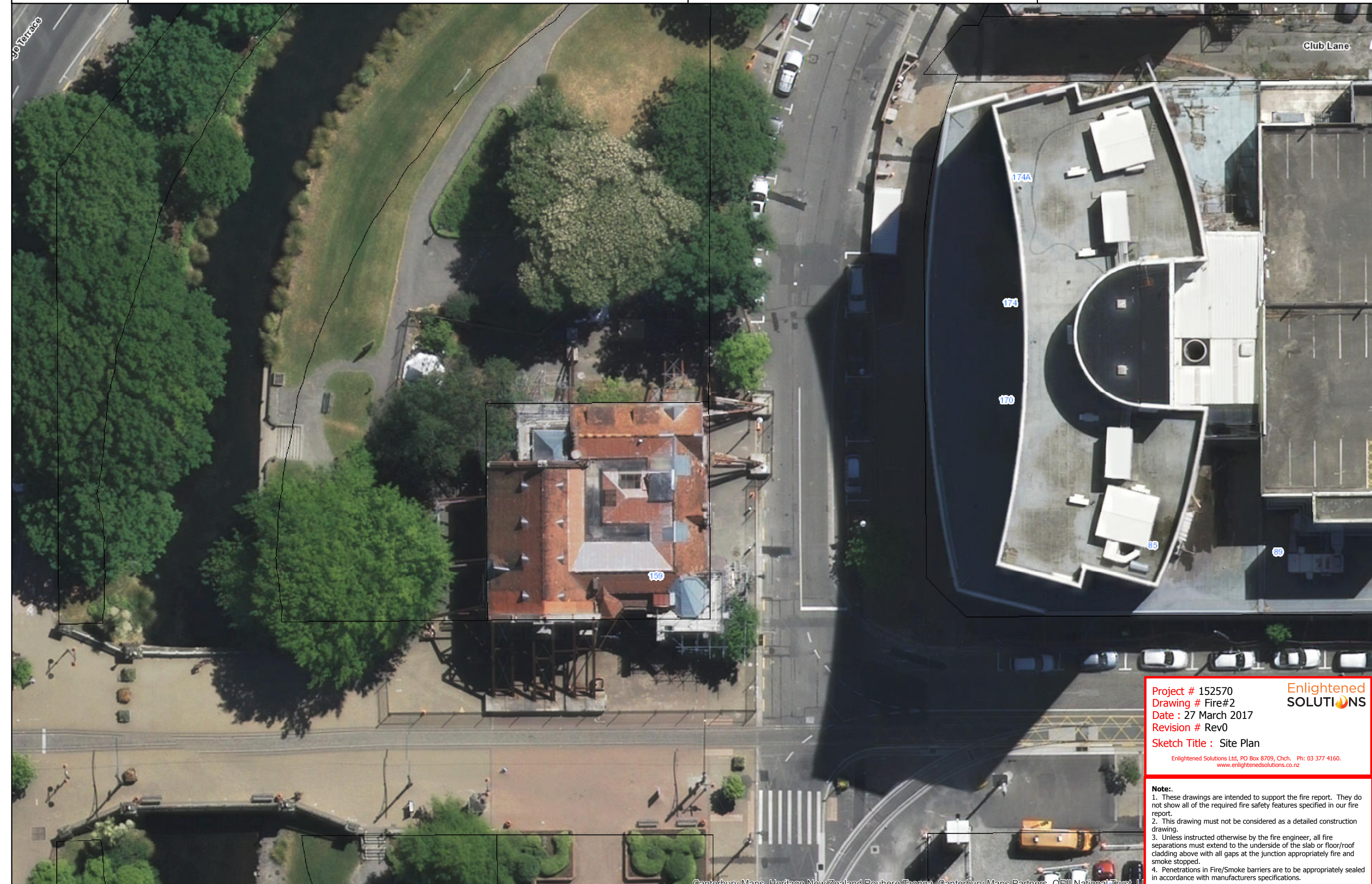
There are some areas where the sprinkler system will have to be reinstated for completion of the staged restoration work and then removed again for the full restoration stage.

