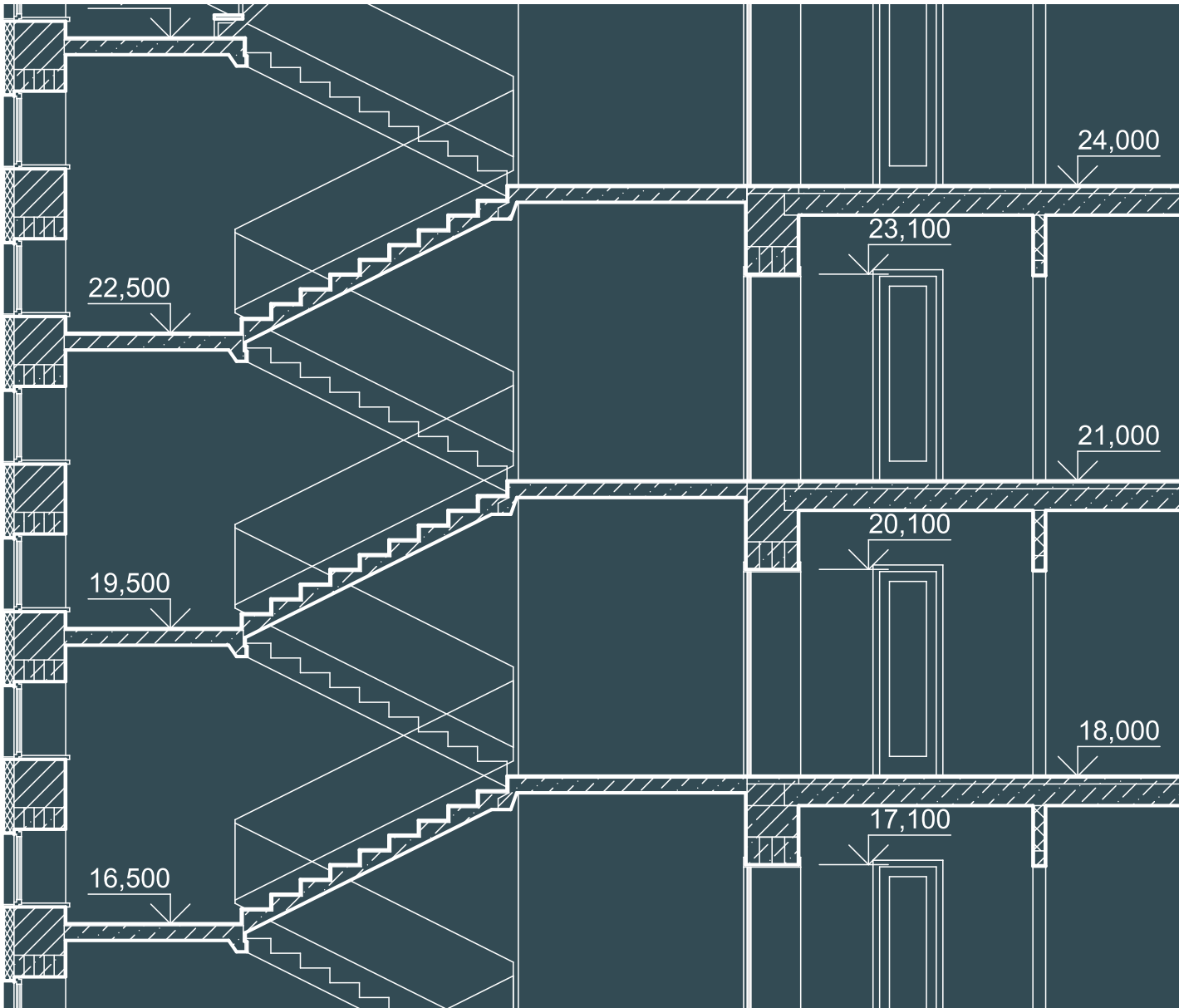
9.0
Fire Safety and Egress



Fire Safety and Egress Design Guidelines

The design guidelines have been developed to provide a greater level of certainty for all stakeholders when CIAL embark on developing a new commercial asset – the focus is to deliver on our three core business pillars of Stronger Business, Kaitiaki and Enhancing Customer Journeys.

This document outlines CIAL's Fire design requirements for commercial projects with the aim of providing safe, compliant, sustainable, simple and cost effective outcomes for the fire elements of a building asset.

Championing the South Island

OUR MISSION

To be a champion airport, acknowledged at home and abroad as the engine room of the South Island's social and economic prosperity

Being a Champion Airport is built on three pillars:

BUILDING A STRONGER BUSINESS

Together we work to make this organisation even more successful and enduring, with strong commercial returns. We do it because that benefits everyone in our place—especially the people and businesses that call it home.

