



Determination 2015/066

Regarding the authority's refusal to issue a building consent for an extension to an aluminium factory building in respect of Clause C3.8 at 53-69 Maui Street, Pukete, Hamilton

Summary

This determination discusses the application of sections 17 and 112 in respect of an alteration to an existing building that has the effect of creating a larger firecell, and the Building Code obligations that are triggered by the increase in size. Also discussed is the fire service intervention time.

1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.
- 1.2 The parties to the determination are:
 - the Licenced Building Practitioner concerned with the relevant building work, B McKeany (“the applicant”), acting through a fire designer
 - Hamilton City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority
 - the New Zealand Fire Service (“the NZFS”) acting through a lawyer.
- 1.3 I note that as the NZFS has been included as a party the obligation to consult with them under section 170 of the Act is satisfied.
- 1.4 This determination arises from the decision of the authority to refuse to grant a building consent for an alteration to an existing aluminium factory building; the authority is not satisfied the building work will comply with Clause C3.8 of the Building Code (First Schedule, Building Regulations 1992).
- 1.5 The applicant sought a determination under a number of ‘matters for consideration’ including very specific questions about: (in summary)
 - whether a design must consider the ability for fire fighters to enter a building to carry out rescue operations
 - fire service response times under Clause C3.8

¹ The Building Act, Building Code, Acceptable Solutions and Verification Methods, past determinations and guidance documents issued by the Ministry are all available at www.building.govt.nz or by contacting the Ministry on 0800 242 243.

- matters relating to the Fire Engineering Brief (“FEB”) process
- whether an authority can require a specific design pathway, and
- the role of the Fire Engineering Unit (“FEU”) in relation to the authority’s decision making powers.

1.6 Although I can provide guidance on the above matters in the course of this determination, I am bound by the jurisdiction under section 177 of the Act to the matters I can determine and I do not consider all the matters raised by the applicant in paragraph 1.5 fall within section 177 of the Act.

1.7 The matters to be determined² are the authority’s exercise of its powers of decision in refusing to issue a building consent, and whether the proposed alteration to the existing factory building comply with Clause 3.8 of the Building Code.

1.8 In making my decision, I have considered the submissions of the parties and the other evidence in this matter.

2. The building work

2.1 The building work consists of an addition to an existing aluminium factory building. The existing building is one of three existing buildings on the site and the intended use is as a purpose-built manufacturing and processing building for aluminium extrusion products and not for warehousing/storage.

2.2 The existing building subject to the proposed addition has a footprint less than 5,000m² and is more than 15m to the relevant boundary. There are no sprinklers in the existing building. It has a steel portal frame, some steel lattice trusses and what appear to be steel purlins and girts with profile metal cladding and a concrete slab.

2.3 The proposed addition (“the extension”) to the existing building will increase the footprint to around 7,300m² and will bring the building to within 15m of the relevant boundary. The north wall is a full height concrete title panel with a minimum of 120/120/120 FRR with a roller door of 3x5m.

2.4 The authority has granted a foundations/structural staged building consent to allow early works to proceed.

3. Background

3.1 The applicant originally applied for a building consent in September 2014 to extend the factory building. (I note the building consent also contained other building work not relevant to this determination).

3.2 At some stage in May 2014 the NZFS received the building consent documentation under section 46 of the Act.

3.3 On 13 June 2014 the NZFS issued a memorandum under section 47 of the Act. The memorandum raised the issue that the extension was located within 15m to the boundary, exceeded 5000m², no sprinklers were proposed and it did not comply with C/AS5³ as the stated in the design submission and therefore did not comply with the Building Code C3.8.

² Under sections 177(1)(a), 177(1)(b) and 177(2)(a) of the Act.