Appendix A – Drawings

Dwg #	Rev #	Date	Description
Fire #1	Rev 0	27 Mar 17	Building Score Sheet
Fire #2	Rev 0	27 Mar 17	Site Plan
Fire #3	Rev 0	27 Mar 17	Ground Floor Fire Notes
Fire #4	Rev 0	27 Mar 17	Toilet Layout Fire Notes
Fire #5	Rev 0	27 Mar 17	First Floor Fire Notes
Fire #6	Rev 0	27 Mar 17	Second Floor Means of Escape

Fire #1 - Building Score Sheet

Building Score Sheet		
Key factors	Points	Score
Building age		
Approved from 1 June 2001 onwards	0	
Approved between 1 January 1993 and 31 May 2001	1	
Approved on or before 31 December 1992	3	√
Information held on the building by the BCA or TA (Score one of these only and choose the most comprehensive assessment)		
For buildings approved from 1 June 2001: no consents made	0	
Full building assessment on file dated 1 June 2001 or later	2	
Full building assessment on file dated on or before 31 May 2001	4	√
One or more partial building assessments on file	6	
No assessment on file for building additions or alterations	8	
Unable to determine history of building	8	
Extent of the proposed building work		
Minor	0	
Moderate	3	√
Significant	6	
Building importance level		
Level 1	0	
Level 2	4	√
Level 3	8	
Level 4 and Level 5	12	
Additional points for building level 1, 2 or 3 with sleeping facilities	4	
Total Score		14



Project # 152570
 Drawing # Fire#2
 Date : 27 March 2017
 Revision # Rev0
 Sketch Title : Site Plan



Enlightened Solutions Ltd, PO Box 8709, Chch. Ph: 03 377 4160.
www.enlightenedsolutions.co.nz

- Note:**
1. These drawings are intended to support the fire report. They do not show all of the required fire safety features specified in our fire report.
 2. This drawing must not be considered as a detailed construction drawing.
 3. Unless instructed otherwise by the fire engineer, all fire separations must extend to the underside of the slab or floor/roof cladding above with all gaps at the junction appropriately fire and smoke stopped.
 4. Penetrations in Fire/Smoke barriers are to be appropriately sealed in accordance with manufacturers specifications.

Project # 152570
Drawing # Fire#3
Date : 27 March 2017
Revision # Rev0
Sketch Title : Ground Floor Fire Notes

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Note:
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2. This drawing must not be considered as a detailed construction drawing.
3. Unless instructed otherwise by the fire engineer, all fire separations must extend to the underside of the slab or floor/roof cladding above with all gaps at the junction appropriately fire and smoke stopped.
4. Penetrations in Fire/Smoke barriers are to be appropriately sealed in accordance with manufacturers specifications.

Legend:
EXIT Exit Signs F8/AS1
FRR (30)/30/-
2.4 m Travel Distance
2.4 m Travel Distance From Floor Above
Existing smoke Separation with -/-/- Sm door
Existing FRR (30)/30/-

To be rebuilt and keep as much of the existing heritage fabric, existing stairs to be kept and reused, create fire separation from other part of building

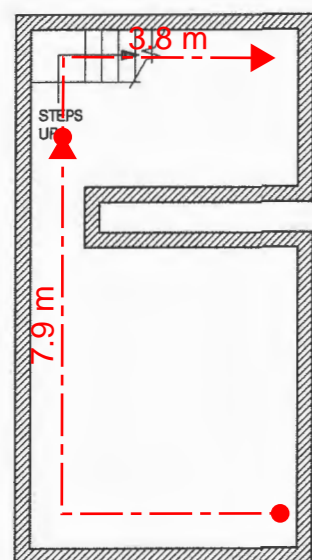
NOTE: Refer Fire #4 AF-1-02 for altered layout to the toilet area

Fire door required to create safe path stairs

Panic Hardware required

Sprinkler Valve room
Fire Alarm Panel

AS 1.02



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Repairs, Reconstruction & Restoration

Project
FULL RESTORATION
Sheet Name
GROUND FLOOR PLAN

Scale	1:50 (1/2 SCALE @ A3)	
Design	TU	Verified TU
Drawn	CG	Approved TU
Project No.	Issue Date	Month 2017
Resident	Sheet No.	