ENHANCING CUSTOMER JOURNEYS

Customers are at the centre of everything we do, so we do everything we can to make their experience all it can be. We challenge ourselves to think about all that's possible, embracing innovative thinking and wise investment. We keep our airport terminal and wider campus one that welcomes, inspires and engages.

BEING GREAT KAITIAKI

We've been given a special responsibility for our place in the world, and we take that seriously. We embrace the Māori concept of Kaitiakitanga (responsibility, care and guardianship). We are especially focused on safety, security and the sustainable use of our natural resources.

CHRISTCHURCH AIRPORT

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9.1 INTRODUCTION

Fire safety and egress provisions to be included in CIAL developments shall be designed and installed to comply with either C/AS2 or C/VM2 of the NZBC. Designs of sprinkler and fire alarm systems may be via design/build contracts.

The guidelines are intended to ensure that the fire safety and egress systems and installations are consistently maintained at a high standard, with a constant level of quality and service throughout the lifetime of each development.

All projects are to complete the attached compliance checklist for each major design phase.

The guidelines are not intended to restrict designers from making recommendations in the interest of the project but rather to encourage the incorporation of features and systems that will provide flexibility for change of use, new technologies or expansion in the future.

9.2 ENVIRONMENTALLY SUSTAINABLE DESIGN PRACTICES

Environmentally sustainable design (ESD) practices and features should be considered for the fire safety and egress systems employed in CIAL developments in accordance with section 1.1.7 of the General Design Guidelines.

9.3 CODES AND STANDARDS

Below are the key codes and standards governing the design, specification and installation of fire safety and egress systems. The current issues of the following standards and codes must be used.

- NZBC acceptable solution C/AS2 and verification method C/VM2
- Fire Safety and Evacuation of Buildings Regulations
- NZS 4541*Automatic fire sprinkler systems*
- NZS 4512 *Fire detection and alarm systems in buildings*
- NZS 4510 *Fire hydrant systems for buildings*
- NZS 4219 *Seismic performance of engineering systems in buildings*
- AS/NZS 1170 *Structural design actions* suite of standards
- NZS 4503 *Hand operated fire-fighting equipment*
- AS 4214 *Gaseous fire extinguishing systems*
- AS/ISO 14520 *Gaseous fire-extinguishing systems*
- AS 2293 *Emergency lighting and exit signs for buildings*
- Relevant New Zealand standard specifications and codes of practice whether specifically mentioned herein or not
- All other standards and documents produced by each and any authority having jurisdiction over the works

9.4 HEALTH AND SAFETY BY DESIGN

Health and safety by design shall be considered as part of the fire services design. Refer to the Health and Safety Design Guidelines for specific details with regard to expected documentation and templates.

Maintenance access shall form a part of the health and safety by design review for the development and **mitigation measures put in place to minimise the risks as a result of that review.**

9.5 EARTHQUAKE PROTECTION AND SEISMIC RESTRAINT

Consultation is required with CIAL and the tenant to determine the importance level of the new building, and suitable seismic restraint shall be allowed for in full compliance with all applicable standards.

Where applicable, the fire sprinkler contractor shall subcontract a chartered professional structural engineer or specialist seismic restraint supplier to design the services supports, flexible connections at seismic joints and any other measures required for the entire mechanical system (including all subtrade works to mechanical).

The design must be compliant with NZS 4219, include specific design of aspects that are not covered by standard NZS 4219 solutions and incorporate the requirements of any other standards applicable to the support of the mechanical services systems such as AS/NZS 1170.2 for wind loading for exterior mounted plant.

The seismic designer shall provide design and as-built drawings along with a PS1 and PS4.

9.6 APPROVED CONTRACTORS

Consider and discuss with CIAL prior to tendering of fire protection works in CIAL developments whether there is a preference for any nominated contractors or subcontractors.

9.7 DESIGN CONDITIONS AND REQUIREMENTS

9.7.1 DOCUMENTATION LEVEL

The level of detailing (LOD) appropriate for the fire services shall be considered and discussed with CIAL. However, the minimum level of detailing expected for fire services is LOD 300.

9.7.2 COORDINATION WITH DESIGN TEAM

The fire services design and associated drawings/model shall be coordinated with the architectural and other design consultants including but not limited to the following:

- Civil
- Hydraulic
- Structural
- Electrical
- Mechanical.

Where these consultants are not engaged on a project, the fire consultant shall identify any areas of concern or issues with compliance in these areas to the CIAL project manager for discussion.

9.7.3 FUTURE FLEXIBILITY

Consideration shall be given by the designer to future flexibility of the installation to allow for potential expansion or integration of new technology and appropriate allowances made. In particular, consideration shall be given to the spatial requirements and services connections required to allow for potential future expansion or alterations.