³ C/AS5 Acceptable Solution for Buildings used for Business, Commercial and Low Level Storage (Risk Group WB) For New Zealand Building Code Clauses C1-C6 Protection from Fire

- 3.4 On 31 October 2014, following the modification and resubmission of the design, the NZFS produced a further memorandum.
- 3.5 In December 2014 the authority sought advice from a consultant fire engineer (“the consultant engineer”) to provide technical input to determine whether the requirements of the Building Act were satisfied. The consultant engineer reviewed the fire design and the NZFS memorandum.
- 3.6 On 12 December 2014 a meeting was held with the authority, the consultant engineer and the applicant. It was agreed the applicant would revisit the ‘gap assessment’ report based on C/AS6⁴ not C/AS5. The authority required an ‘as nearly as is reasonably practicable’ analysis to be addressed. A staged building consent was to be granted on the condition that the revised fire design would proceed and be shown to meet the requirements of section 112 of the Act (“the fire design condition”).
- 3.7 At some stage following the meeting, the stage one foundations and structural consent was granted including the fire design condition.
- 3.8 In mid-January 2015 the applicant produced a revised fire report for the authority.
- 3.9 On 3 February 2015, following the modification and resubmission of the design, the NZFS produced a further memorandum.
- 3.10 On 20 February 2015 an online meeting was held between the applicant, and the consultant engineer to discuss the resubmitted design. The applicant argued that 112(1)(a) ‘is only concerned with those clauses relating to means of escape’, with the applicant holding the view that ‘compliance with Clause C3.8 falls within section 112(1)(b)’.
- 3.11 On 17 March 2015 the authority wrote to the applicant noting four options around demonstrating compliance with Clause C3.8:
- ‘C/ASx (reduce firecell size or sprinklers)’
 - C/VM2 compliance
 - alternative solution (the authority noted an FEB would be required)
 - determination
- (I note I have not seen a copy of this correspondence.)
- 3.12 On 23 March 2015 the applicant provided a memorandum to the authority’s consultant engineer. The applicant has stated this memorandum (number 4) and the FEB (refer paragraph 3.16) provide the basis for the justification in relation to the current determination application (refer submission at paragraph 4.1.4). The memorandum concluded that full compliance with section 112 of the Act was achieved and stated (in summary):
- The proposed extension fits within the scope of C/AS5 as a manufacturing/processing building with storage less than 3m high. The applicant has completed an analysis confirming that full compliance is achieved for the current alteration except for C/AS5 2.1.1 and 2.1.2, as the firecell floor area is greater than 5000m² and the building is less than 15m to a relevant boundary.

⁴ C/AS6 Acceptable Solution for Buildings used for High Level Storage and Other High Risk Purposes (Risk Group WS) For New Zealand Building Code Clauses C1-C6 Protection from Fire

- Section 112(1)(b) requires the building to ‘continue to comply’ with the relevant C provision so a ‘Gap assessment’ cannot be used to demonstrate compliance to C/AS5 2.1.1 and 2.1.2. Full compliance must be demonstrated.
 - An alternative solution is proposed for Clause C3.8, and in the course of justifying this the applicant has noted:
 - the building is not sprinkler protected
 - the wall areas within 15m to a relevant boundary are to be concrete tilt panel designed at 120/120/120 Fire Resistance Rating (“FRR”)
 - the fire load is <20 TJ
 - the radiant flux level at 1.5m above floor level has been shown to be less than 4.5Kw/m² at the time firefighters first apply water
 - the NZFS pre-determined arrival time is 8 minutes
 - the Pukete fire station is 2.5km and 5minutes away. This allows 7.8 minutes for the fire to be discovered, 111 call made, and fire service personnel to enter the building with visibility (due to proximity of smoke layer) being still at no less than 2m, this is ‘more than sufficient’.
 - The applicant concluded full compliance with section 21(2) of the Act (specifying that a particular means of compliance with the Building Code must be followed) was not mandated.
- 3.13 On 14 April 2015, following the modification and resubmission of the design, the NZFS produced a further memorandum.
- 3.14 In April 2015 the applicant and the NZFS discussed the design. The NZFS advised it would assist the applicant in developing a time based analysis (comparing time to untenable conditions to the time required for fire fighters to apply water to the fire in order to demonstrate compliance with Clause C3.8.
- 3.15 At some stage in March-April 2015 the applicant sought advice from an officer of the Ministry who confirmed (14 April 2015) that the authority can decide whether a FEB is required.
- 3.16 On 18 May 2015 the applicant submitted an FEB to the NZFS, superseding the memorandum of 23 March 2015. In summary:
- The existing building and proposed alteration fit within the building use of WL⁵ and the risk group WB⁶ and Importance Level 2.
 - The altered building does not fall within the fire cell limits in C/AS5 as the firecell floor area is >5000m², non-sprinkler protected and <15m to a relevant boundary.
 - At the time firefighters first apply water to the fire, the maximum radiation flux at 1.5m above the floor is no greater than 4.5kW/m² and the smoke layer is not less than 2.0m above the floor.
 - The detection time for a manually operated fire alarm (as per C/VM2) is 255 seconds (4.25 minutes).