Project # 152570
Drawing # Fire#4
Date : 27 March 2017
Revision # Rev0
Sketch Title : Toilet Layout Fire Notes

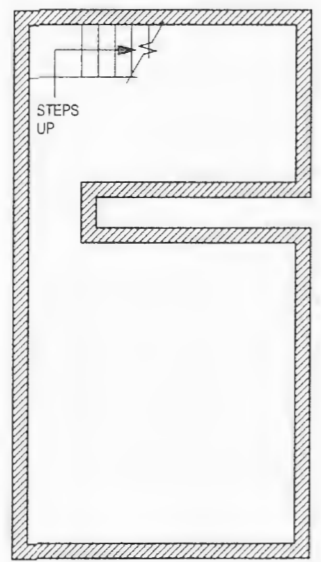
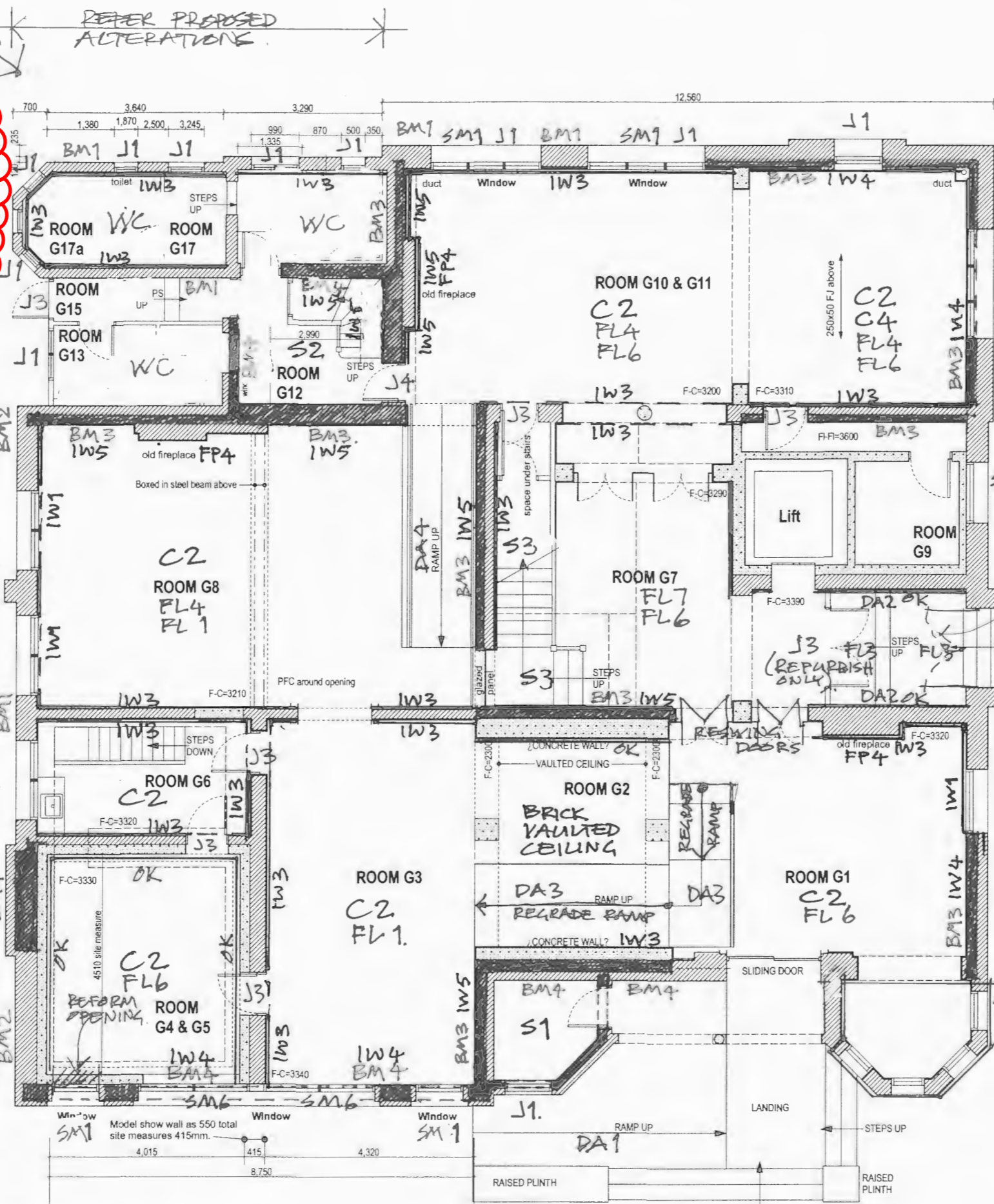
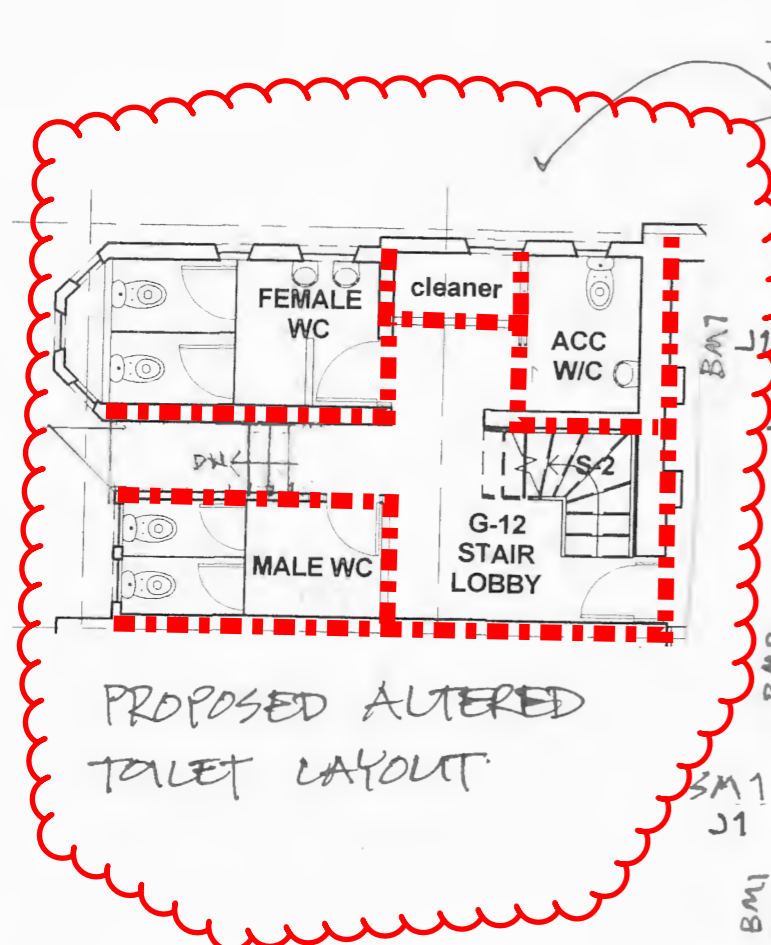
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- Note:**
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 2. This drawing must not be considered as a detailed construction drawing.
 3. Unless instructed otherwise by the fire engineer, all fire separations must extend to the underside of the slab or floor/roof cladding above with all gaps at the junction appropriately fire and smoke stopped.
 4. Penetrations in Fire/Smoke barriers are to be appropriately sealed in accordance with manufacturers specifications.