Additional consultation with the tenant shall be carried out and allowances made for any specific requirements.

9.7.4
PROPERTY OWNERSHIP

Typically, CIAL owns both the land and buildings on its sites. Lease agreements typically do not exceed 35 years.

Fire engineers shall include the benefit of this ownership structure when considering protection of neighbouring property. Where CIAL continues to own both the land and buildings on both sides of any given property or lease boundary, external walls need not provide neighbouring property protection.

Where CIAL does not own both the land and buildings on both sides of any given property or lease boundary, external walls shall be designed to provide protection as required by the NZBC.

9.7.5
BUILDING USE

The fire engineer shall discuss with CIAL possible future uses of the building and shall include provision for the future use in the fire design.

9.7.6
DESIGN OCCUPANCIES

Design occupancies shall be based on the occupant densities given in NZBC acceptable solution C/AS2 and verification method C/VM2 or from furniture layouts given by tenants, whichever is the greater.

9.7.7
EVACUATION SCHEME

The fire engineer shall advise whether an evacuation scheme is required for the building being designed. The preparation of the evacuation scheme shall remain the responsibility of CIAL. CIAL shall apply for an evacuation scheme up to 30 days before the date the building is first lawfully occupied.

9.7.8
SPRINKLER SYSTEM

Where a sprinkler system is required either by NZBC acceptable solution C/AS2 or verification method C/VM2 or CIAL or the tenant, the system shall comply with NZS 4541 including the appropriate sprinkler system certifier's technical directives.

Sprinklers shall be included under external canopies.

Sprinkler systems shall be connected to FENZ and the CIAL Fire Service.

9.7.8.1
General

All builder's work associated with sprinkler systems shall be specified by the fire engineer.

Coordinated sprinkler pipe and head layouts shall be provided by the sprinkler system designer, giving attention to the proximity to light fittings.

The fire engineer and the architect must approve the proposed layout before work proceeds on site.

AON or Sprinkler Alarm Inspections Limited (SAIL) shall inspect and approve sprinkler systems at the completion of the project.

As-built drawings and O&M manuals for the sprinkler system shall be submitted on completion.

Defects liability shall be 12 months from practical completion.

Seismic design and installation of the sprinkler system shall be compliant and certified in accordance with AS/NZS 1170 and NZS 4219

Any pipework penetrating fire-rated elements shall be fire stopped as appropriate (see section 9.7.18).

9.7.8.2

Water supply

If the development is in Dakota Park, the water supply for the system shall be taken from the existing underground fire main, fed from CIAL's fire-fighting water storage tanks and pump at the west end of George Bellew Road. Refer also to Appendix 9A:.

If the development is not in Dakota Park, the water supply shall be taken from the CIAL potable main. Include a monitored backflow preventer. CIAL's preference is for this to be located within the sprinkler valve room. However, this location must be accepted by the territorial authority. If the territorial authority requires the backflow preventer at the boundary, include a concrete slab and sheet steel surround.

If the sprinkler design requires a dual supply, a separate water storage tank and booster pump shall be installed on site.

The incoming main must be located off to the side of any site driveway rather than along the centre.

Underground pipework must be PE. Include thrust blocks as necessary.

The fire protection contractor shall be responsible for underground connections, trenching, thrust blocks, backfilling and making good of all surfaces to match the existing surfaces to run pipes and cabling. The underground pipe shall be of a material suitable for the ground conditions.

The location of the sprinkler valve and FENZ inlets shall be approved by FENZ and the CIAL Fire Service.

Fire service inlets shall be located either inside the sprinkler valve room or behind a glazed external door.

Sprinkler valves shall be enclosed in a purpose-made sprinkler valve room and not simply fixed to the outside of the building. Provide a concrete nib at least 100mm high between the sprinkler valve room and the remainder of the building to protect against water spilling. It is recommended that water-resistant linings such as fibre-cement board or GIB Aqualine are used for wall linings.

Sprinkler valve enclosures shall include power supply, heater, lighting, drain to sewer and sewer connection and drain to stormwater and stormwater connection.

Include pressure relief valves to allow for expansion in summer.

9.7.8.2.1

Dakota Park

If the development is in Dakota Park, the water supply for the system shall be taken from the existing underground fire main, fed from CIAL's fire-fighting water storage tanks and pump at the west end of George Bellew Road.

Include an electronically monitored sluice valve at the connection to the existing main. The valve shall be a model Hawle E2 PN16. A Hawle E2-Schieber position indicator shall be fitted to the valve. The limit switch shall be IP66/67 rated from Siemens. The limit switch shall be closed when the valve is open. The valve shall be installed in a 600mm diameter inspection chamber complete with a cast iron lid. The cast iron lid shall be per CCC standard manhole covers drawing SD301. Connect this to the existing fibre connection to CIAL. This system advises CIAL that the sprinkler system has activated. The fire protection trade is responsible for the complete installation of this valve and its monitoring connection.