⁵ WL (Working Low) as specified in Schedule 2 of the *Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005*

⁶ Risk Group WB (Business, commercial and low level storage). Risk groups are set out in Table 1.1 of the Acceptable Solutions for Clauses C1-C6

- Based on factual evidence, the actual fire service attendance time is an average of 5.9 minutes.
- It was agreed the NZFS would most likely not enter the building when it was unoccupied, so the NZFS intervention assessment has been made during the hours the building is lawfully occupied. The total intervention time, based on a reasonable assessment made based on the applicant's and an experienced fire officer's opinion is 3.5 minutes.

3.17 The NZFS responded on 3 June 2015. In summary:

- It was not agreed the analysis could be limited to occupied hours of the building. Maintaining tenability to allow internal firefighting is required by the Building Code; Clause C3.8 does not differentiate between the building being occupied or unoccupied.
- The input parameters have a high level of uncertainty attached to them. The NZFS requested clarification of what sensitivity or uncertainty studies were proposed to be undertaken.
- The use of manual detection methodology is inappropriate as the proposed fire growth rate for this building corresponds to a fast fire.
- The FEB proposes to use an average NZFS time derived from recent callouts to the site. The NZFS maintain the national target times in the Service Delivery Guidelines should be used as local crew may not be available, or on station which can result in longer attendance times. The times proposed in the FEB have not been substantiated, and do not reflect the size and complexity of the building.
- The NZFS required further justification for various modelling inputs and assumptions.

3.18 The Ministry received an application for determination on 4 June 2015.

3.19 On 21 July 2015 the Ministry noted the limitations of the matters to be determined in reference to section 177 of the Act and sought further information from the applicant, in summary:

- Information relating to the background of the determination from the applicant's perspective.
- Sufficient detail to support the application, such as copies of any fire safety design reports and an assessment of the compliance of the building as a whole.

4. The submissions

4.1 The applicant

4.1.1 The applicant provided a written submission with their application for determination, in summary:

- In relation to Clause C3.8 this requires fire fighters to enter the building and put water on the fire with the smoke layer at no less than 2.0m above the floor. However the applicant considered:
 - there is no substantiated or validated data to use when compiling NZFS response and intervention times

- the NZFS Service Delivery Guidelines require a response time goal being achieved only 90% of the time
 - the FEU stated they cannot guarantee any calculated intervention times will be met
 - there is no correlation between tenability levels ‘when the exact same non-sprinkler protected building of >5000m² is located >15m to a boundary does not require an assessment under Clause [C] 3.8 thereby negating the requirement for firefighter tenability’.
 - The authority should not be able to require compliance with Clause C3.8 as a method for achieving compliance with s112(1)(b)(i) in full if it cannot be ‘validated’.
- 4.1.2 Following a request for further information from the Ministry (refer paragraph 3.19), the applicant provided the following in response on 24 August 2015⁷:
- The FEB dated 18 May 2015.
 - The report for fire safety and accessibility prepared by the applicant and dated 23 March 2015.
 - Memoranda to the authority’s consultant engineer, dated 4 November 2014, 14 February 2015, 21 February 2015, 23 March 2015, and 12 July 2015.
 - A letter to the applicant dated 10 October 2013 entitled the ‘fire safety summary’.
 - Various email correspondence between the authority, the authority’s consultant engineer and the applicant, dated 17 March 2015 – 15 July 2015.
 - The minutes of a meeting held on 12 December 2014 between the applicant, the authority and the authority’s engineer.
 - Various correspondence with an officer of the Ministry, dated 26 March 2015 – 9 April 2015.
- 4.1.3 The applicant set out that the determination application more accurately fits within section 177(1)(b) being the failure of the authority to make a decision based on reasonable grounds. The applicant considers sufficient information has been provided for the authority to make a decision under section 49 of the Act that the proposed alterations and additions meet the requirements of Clause C3.8 of the Building Code and that accordingly a Building Consent can be granted.
- 4.1.4 The applicant, in addition, provided a response to the matters raised by the NZFS (refer paragraph 4.2.1 below) dated 27 July 2015.
- Section 21(2) of the Act states that ‘a person may comply with the Building Code by any means’; the applicant is of the opinion that sufficient information relating to Clause C3.8 of the Building Code has been provided for the authority to grant a building consent ‘on reasonable grounds’.
 - The Fire Design memorandum number 4 and the FEB detail how compliance with section 112(1)(b)(i) was satisfied by showing compliance with Clause C3.8.
 - The Fire Service Intervention Time referred to in the FEB has been developed by the applicant using an ‘intimate knowledge of NZFS operational procedures at

