Determination 2012/079

Regarding the refusal to issue a code compliance certificate in respect of the compliance of the fire safety design for a new retail warehouse building at 26-54 Kingsford Smith Street, Rongotai, Wellington

1. The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("the Act") made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment ("the Ministry")[2], for and on behalf of the Chief Executive of the Ministry.

1.2 The parties to the determination are:

- the owner of the building, Bunnings Limited ("the applicant"), represented by a legal adviser
- Wellington City Council, carrying out its duties and functions as a territorial authority or building consent authority ("the authority"), represented by a legal adviser
- the fire engineer who undertook the design work, T Gibson, who is a Chartered Professional Engineer (treated as a licensed building practitioner[3]) concerned with the relevant building work under section 176(d) of the Act ("the fire engineer").

1.3 I have provided the New Zealand Fire Service Commission ("the NZFS") with the determination documentation for comment by way of consultation under section 170 of the Act.

1.4 The dispute arises from the decision of the authority to refuse to issue a code compliance certificate for the construction of a new warehouse building, as the authority was not satisfied that the building complied with the Building Code in respect of the fire safety design.

[1] The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.dbh.govt.nz or by contacting the Ministry on 0800 242 243.

[2] After the application was made, and before the determination was completed, the Department of Building and Housing was transitioned into the Ministry of Business, Innovation and Employment. The term "the Ministry" is used for both.

[3] Chartered Professional Engineers, under the Chartered Professional Engineers of New Zealand Act 2002, are treated as if they were licensed in the building work licensing class Design 3 under the Building (Designation of Building Work Licensing Classes) Order 2010, and therefore deemed to be licensed building practitioners under the Building Act.

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1.5 Therefore, I consider the matter to be determined[4] is whether the authority correctly exercised its power of decision in refusing to issue a code compliance certificate for the new warehouse building.

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

1.7 I have not considered any other aspects of the Act or the Building Code.

2. The building work

2.1 The site is bordered by commercial/industrial premises to the north and south, a road to the east, and recreational reserve land to the west. Parking areas lie between the building and the north, east, and south boundaries. Approximate distances to relevant boundaries are 65 metres to the north, 35 metres to the east, 30 metres to the south, and zero metres to the west. The distance to the relevant boundary to the west as defined in Acceptable Solution C/AS1 is 18 metres.

2.2 The building is a 9386m^2 large span portal frame single storey building, with an upper floor office area of 268m^2 containing staff administration functions and amenities. The upper floor office is constructed as a single firecell fully fire separated from the warehouse trading area. The open plan structure includes a nursery/plant area at the north end (1509m^2) that is partly covered by canopies, a hardware and general goods area (5889m^2), a timber trade sales area (1988m^2) and an 'outdoor' nursery/bagged goods area.

2.3 The building is constructed with structural steel portal frames, metal purlins/grits with metal cladding and roofing. Glass reinforced polyester ("GRP") panels make up 20% of the roof area. The south and east walls consists of 2.1m precast concrete panels with corrugated metal cladding above, the west wall is full height precast concrete, and the remaining north wall is full height corrugated metal cladding.

3. The background

3.1 On 7 December 2009 an initial application for building consent was lodged with the authority to cover all building work. The application was supported by a fire report prepared by the fire engineer, dated 27 November 2009.

3.2 According to the fire engineer and the applicant's lawyer, the authority drew the applicant's attention to a previous determination and in response to a request from the authority for further information, including matters regarding fire requirements, a revised fire report dated 10 February 2010 was provided to the authority. Subsequently the authority required a peer review be undertaken.

[4] Under section 177(1)(b) and 177(2)(d)

3.3 On 1 March 2010, the NZFS Design Review Unit ("the DRU") provided a section 47 memorandum, No. 3347, based on the 2009 fire report. The memorandum noted that:

- the application did not cover the applicability of an S rating for NZFS operational requirements, fire cell floor areas, or various matters of detail such as fire resistance ratings and interior surface finishes
- inadequate fire safety precautions were proposed
- the building would not comply with the Building Code and therefore the DRU recommendation was that the authority reject the consent application.

3.4 On 12 April 2010 the authority issued building consent for Stage 1, which included the foundations, all structural works and underground drainage.

3.5 A peer review by a Chartered Professional Engineer was provided to the authority on 26 April 2010 and a further revised fire report was provided to the authority on 7 May 2010.