9.7.8.2.2

General

If the development is not in Dakota Park, the water supply shall be taken from the CIAL potable main. Include a monitored backflow preventer. CIAL's preference is for this to be located within the sprinkler valve room. However, this location must be accepted by the territorial authority. If the territorial authority requires the backflow preventer at the boundary, include a concrete slab and sheet steel surround. If the sprinkler design requires a dual supply, a separate water storage tank and booster pump shall be installed on site. The incoming main must be located off to the side of any site driveway rather than along the centre. Underground pipework must be PE. Include thrust blocks as necessary.

The fire protection contractor shall be responsible for underground connections, trenching, thrust blocks, backfilling and making good of all surfaces to match the existing surfaces to run pipes and cabling.

The underground pipe shall be of a material suitable for the ground conditions. The location of the sprinkler valve and FENZ inlets shall be approved by FENZ and the CIAL Fire Service. Fire service inlets shall be located either inside the sprinkler valve room or behind a glazed external door.

Sprinkler valves shall be enclosed in a purpose-made sprinkler valve room and not simply fixed to the outside of the building. Provide a concrete nib at least 100mm high between the sprinkler valve room and the remainder of the building to protect against water spilling. It is recommended that water-resistant linings such as fibrecement board or GIB Aqualine are used for wall linings. Sprinkler valve enclosures shall include power supply, heater, lighting, drain to sewer and sewer connection and drain to stormwater and stormwater connection. Include pressure relief valves to allow for expansion in summer.

9.7.8.3
Pipework

All sprinkler pipework shall be concealed where possible. Exposed pipework is acceptable in warehouse and factory areas unless hygiene requirements require it to be concealed.

External sprinkler pipework, including that under canopies, shall be at least 40mm diameter so that insulation for frost protection is not required.

Exposed pipework shall be galvanised and be marked "SPRINKLER".

Roof and ceiling spaces shall be sprinkler protected where required by NZS 4541 rather than including fire-rated baffles.

Sprinkler pipework in roof spaces smaller than 40mm diameter shall be insulated either with 19mm Centuralon or equivalent around the pipework or building insulation at roof level. Where insulation is provided to the underside of the roof, it shall be held in place with metal strapping or wire. Plastic strapping is not acceptable.

Include flexible stainless seismic joins in the pipework where it passes over seismic gaps. The length of flexible pipe shall be calculated using the expected ULS movement.

Pipework drains shall be located so that the water can easily drain to sewer.

9.7.8.4
Sprinkler heads

Under-ceiling sprinkler heads shall be white finish with white two-piece escutcheon.

Sprinkler heads in warehouse and factory areas, under canopies and in concealed spaces shall be bronze.

Under-ceiling sprinklers shall be a fast-response type with a response time index (RTI) of no greater than 50(ms)$^{1/2}$. Concealed-space sprinklers shall include intermediate response sprinklers.

Sprinkler heads in areas that are likely to be damaged shall include cages.

Recessed heads may be required in feature ceilings. The fire engineer shall discuss this with CIAL and the architect.

Spares of all sizes and types of sprinkler heads shall be kept in the sprinkler valve room.

9.7.8.5
Hazards

All hazards, including transformers, shall either be located at least 10m from the sprinklered building or adjoin the sprinkler-protected building, be roofed and sprinkler protected.

Alternatively, external drenchers shall be installed.

The preferred option shall be discussed and agreed with CIAL.

9.7.9
FIRE ALARM SYSTEM

At least a Type 4 fire alarm system shall be installed. All fire alarm systems shall be connected to FENZ, after discussion with CIAL.

Where smoke detectors will cause false alarms, a Type 3 system shall be installed with supplementary smoke detection.

The system shall comply with NZS 4512.

Where sprinklers are installed, a Type 2 fire alarm system is sufficient unless smoke detection is required by either acceptable solution C/AS2, verification method C/VM2 or the tenant.

Fire alarm systems shall either be Ampac or Pertronic or an approved alternative.

Type 4 smoke detection systems shall be analogue addressable if more than 20 detectors are installed.

Type 3 heat detection systems may be conventional.

Manual alarm systems may be conventional unless part of an analogue addressable smoke detection system.

9.7.9.1
General

All cabling shall be concealed in roof spaces, ceilings and wall cavities. Exposed conduit or neatcap is acceptable only in open factory or warehouse areas.

The fire protection contractor shall be required to coordinate the location of detectors, call points and sounders with all other service trades including architectural and structural elements. The fire protection contractor shall provide shop drawings for coordination with all the other trades. The engineer and the architect must approve the proposed layout before work proceeds on site.