⁷ I acknowledge the applicant was of the opinion the additional information was sent on the 27 July 2015, however, this was not received by the Ministry or the other parties and was resent on 24 August 2015.

fires' based on his 15 years of experience as a firefighter and fire safety officer and the experiences of a members of his team, with most of the experience referred to having been gained in Hamilton.

- At the meeting on 2 May 2015, it was put forward by the NZFS that it was highly unlikely the NZFS would enter the building under fire conditions when it was unoccupied. The authority agreed fire fighter entry into the building when unoccupied would not need to be discussed. (I note I have no record or minutes provided for this meeting)
- The NZFS assume fire service intervention is directly related to an internal fire attack. The applicant asserted that this was not correct, stating that an intervention can take the form of an external firefighting attack using delivery hoses to cut off the spread of fire. C/AS5 permits 120 minutes for buildings with storage <3.0m high, and the fire walls have been designed for a building with storage <3m high. The applicant stated:

We have shown that the fire loading is <20TJ and at the time firefighters apply water to the fire the radiant flux at 1.5m above floor level was only 1.3kW/m² which is 29% of the permitted 4.5kW/m² specified in Clause C3.8. Therefore... the fire rated external walls are sufficient to protect other property without Fire Service internal intervention under tenable conditions

- Firefighter intervention is not required based solely on protection of other property, therefore the provisions of Clause C3.8 and section 112(1)(b)(i) are satisfied as the building will continue to comply to at least the same extent as before the alteration.
- The applicant maintained the view that the building consent process did not require an FEB process.
- The fire service response times for the current building was based on five 'actual call outs' from 2013-2015, averaging 5.9 minutes. It was considered reasonable to use this information in the absence of a validated Fire Brigade Intervention Model ("FBIM") being available.

4.2 The NZFS

4.2.1 On 16 July 2015 the NZFS provided a written submission through a lawyer. The NZFS submitted the applicant is required to fully comply with Clause C3.8 of the Building Code and has failed to illustrate compliance for the building consent application. The NZFS consider the applicant must address fire-fighter tenability to demonstrate compliance with Clause C3.8 by an Acceptable Solution in full or by using an alternative compliance methodology. In summary:

- The requirement of section 112(1)(b)(i) is for the building to comply with the provisions relating to NZFS access to the same extent as it complied before the works. Clause C3.8 is the relevant clause for this determination. The proposed extension to the building will trigger Clause C3.8 requirements. Prior to the extension, Clause C3.8 was not applicable.
- In relation to the applicant's 'matters for consideration' (refer paragraph 1.5) the NZFS provided comment on each matter. In relation to C/VM2 the time is not relevant in the context of this project as the applicant is proposing an alternative solution.