Legend:

■ ■ ■ ■ FRR (30)/30/30



EXISTING WROUGHT IRON GATES.
Oxford Terrace Street Entry

WHOLE TURRET - DECONSTRUCT
RECONSTRUCT - REFER BMS

AF 1-02

DO NOT SCALE

Project # 152570
Drawing # Fire#5
Date : 27 March 2017
Revision # Rev0

Enlightened SOLUTIONS

Sketch Title : First Floor Fire Notes

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- Note:**
1. These drawings are intended to support the fire report. They do not show all of the required fire safety features specified in our fire report.
 2. This drawing must not be considered as a detailed construction drawing.
 3. Unless instructed otherwise by the fire engineer, all fire separations must extend to the underside of the slab or roof cladding above with all gaps at the junction appropriately fire and smoke stopped.
 4. Penetrations in Fire/Smoke barriers are to be appropriately sealed in accordance with manufacturers specifications.

Legend:

- Existing FRR of (30)/30/- underside of stairs, floor & supporting elements
- EXIT Exit Signs F8/AS1
- 2.4 m Travel Distance
- 2.4 m Travel Distance From Floor Above
- Existing FRR (30)/30/-
- Smoke Separation with -/-/- Sm door
- FRR (30)/30/-



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Project
FULL RESTORATION

Sheet Name
FIRST FLOOR PLAN

Scale
1:50 (1/2 SCALE @ A3)

Design	TU	Verified	TU
Drawn	CG	Approved	TU
Project No.	Project Number	Issue Date	Month 2017
Revision	Sheet No.		