All fire alarm hardware shall be suitable for the environment. It is the fire protection contractor's responsibility to ensure that the design and installation of the fire protection system is suitable for their environment. Any special maintenance requirements required to be completed to maintain warranties of the fire alarm system shall be made known to CIAL as part of the design process.

Keep detectors out of the airflow from air-handling grilles.

Fire alarm systems shall be inspected and approved on completion by SAIL or AON.

The fire protection contractor shall provide as-built drawings and O&M manuals on completion of the project.

9.7.9.2
Alarm panel

Alarm panels for automatic analogue addressable smoke detection systems shall be analogue addressable.

Alarm panels for automatic conventional heat detection systems shall be conventional.

Alarm panels for manual conventional systems shall be conventional.

The proposed location of fire alarm panels shall be confirmed with FENZ and the architect. Approval from these entities shall be sought as part of the design process.

The preferred location of the main fire alarm panel is adjacent to the main entry.

Where the alarm panel can be inside the sprinkler valve room, this option shall be taken and a mimic panel installed adjacent to the main entry.

The electrical contractor shall provide a dedicated power supply to the alarm panel.

Alarm panels shall:

- include a trial evacuation switch and an alarm silencing
- include building zoning
- be serviceable from the inside and viewable from the outside if not inside a sprinkler valve room
- be located to suit FENZ requirements.
- Mimic panels shall:
- include a trial evacuation switch and an alarm silencing
- include building zoning
- be serviceable from the inside and viewable from the outside
- be located to suit FENZ requirements
- show the location of the main fire alarm panel, hydrant fire service inlet (FSI) and the sprinkler valve room when appropriate
- show the location of the main switchboard
- be centred at 1700mm above outside ground level.

Provide volt-free contacts at the fire alarm panel for connection of the mechanical services systems so that, on activation of the fire alarm system, HVAC systems are shut down where required by the fire safety design.

9.7.9.3
Detectors

Type 4 smoke detection systems shall be analogue addressable if more than 20 detectors are installed.

Type 3 heat detection systems may be conventional.

Heat detectors are required in lift shafts even when the building is sprinkler protected. The heat detectors shall be connected to the lift control system.

9.7.9.4
Call points

Call points shall be analogue addressable when part of an analogue addressable smoke detection system.

Call points shall be flush mounted and shall include snapglaze breakglass.

The fire engineer shall advise if additional manual call points are required for tenant fitout racking, including access, protection from damage and signage.

9.7.9.5
Sounders

Sounders in offices areas and the like where ceilings are installed shall be white flush ceiling-mounted speakers.

Sounders in open warehouse or factory areas shall be red sirens.

All sounders shall include evacuation voice messaging.

9.7.9.6
Strobes

Visual strobe lights shall be installed as part of the fire alarm system in areas where the building contains noisy machinery and where ear protection is worn by the occupants.

9.7.10
FIRE HYDRANT SYSTEM

Fire hydrant systems where required by the fire safety design shall comply with NZS 4510.

The hydrant outlets shall be in locations that provide at least the coverage required by NZS 4510. This includes both internal and external hydrants. Hydrants in high-use stairs shall be located in recesses off the stairwell so that the hydrant valves are well clear of the landings.

Proposed locations shall be confirmed by FENZ.

Where doors are provided for accessing the hydrant outlets, the door to the enclosure shall be toughened glass. Appropriate signage is required and will be provided by the fire protection contractor.

Provide a tamper-proof lock to the hydrant outlets as permitted by NZS 4510.

Hydrant fittings shall comply with NZS 4510.

Internal hydrant outlets shall be located between 600mm and 1350mm above floor level and be provided with a clear space 150mm each side of this and 1200mm in front of this.

Pipe shall be galvanised and shall be identified as a hydrant pipe.

The location of the FSI shall be provided externally to the building and shall be confirmed by the architect and FENZ. The fire protection contractor shall obtain this approval.

Where there is exterior glazing to external walls on floors above the FSI, a canopy shall be provided extending at least 1m in front of and 1m to each side of the hydrant FSI to provide protection to fire service personnel from falling glass.

The hydrant system shall be connected to the water supply system so that it is always pressurised.

Any seismic separations shall include a seismic joint in the pipework. The locations of and movement requirements for seismic joins shall be confirmed with the structural engineer.

Provide a drain from the furthest and highest (most hydraulically demanding) hydrant outlet from the FSI to stormwater that is capable of at least 1500L/min. This drain may be via an external gully trap.

SAIL or AON shall inspect and approve the fire hydrant system at the completion of the project.

9.7.11
GAS FLOOD AND VESDA SYSTEM

Where required by CIAL or the tenant, the fire protection contractor shall supply, install and configure a gas flood fire suppression solution approved by the fire engineer. The system shall comply with the requirements of AS 4214 and AS/ISO 14520.