- Regarding the applicability of Clause C3.8; it is not possible to design on the assumption that a building will be empty of occupants when a fire occurs. The Building Code makes provisions for fire-fighter access to the building without factoring in whether they will actually enter the building or not.
- In this case the requirement to provide tenable conditions for fire fighters applies irrespective of whether the building is occupied. The purpose is to ensure that at the time of NZFS intervention a range of options are available, including internal fire attack if deemed safe.
- The FEB process is intended to establish ‘in-principle’ agreement to key design parameters before any significant work is completed. The FEU has delegated authority under the Act to provide comments to the authority when deciding whether to grant building consent.
- The FEB approach is the preference of the NZFS but not a requirement of the building consent process.
- In relation to the comments made by the applicant in his submission (refer paragraph 4.1.1) the NZFS noted the Service Delivery Guidelines were suggested as setting target response time to fire incidents and 90% would represent a sufficiently robust figure. There will inherently be a level of uncertainty involved.
- The purpose of the additional requirements in Clause C3.8 for larger buildings in close proximity to the boundary are to ensure that reliance on passive measures can be supported with fire service intervention to reduce the risk of fire spread in situations which are seen to pose an increased risk.

4.2.2 The NZFS attached the following documentation with the submission:

- correspondence between the NZFS and the applicant dated between 13 June 2014 and 3 June 2015
- the various memoranda produced by the NZFS

4.3 The authority

4.3.1 On 31 July 2015 the authority provided a written submission in response to the determination application. The authority provided further background information which has been included in section 3 of this determination. The authority noted it has had several meetings and various communications with the applicant to resolve the matter. The authority responded on the following matters, in summary:

- Clause C3.8 was fully satisfied prior to the proposed extension, under section 112(1)(b)(i) it must continue to fully comply with Clause C3.8 after the extension is complete as this clause is a non ‘means of escape from fire’ and therefore ‘as nearly as is reasonably practicable’ is not permitted by the Act.
- The FEB was provided by the applicant without peer review of the proposed fire design, and to date the applicant has not provided ‘robust and complete fire engineering consent documentation underpinned by an agreed FEB or peer reviewer’s PS2 for the non ‘means of escape from fire’ code clauses including C3.8...’
- The authority has not had a complete fire engineering design consent submission addressing all of section 112 to make a decision on.

- In relation to the applicant's 'matters for consideration' (refer paragraph 1.5) the authority has commented that if C/VM2 was adopted in full, 1200 seconds [20 minutes] would apply, and for the proposed alternative solution the authority advised response times should be discussed with the NZFS and stakeholders in the FEB process to reach a consensus.
- The NZFS advice issued under section 46 and 47 of the Act is non-binding to the authority, but it is factored into the authority's decision making process to issue a building consent on reasonable grounds.
- The authority requires the FEB process to be used if the building consent application involves an alternative solution.

4.3.2 The authority provided a hand drawn sketch with its written submission by its consultant engineer illustrating how section 112(1)(a) and (b) clauses should be approached.

4.4 The draft determination and submissions in response

4.4.1 A draft determination was sent to the parties for comment on 14 September 2015.

4.4.2 The NZFS responded on 30 September 2015, accepting the draft subject to minor amendment regarding the FBIM (refer paragraph 5.2.3).

4.4.3 The applicant did not accept the draft determination, and in a submission received on 8 October 2015 made the following comment (in summary):

- The project specific FBIM 'is not a substantiated figure', but substantiated times based on actual incidents that were provided by the applicant were disputed.
- Substantive design to satisfy clause 3.8 cannot be carried out until the NZFS can produce an FBIM – until then clause 3.8 'cannot be validated'.
- The FEB process is not mandatory and does not require the inclusion of any modelling to support the FEB.
- Section 17 does not specify "full compliance", and the Act permits the authority to grant consent 'if it is satisfied on reasonable grounds'; this was discussed in Determination 2013/014⁸ where full compliance was not achieved for new building work.
- The applicant has not declined to work with the NZFS, but has questioned the role and authority of the FEU 'when the FBIM is clearly a Hamilton Fire Service operational matter'.
- The C/VM2 does not specifically state that anything other than an Acceptable Solution must be completed by a CPEng Fire Engineer.
- The draft used the example of signs being provided as a means of restricting storage height where the designed maximum is able to be exceeded: this is not relevant to this building and is unlikely to be accepted by the authority given the Ministry's earlier stance on the use of signs.