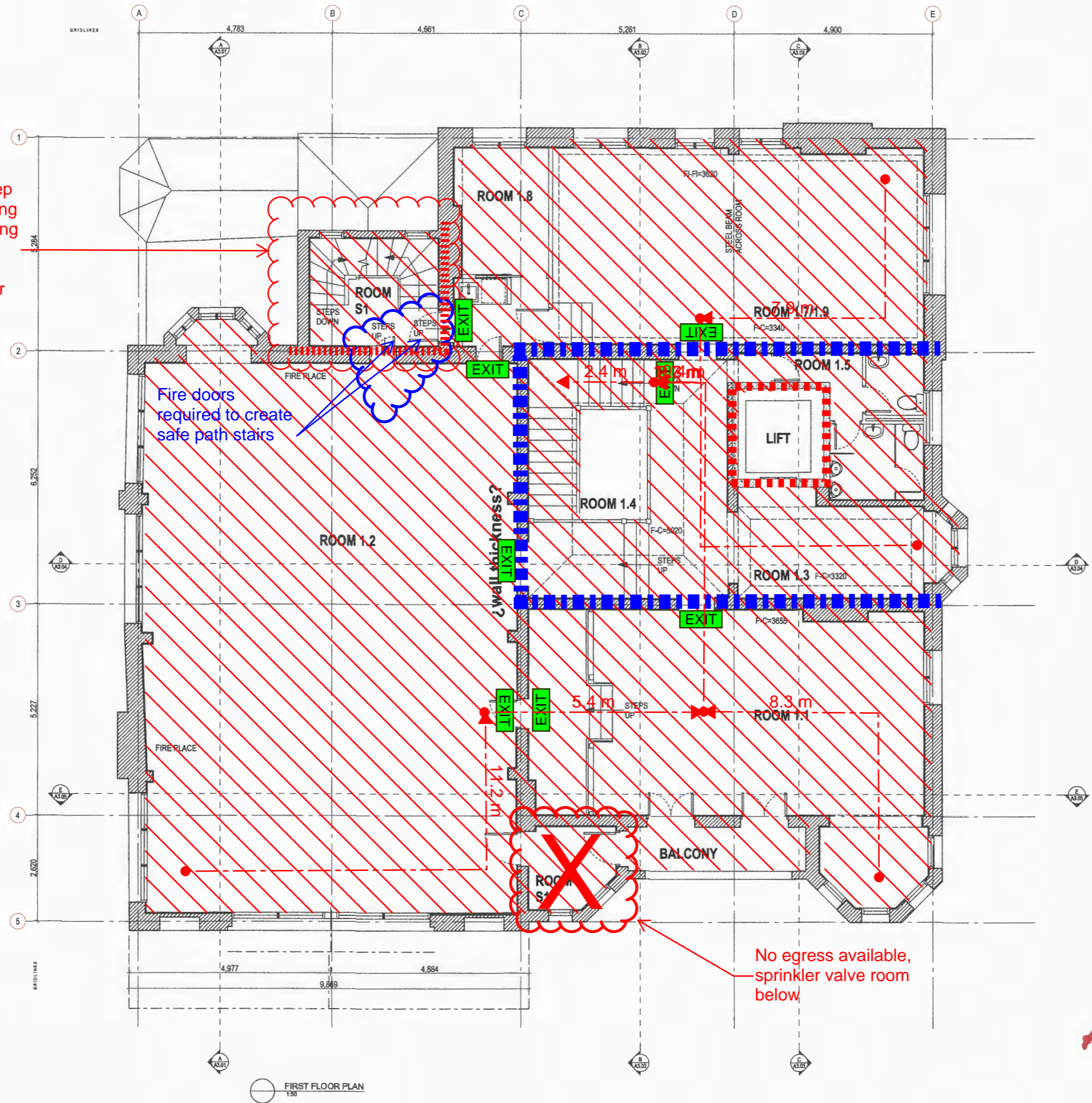
Revision **A** Sheet No. **A1.03**

To be rebuilt and keep as much of the existing heritage fabric, existing stairs to be kept and reused. Create fire separation from other part of building