9.7.11.1
General

The location of the gas flood Bottles shall be confirmed before installation on site.

All necessary documentation on the gas flood system and training in its use shall be provided to CIAL and the tenant.

9.7.11.2
System activation

Very early smoke detection apparatus (VESDA) or other aspirating smoke detection approved by the fire engineer shall be incorporated into the design to activate the gas flood system.

The VESDA system must activate the gas flood system at the smoke threshold agreed to by CIAL and/or the tenant. This approval must be sought and obtained before the system is commissioned.

The VESDA system shall include the following thresholds:

- Threshold 1: The system shall activate the visual and audible alarms in an area designated by CIAL and/or the tenant. The visual alarm shall be a flashing strobe light. The flashing strobe light shall include an audible alarm, different to the main building fire alarm, to provide a 65dBa sound in the space in which the strobes are fitted. This is not to sound the building-wide alarm.
- Threshold 2: The VESDA system shall activate the gas flood system.

Provide a reset button in an area designated by CIAL and/or the tenant that silences and resets the audible and visual alarms.

Connection to the BMS system shall also be provided where applicable.

Provide a manual override breakglass button outside the room, which activates the gas flood system. This breakglass button shall be marked accordingly.

Provide an override cut-off button outside and inside the room.

9.7.12
SMOKE CONTROL

Where required by the fire safety design, mechanical ventilation system shall be interfaced with the fire alarm system so that it shuts down on fire alarm activation. Volt-free contacts will be provided at the fire alarm panel for the mechanical trade to connect to. The mechanical contractor shall make the connection between the fire alarm panel and HVAC system and provide a PS3 on completion.

9.7.13
FIRE EXTINGUISHERS

Fire extinguishers shall be provided in accordance with NZS 4503.

These shall be provided:

- adjacent to switchboards
- in kitchens
- in laundries
- in staffrooms
- in corridors
- in other areas in order to comply with the requirements of NZS 4503.

The exact locations of these shall be confirmed by the fire engineer and the tenant.

The type and size of the fire extinguishers shall be specified by the fire engineer. Include signage.

9.7.14
EXIT SIGNS

Exit signs shall be maintained illuminated 'running person' signs and shall be located in accordance with NZBC clause F8. These locations shall be determined by the fire engineer as part of the design phase. Refer also to the Electrical, Communications and Security Design Guidelines.

9.7.15
EMERGENCY LIGHTING

Electronic emergency lighting shall be installed to comply with AS 2293 and NZBC acceptable solution F6/AS1.

Areas that require emergency lighting shall be identified by the fire engineer and be designed and documented by the electrical engineer, and the design shall be submitted with the building consent.

External stairs and steps shall either be lit with electrical emergency lighting or be fitted with photo luminescent nosing strips. The preferred option shall be determined in conjunction with CIAL.

9.7.16
FIRE-RATED WALLS AND DOORS

9.7.16.1
Walls

Lightweight timber-framed or steel-framed fire-rated walls shall be specified according to the Winstone's GIB and/or James Hardie fire-rated systems for the required fire rating.

The walls shall extend to the edges of the cladding. Any gaps shall be appropriately fire sealed to maintain the fire rating of the walls. Where a ventilation or drainage gap is required, an intumescent strip such as Firetherm Rainbar or Tenmat shall be installed to maintain the fire rating of the walls.

Any deflection head detail shall be approved by the fire engineer. Where a deflection head is provided at a point below the top of the wall, bracing structure shall be provided on both sides of the wall so that the wall remains supported if the structure on one side of the wall is compromised due to fire. The deflection head shall be approved by the fire-rated system manufacturer and shall not reduce the fire resistance rating (FRR) of the wall.

Fire-rated external walls shall remain supported during and after fire conditions when subjected to the loads prescribed by NZBC verification method B1/VM1. The structural engineer shall determine how this is to be achieved.

Panel joins in fire-rated concrete walls shall be fire rated with Silaflex PU to provide the required fire rating.

All light switches, power sockets etc. in lightweight framed walls shall include steel flush boxes and intumescent blocks.

9.7.16.2
Doors

Doors in fire-rated walls shall comply with NZS 4520:210 *Fire-resistant doorsets* and shall meet the fire rating requirements of the fire safety design.

The doors shall include magnetic hold-open devices with manual release button where required by the NZBC, CIAL or the tenant. The magnetic hold-open devices shall be linked to the fire alarm system. Provide a power supply and include a flush wall-mounted PDL 600 Series sprung door release button, 1200mm above floor level, adjacent to the door marked "DOOR RELEASE".

The doors shall also include:

- rebated intumescent smoke seals to the two vertical edges and top edge of the door frame and meeting stile for double doors
- door closers
- latching
- certification labels to the door leaf and frame
- white on green fire door signage to the door leaves
- fire-rated vision panels if required by the NZBC, CIAL or the tenant
- hardware that always allows egress without a key
- security locking systems (where required) approved by the fire door supplier with respect to compliance of the door.