⁸ Determination 2013/014: The compliance of a stair to proposed alterations to a cattery at 160 Main North Road, Papanui, Christchurch (*Ministry of Business, Innovation and Employment*) 15 March 2013

- A ‘full s112 fire report’ has been compiled and submitted to the authority for review; however that review was effectively on hold until the issue regarding compliance with C3.8 was resolved by way of this determination.
- 4.4.4 The applicant reiterated his view that in order to establish compliance with Clause C3.8 the NAFS response times must be established, and as there is no validated data for New Zealand ‘Clause 3.8 cannot be assessed’. The applicant maintains that ‘no design using C/VM2 inputs can succeed’ as the inputs are too onerous for the actual use of the subject building, and that an alternative solution cannot be used as the NZFS cannot provide validated FBIM times.
- 4.4.5 The authority responded on 16 October 2015, noting that it was generally supportive of the draft determination. The authority noted that it had not yet carried out an assessment in regards to the means of escape from fire, but that this was outside the matter being considered in the determination.

5. Discussion

5.1 The legislative framework

- 5.1.1 Where a building consent is required, section 49 of the Act gives effect to the requirements of section 17 by specifying that a building consent will not be granted unless the authority “is satisfied on reasonable grounds that the provisions of the Building Code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application.”
- 5.1.2 Section 17 requires that building work must comply with the Building Code to the extent required by the Act regardless of whether a building consent is required. The “building work” to which section 17 applies can consist of the construction of a new building or alterations or repairs to a building.
- 5.1.3 It is important to distinguish between the need for building work (i.e. the extension to the building in this case) to comply with the Building Code as required by section 17 of the Act, and the need to ensure the building work undertaken within that does not reduce the extent to which the altered building as a whole complies with the Building Code, as required by section 112(1)(b) of the Act. These two requirements relate to different parts of the building, the extent of code compliance is different, and they can relate to different Building Code performance criteria.
- 5.1.4 In this case the building work is an alteration to an existing building. Section 112 of the Act contains specific requirements for alterations that relate to the compliance of the existing building (which is the whole building as altered, not merely the alteration). Section 112(1) does not detract from the section 17 requirement that the building work within the extension of the building must comply with the Building Code.
- 5.1.5 As noted in Determination 2012/027⁹, the Building Code is made up of clauses that set out the performance requirements that buildings and building work must meet. Most clauses of the Building Code have a subject to which the Building Code obligations are expressly intended to apply, and it is that subject that defines the scope of the Building Code obligation. Central to the matter for determination in this case is Clause C3.8, which applies to a space within the building, being the firecell.

⁹ Determination 2012/027 The refusal to grant a building consent for the retrofitting of foam insulation to a house (*Department of Building and Housing*) 10 April 2012

- 5.1.6 This clause did not apply to the existing building because the building was not within 15m of the relevant boundary and did not have a floor area greater than 5,000m².
- 5.1.7 As a result of the extension the Clause C3.8 requirement is triggered as the fire cell will be in excess of 5,000m² and within 15m of the relevant boundary. I consider under section 17 of the Act the extension to the building and creation of a larger firecell will be required to achieve full compliance with Clause C3.8 of the Building Code.

5.2 Compliance with Clause C3.8 of the Building Code

- 5.2.1 Clause C3.8 of the Building Code relates to external fire spread and the potential need for the intervention of the fire service.

Firecells located within 15 m of a relevant boundary that are not protected by an automatic fire sprinkler system, and that contain a fire load greater than 20 TJ or that have a floor area greater than 5,000 m² must be designed and constructed so that at the time that firefighters first apply water to the fire, the maximum radiation flux at 1.5 m above the floor is no greater than 4.5 kW/m² and the smoke layer is not less than 2 m above the floor.