Fire doors required to create safe path stairs

No egress available, sprinkler valve room below

AE 1.03



FIRST FLOOR PLAN
1:50

Project # 152570
Drawing # Fire#6
Date : 27 March 2017
Revision # Rev0

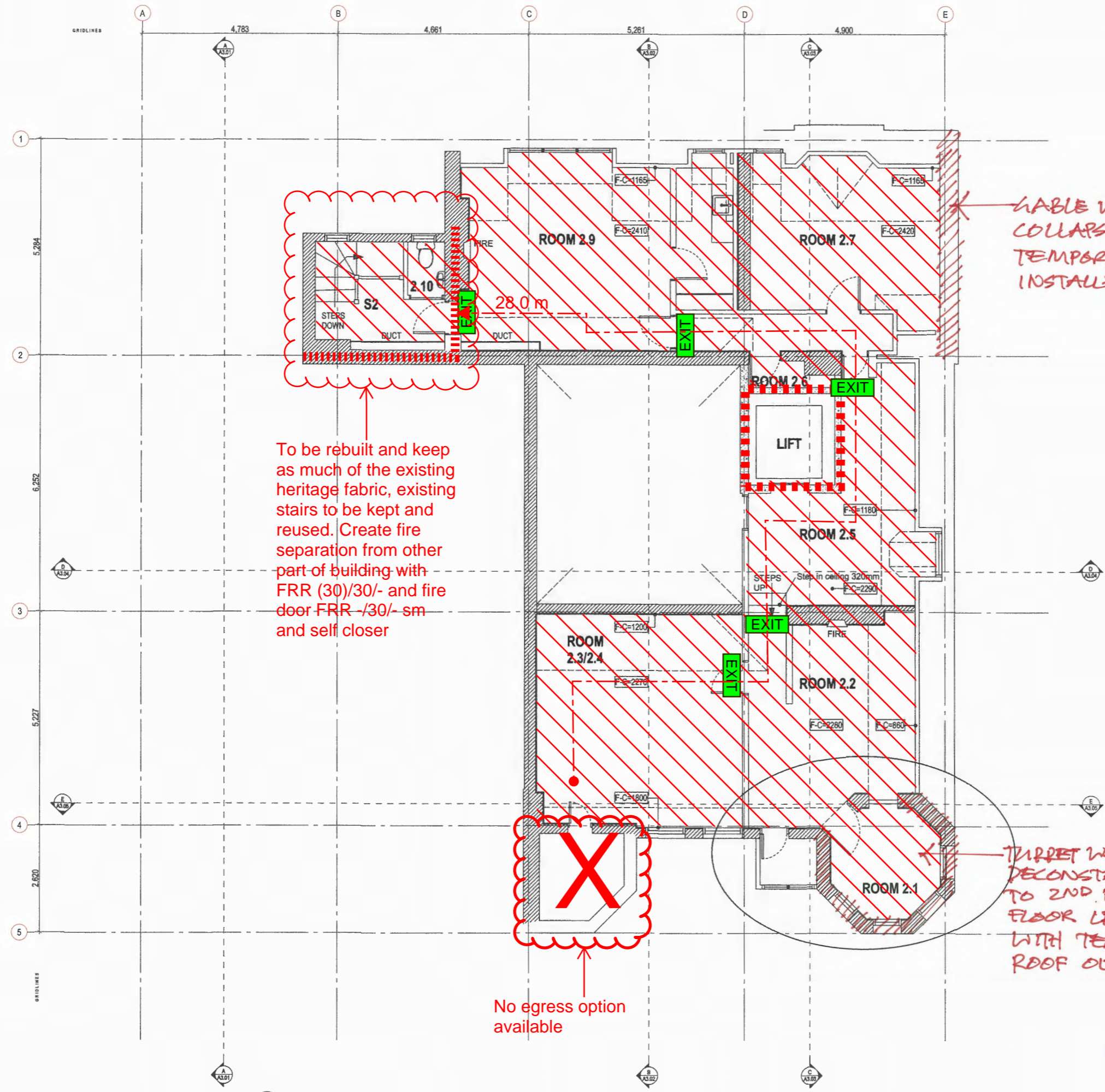
Enlightened SOLUTIONS

Sketch Title : Second Floor Fire Notes
Enlightened Solutions Ltd, PO Box 8709, Chch. Ph: 03 377 4160.
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- Note:**
1. These drawings are intended to support the fire report. They do not show all of the required fire safety features specified in our fire report.
 2. This drawing must not be considered as a detailed construction drawing.
 3. Unless instructed otherwise by the fire engineer, all fire separations must extend to the underside of the slab or floor/roof cladding above with all gaps at the junction appropriately fire and smoke stopped.
 4. Penetrations in Fire/Smoke barriers are to be appropriately sealed in accordance with manufacturers specifications.

Legend:

- EXIT Exit Signs F8/AS1
- Existing FRR of (30)/30/- underside of stairs, floor & supporting elements
- Existing FRR (30)/30/-
- FRR (30)/30/-
- 2.4 m Travel Distance



OLD MUNICIPAL CHAMBERS
Repairs, Reconstruction & Restoration

Project
FULL RESTORATION

Sheet Name
SECOND FLOOR PLAN

Scale
1:50 (1/2 SCALE @ A3)

Design	TU	Verified	TU
Drawn	CG	Approved	TU

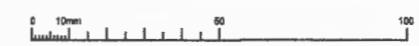
Project No. Project Number Issue Date Month 2017
Revision Sheet No. **A**

ARCHITECTURAL



AE 1.04

SECOND FLOOR PLAN
1:50



Appendix B – FIRE Compliance Schedule Items

		Existing	New or Modified	Removed
1	Automatic systems for fire suppression		X	
2	Automatic or manual emergency warning systems for fire or other dangers		X	