9.7.16.3
Fire stopping

All penetrations through fire-rated walls shall be passively fire stopped as per section 9.7.18 to maintain the required fire rating.

Any ducts penetrating the fire-rated elements shall include fire dampers to maintain the FRR of the building element. This shall be completed by the mechanical trade.

9.7.17
FIRE-RATED FLOORS

Timber fire-rated floors shall be specified according to Winstone's GIB fire-rated systems for the required fire rating.

All GIB Fyreline sheet joins shall be solid blocked and stopped.

Fire-rated floors shall extend to the edges of the cladding. Any gaps shall be appropriately fire sealed to maintain the fire rating of the floor. Where a ventilation or drainage gap is required, an intumescent strip such as Firetherm Rainbar or Tenmat shall be installed to maintain the fire rating of the floor.

Any steelwork required for support of a fire-rated floor, including lateral support required by NZS 1170.0 clause 4.2.4 as modified by verification method B1/VM1, shall be fire rated for at least the same fire rating as the floor. The structural engineer shall confirm which members are required to be fire rated.

Steelwork supporting fire-rated floors shall be fire rated either within tumescent paint or encased in Fyreline as per the Winstone's GIB fire-rated systems.

If intumescent paint is used, sufficient gap must be provided around the steel for the intumescent paint to expand. The steelwork shall be abrasive blasted to Sa 2½ rating and be primed with a primer that is compatible with the intumescent coating. An independent certifier shall provide a PS3 at the end of the project stating that the required thickness has been applied and the required FRR has been achieved, including dry film thickness (DFT) test results. Allow for the thickness of the primer coat when testing the DFT. The structural engineer shall provide the limiting temperatures of the structural steel elements and schedule mark-up of elements requiring fire rating.

Any external intumescent painted steel shall be coated or clad to protect the coating from the weather.

Any lightweight walls supporting fire-rated floors shall be fire rated as per Winstone's GIB fire-rated systems and be considered as universal walls, as fire can attack the walls from both sides simultaneously.

All service pipes and cables etc shall be fire rated at floor level. All fire stopping shall be carried out as per section 9.7.18.

Light fittings under lightweight fire-rated floors shall be surface mounted.

Ducts penetrating fire-rated elements shall include fire dampers to maintain the FRR of the building element. This shall be completed by the mechanical trade.

9.7.18
FIRE STOPPING

All fire stopping shall be carried out by an approved specialist fire-stopping contractor.

All fire stopping must include fire-stopping systems that are tested and approved.

All fire-stopping systems installed shall include labelling of the penetration including the products used and the fire rating achieved by the fire stopping.

The installer shall provide a PS3 on completion certifying that all penetrations through fire separations have been installed in accordance with the manufacturer's requirements for the situation where these are installed.

9.7.19
EGRESS DOORS AND EGRESS ROUTES

Egress doors shall include keyless hardware in the direction of egress.

Electronic locks shall be fitted with an EMREX or battery backed up push button.

Panic push bars are only required if the NZBC requires them.

Auto doors shall include a fail-safe system so that the doors open and remain open in the event of power failure.

Painted hatching on factory and warehouse floors shall be installed to mark the required egress routes.

Egress gates from secure compounds shall also include keyless hardware on the inside so that egress is always available.

9.7.20
LIFTS

Lift doors shall include a fire rating the same as the wall in which it is located.

Lifts shall include a FENZ lift control if required by the NZBC.

9.7.21
SURFACE FINISHES

The architect shall include the achieved Group Numbers of the walls and ceilings as part of the building consent documents. Documentation shall show that the materials meet the requirements of reaction-to-fire tests ISO 9705-1 or ISO 5660-1.

The architect shall include the achieved critical radiant heat flux of the flooring as part of the building consent documents. Documentation shall show that the materials meet the requirements of ISO 9239-1.

9.7.22
SOLID WASTE STORAGE

Internal solid waste storage areas shall be enclosed in a separate firecell as required by the NZBC.

9.7.23
PLANT ROOMS

Spaces within a building containing an incinerator, plant, boiler or machinery that uses solid fuel, gas or petroleum products as the energy source (excluding space and local water heating appliances) shall be a separate firecell with a fire rating of 90 minutes as required the NZBC.

9.7.24
STORAGE SIGNS

Signage shall be installed in warehouse spaces stating the maximum permitted storage height.

Such signs shall be located 1.5m above floor level and be clearly visible. The location shall be approved by CIAL and the tenant before installation.