Fire Fighter Response Time

- 5.2.2 The relevant calculation in C3.8 is ‘the time that fire-fighters first apply water to the fire’. This requires the following to be taken into account:
- the time taken for a fire to be detected and the fire service called
 - the time taken for the fire service to arrive at the site
 - the time taken for the fire service to determine the location of the fire and best point of entry
 - the time taken to connect to the pump and enter the building (bypassing locked doors for example)
 - depending on the location of the fire, the time taken to reach a point where firefighters can put water on the fire.
- 5.2.3 The NZFS acknowledges it is currently working on developing New Zealand specific input data for the existing Fire Brigade Intervention Model (“FBIM”) to assist designers in calculating fire service intervention time. However, the full validated data would not be ready in time for this project. The NZFS advised that they would work with the designer to develop a project specific FBIM to include all parameters. The NZFS suggested the Service Delivery Guidelines, which set a target response time to fire incidents, would represent a robust figure. The applicant has not accepted the basis on which the NZFS would develop a project specific FBIM (refer paragraph 4.4.3, bullet point #1).
- 5.2.4 The applicant has stated there was an agreement with NZFS and the authority to complete the design based on the assumption that the building will be empty of occupants when a fire occurs. The NZFS and the authority do not agree with this statement, and this point continues to be disputed between the parties. I consider that irrespective of any agreement or otherwise, an analysis of the building in relation to fire safety cannot rely on the building being unoccupied (for example during night time) at the time a fire occurs. I therefore agree with the statement from NZFS that ‘the requirement to provide tenable conditions for fire-fighters applies irrespective of whether the building is occupied’.

5.2.5 The applicant provided a variety of information and assessments at the further request of the Ministry. I note this information has not been clearly summarised and some appears to be conflicting. From what I can ascertain, the alternative solution proposed by the applicant for C3.8 is based on the following assumptions and supporting justification from the provided FEB dated 18 May 2015:

- A detection time for a manually operated fire alarm of 255 seconds (4.25 minutes)
- A fire service attendance time to the first responding pump of 354 seconds (5.9 minutes) based on an average of five actual call outs between 2013-2015, all activated by a manual call point
- A fire service intervention time (during the hours the building is lawfully occupied) of 210 seconds (3.5 minutes). This is based on the applicant's past experience as a fire officer in the Hamilton area.

5.2.6 In total this provides for 13.65 minutes. However, as provided for in Memo 4 (refer paragraph 3.11), the applicant allows for 5 minutes for the fire service to arrive at the building, with no supporting justification and no calculations provided for the time taken to first apply water to the building. The time calculated in the FEB for fire fighters to apply water exceeds the time for smoke to descend to 2m within Memo 4 (12.8 minutes). The source of this information is unclear.

5.2.7 I note that for time taken for Fire Service to first apply water the relevant Verification Method C/VM2 states at section 4.8 Design scenario (FO): Firefighting operations the following:

"For the purposes of NZBC C3.8, take the time that the Fire Service first applies water to the *fire* as either:

- a) 1200 seconds, or
- b) 1000 seconds if there is an automatic alarm and direct connection to the Fire Service, or
- c) Some other time as determined and supported by the application of a *fire* brigade intervention model."

The method of C/VM2 has not been followed in determining the time for fire fighters to apply water.

5.2.8 I consider the justification provided by the applicant to be insufficient. The time for fire fighters to first apply water has not been justified. The NZFS provides guidance on calculation of fire fighter response on their website¹⁰ as

Time to:

- notify the brigade
- dispatch resources
- reach kerb side
- access information, and
- assess and determine strategy.

Time for:

- fire brigade set up (including fire-fighting safety)
- search and rescue tasks
- exposure protection tasks
- fire extinguishment tasks, and environmental protection tasks.

¹⁰ <http://www.fire.org.nz/index.html> accessed 31 August 2015

- 5.2.9 The alternative solution design (which uses a large component of C/VM2) has not been completed by a CPEng Fire Engineer, nor has a peer review been completed by a CPEng Fire Engineer. Use of verification method C/VM2 limits its application by the following rider:

It is suitable for use by professional fire engineers who are proficient in the use of fire engineering modelling methods.

- 5.2.10 The authority and NZFS have advised the applicant to collaborate with the NZFS to agree to a project specific time.
- 5.2.11 I do not consider the applicant has provided sufficient information that the proposed alternative solution complies with C3.8 of the Building Code.