3	Electromagnetic or automatic doors or windows (for example, ones that close on fire alarm activation)			
3/1	Automatic doors	X		
3/2	Access controlled doors			
3/3	Interfaced fire or smoke doors or windows			
4	Emergency lighting systems		X	
5	Escape route pressurisation systems			
6	Riser mains for use by fire service			
7	Automatic back-flow preventers connected to a potable water supply			
8	Lifts, escalators, travelators, or other systems for moving people or goods within buildings			
8/1	Passenger carrying lifts			
8/2	Service lifts			
8/3	Escalators and moving walks			
9	Mechanical ventilation or air conditioning systems			
10	Building maintenance units			
11	Laboratory fume cupboards			
12	Audio loops or other assistive listening systems			
12/1	Audio loops			
12/2	FM radio frequency systems and infrared beam transmission systems			
13	Smoke control systems			
13/1	Mechanical smoke control			
13/2	Natural smoke control			
13/3	Smoke curtains			
14	Emergency power systems for, or signs relating to, a system or feature specified in any of the clauses 1 to 13			
14/1	Emergency power systems			
14/2	Signs relating to specified systems		X	

COMPLETE THIS SECTION ONLY IF THE BUILDING CONTAINS OR WILL CONTAIN ANY OF THE SYSTEMS ABOVE

15	Any or all of the following systems and features, so long as they form part of a building's means of escape from fire, and so long as those means also contain any or all of the systems or features specified in clauses 1-6, 9 & 13			
15/1	Systems for communicating spoken information intended to facilitate evacuation			
15/2	Final Exits		X	
15/3	Fire separations		X	
15/4	Signs for communicating information intended to facilitate evacuation		X	
15/5	Smoke separations			
16	Cable Cars			