9.7.25
FIRE FIGHTING

Roading on the site shall be designed to allow FENZ to use. Pavements shall:

- be able to withstand a laden weight of up to 25 tonnes with an axle load of 8.2 tonnes or have a loadbearing capacity of no less than the public roadway serving the property, whichever is the lower
- be trafficable in all weathers
- have a minimum width of 4.0m
- provide a clear passageway of no less than 3.5m in width and 4.0m in height at site entrances, internal entrances and between buildings
- provide access to within 20m of the entrance to the building.

9.8
DOCUMENTATION

On completion of construction, the following documentation is required:

- Fire protection contractor's PS3 for sprinkler, fire alarm and hydrant systems, including confirmation of what systems have been connected to FENZ and including confirmation that magnetic door hold-open devices are connected to the fire alarm system or to the smoke detectors either side of the door
- SAIL or AON certificate for sprinkler, fire alarm and hydrant systems
- PS4 for the installation of the seismic restraint for the sprinkler system
- As-built drawings of fire protection services in .dwg and .pdf format
- Mechanical contractor's PS3 for auto shut-down of air-handling systems
- PS4 for emergency lighting
- PS3 from the fire stopping specialist contractor
- PS3 and DFT test results for intumescent paint
- PS3 for fail-safe features to auto doors and EMREX systems
- PS3 for lift control systems
- PS3 for fire-rated floor and wall linings
- CIAL asset register
- CIAL maintenance and inspection register

9.9
FIRE SAFETY AND EGRESS COMPLIANCE CHECKLIST

PROJECT NAME: **DATE:**

SUBMITTED BY: **STAGE:**

SECTION 9.0 FIRE SAFETY AND EGRESS DESIGN GUIDELINES

1.0	GENERAL DESIGN GUIDELINE	Compliant	Non-Compliant	Not Applicable	Comments
	All Clauses	☐	☐	☐	
9.0	**FIRE SAFETY AND EGRESS DESIGN GUIDELINES**				
9.1	Introduction	☐	☐	☐	
9.2	Environmentally sustainable design practices	☐	☐	☐	
9.3	Codes and standards	☐	☐	☐	
9.4	Health and safety by design	☐	☐	☐	
9.5	Earthquake protection and seismic restraint	☐	☐	☐	
9.6	Approved contractors	☐	☐	☐	
9.7	Design conditions and requirements	☐	☐	☐	
9.7.1	Documentation level	☐	☐	☐	
9.7.2	Coordination with design team	☐	☐	☐	
9.7.3	Future flexibility	☐	☐	☐	
9.7.4	Property ownership	☐	☐	☐	
9.7.5	Building use	☐	☐	☐	
9.7.6	Design occupancies	☐	☐	☐	
9.7.7	Evacuation scheme	☐	☐	☐	
9.7.8	Sprinkler system	☐	☐	☐	
9.7.8.1	General	☐	☐	☐	
9.7.8.2	Water supply	☐	☐	☐	
9.7.8.3	Pipework	☐	☐	☐	

		Compliant	Non-Compliant	Not Applicable	Comments
9.7.8.4	Sprinkler heads	☐	☐	☐	
9.7.8.5	Hazards	☐	☐	☐	
9.7.9	Fire alarm system	☐	☐	☐	
9.7.9.1	General	☐	☐	☐	
9.7.9.2	Alarm panel	☐	☐	☐	
9.7.9.3	Detectors	☐	☐	☐	
9.7.9.4	Call points	☐	☐	☐	
9.7.9.5	Sounders	☐	☐	☐	
9.7.9.6	Strobes	☐	☐	☐	
9.7.10	Fire hydrant system	☐	☐	☐	
9.7.11	Gas flood and VESDA system	☐	☐	☐	
9.7.11.1	General	☐	☐	☐	
9.7.11.2	System activation	☐	☐	☐	
9.7.12	Smoke control	☐	☐	☐	
9.7.13	Fire extinguishers	☐	☐	☐	
9.7.14	Exit signs	☐	☐	☐	
9.7.15	Emergency lighting	☐	☐	☐	
9.7.16	Fire-rated walls and doors	☐	☐	☐	
9.7.16.1	Walls	☐	☐	☐	
9.7.16.2	Doors	☐	☐	☐	
9.7.16.3	Fire stopping	☐	☐	☐	
9.7.17	Fire-rated floors	☐	☐	☐	
9.7.18	Fire stopping	☐	☐	☐	
9.7.19	Egress doors and egress routes	☐	☐	☐	
9.7.20	Lifts	☐	☐	☐	
9.7.21	Surface finishes	☐	☐	☐	
9.7.22	Solid waste storage	☐	☐	☐	
9.7.23	Plant rooms	☐	☐	☐	
9.7.24	Storage signs	☐	☐	☐	
9.7.25	Fire fighting	☐	☐	☐	
9.8	Documentation	☐	☐	☐	