The design fire

- 5.2.12 Selection of the design fire is important for the determining the time for the maximum radiation flux at 1.5 m above the floor to reach 4.5 kW/m² and the smoke layer to reach 2 m above the floor. As an alternative solution the design inputs need to be fully justified for the specific use of the building.
- 5.2.13 The applicant has used the C/VM2 as the basis for his design fire as part of his alternative solution, however, has not provided justification for this. In Memo 4 the fire growth rate is provided as 0.0469 t² for a capable storage height of less than 3m.
- 5.2.14 The building has a total roof height that ranges from 7.7m to 11m. The new addition is 6m high. The applicant has calculated an average height of 8.5m and a capable storage height of less than 3m.
- 5.2.15 I consider the building could have a capable storage height greater than 3m. While I understand the building is used as a processing and manufacturing factory and not for warehousing, the applicant needs to justify the maximum storage height and means of controlling the height of storage.
- 5.2.16 NZFS also note that this is an alternative solution and design fires need to be fully justified. They note that there are other potential fire sources and office fire and fork lift fire should be considered.
- 5.2.17 The applicant has submitted a time of 12.8 minutes for smoke to descend to 2m above the floor without any modelling data or support from a peer review.
- 5.2.18 I do not consider the applicant has provided sufficient information to justify the design fire that determines the time for the maximum radiation flux at 1.5 m above the floor to reach 4.5 kW/m² and the smoke layer to reach 2 m above the floor.

5.3 Further section 112 analysis to other code clauses

- 5.3.1 I note the matter for determination does not relate to means of escape from fire, and therefore an analysis of section 112(1)(a) is not required.
- 5.3.2 Section 112(1)(b) states that the authority must not grant a building consent for the alteration of an existing building, unless the authority is satisfied that after the alteration the building will, if it complied with the other provisions of the Building Code immediately before the building work began, continue to comply with those provisions.

5.3.3 I have concluded that the alteration to the firecell triggers the requirement under section 17 of the Act to fully comply with Clause C3.8 of the Building Code; however it is for the applicant to provide sufficient information to the authority for other components of the building and the relevant Building Code obligations for these components to satisfy section 112(1)(b) of the Act.

6. The decision

6.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:

- the proposed alteration does not comply with Clause C3.8 of the Building Code; and
- the authority correctly exercised its powers of decision in refusing to issue a building consent, and I confirm that decision.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 21 October 2015.

John Gardiner
Manager Determinations and Assurance

Appendix A

A.1 Relevant sections of the Building Act 2004

112 Alterations to existing buildings

(1) 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,—

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

- (i) means of escape from fire; and
- (ii) access and facilities for persons with disabilities (if this is a requirement in terms of section 118); and

(b) the building will,—

- (i) if it complied with the other provisions of the building code immediately before the building work began, continue to comply with those provisions; or
- (ii) if it did not comply with the other provisions of the building code immediately before the building work began, continue to comply at least to the same extent as it did then comply.

(2) Despite subsection (1), a territorial authority may, by written notice to the owner of a building, allow the alteration of an existing building, or part of an existing building, without the building complying with provisions of the building code specified by the territorial authority if the territorial authority is satisfied that,—

(a) if the building were required to comply with the relevant provisions of the building code, the alteration would not take place; and

(b) the alteration will result in improvements to attributes of the building that relate to—

- (i) means of escape from fire; or
- (ii) access and facilities for persons with disabilities; and

(c) the improvements referred to in paragraph (b) outweigh any detriment that is likely to arise as a result of the building not complying with the relevant provisions of the building code.

A.2 Relevant sections of the Building Code

C3.8

Firecells located within 15 m of a *relevant boundary* that are not protected by an automatic *fire* sprinkler system, and that contain a *fire load* greater than 20 TJ or that have a floor area greater than 5,000 m² must be designed and constructed so that at the time that firefighters first apply water to the *fire*, the maximum radiation flux at 1.5 m above the floor is no greater than 4.5 kW/m² and the smoke layer is not less than 2 m above the floor.

A.3 Relevant sections of the Acceptable Solution C/AS5

2.1 Provision of firecells

Firecell floor area limits

2.1.1. When less than 15 m from a *relevant boundary*, the floor area of an unsprinklered *firecell* shall not exceed 5000 m².

2.1.2. If a firecell is 15 m or more from a relevant boundary or it is sprinkler protected, except when risk groups require subdivision or other area limitations are imposed by this Acceptable Solution, the firecell floor area may be unlimited.