3.6 On 4 June 2010 the DRU issued a second memorandum, No. 3458, based on the 7 May fire report. Included in that memorandum the DRU commented that:

- the fire expert had not provided specific fire engineering design details for the purposes of S rating calculation
- the approach to firecell floor area limits was inconsistent with Determination 2010/004
- the fire design did not demonstrate compliance with Clauses C3.3.6 or C3.3.9
- the proposed external fire hydrant was not in accordance with C/AS1 and did not meet the NZFS operational needs
- [BRANZFIRE] modelling carried out in support of the fire design had been conducted beyond its validation limits
- evacuation path lengths could not be validated on the basis of the information available.

3.7 In an email of 15 June 2010 the authority stated that although it did not wish to dismiss the use of an alternative solution, the authority was not privy to a draft determination produced by the Ministry in relation to a determination regarding the use of GRP panels in another building ("the draft determination"), and would be reluctant to rely on a draft determination as a means of establishing compliance.

3.8 The fire engineer then provided a further revised report on 17 June 2010 ("the fifth fire report"), which was peer reviewed by a Chartered Professional Engineer. In an email to the authority on 28 June 2010, this engineer stated that the fifth report introduces the provision of 20% GRP panels and that 'this alternative solution provides for [effective] fire venting even though as per my previous review it is not required to do so' and noted the historic use of the product supported the provision of GRP panels for effective fire venting.

3.9 On 9 July 2010 the NZFS provided a third memorandum based on the fifth report. That memorandum stated that:

- the proposed design adopted neither demonstrated equivalence with the effective fire venting requirements of C/AS1, nor provided quantitative fire design based from first principles to demonstrate compliance with Clauses C3 and C4
- the proposed design had not been assessed as an alternative solution and the documentation and design submitted did not demonstrate compliance with the requirements of the Building Code
- the occupancy characteristics associated with the proposed facilities have not been considered within the report as an input to the fire modelling provided, there are issues with the fire modelling undertaken and the purported results.

3.10 The memorandum listed the following:

> The hose run distances to the second floor offices appears to exceed 75m and the design does not appropriately demonstrate compliance with NZS 4510:2008.
>
> Concrete tilt panels are to be used and connected to a non fire rated steel portal frame. The issues of outward collapse or any structural design to ensure that they do not collapse outwards has not been assessed. These design concerns do not appear to have been taken into account [in regard to] fire service access requirements.
>
> While 20% GRP [panels] has been specified this proposal does not appear to have been carried through the plans or specifications which still identify 15%.
>
> Insufficient information is provided to confirm that no structural fire ratings are required due to the distance to the site boundaries.
>
> The design does not consider or confirm that the fire fighting water supplies available will meet the requirements of NZS 4509:2008.

3.11 The NZFS memorandum went on to note that the proposed design was based on the draft determination and that the applicant considered that 20% GRP panels provides for effective fire venting. The NZFS commented that the building had considerable differences compared to that considered in the draft determination; including a drive through area, café, playground facility, and outdoor sales area, and also that the draft determination concluded that the subject building did not demonstrate compliance with Clauses C2 and C3.

3.12 On 16 July 2010 the authority issued building consent No. 211641 for Stage 2, which included completion of the remainder of the building including fire design and fire protection services. Included under the heading 'Guidance to the Consent' the consent document required

> The fire report of [the fire engineer] dated June 2010 is approved with the following condition
>
> - In support of the fire design, specific fire engineering design for the [effective fire] venting requirements is to be submitted for approval prior to the application for [a code compliance certificate] and prior to any occupation of the building.
> - Approval and agreement from the [NZFS] with regards to external fire hydrant and fire fighting facilities are to be submitted prior to application for [a code compliance certificate].

3.13 In a letter to the authority dated 10 December 2010 the applicant agreed, in order to obtain a certificate of public use and a code compliance certificate, to:

> install [proprietary louvre vents], as described in [the fire engineer's] addendum to fire report dated 30 September 2010 and subsequent review from [proprietary louvre vents provider] which increased the number of vents from eight to ten [subject to agreement on the fire hydrant design]
>
> install fire hydrants at the Northern and Southern end of the building in lieu of previous hydrants designed on the western side of the building, to meet the requirements of the [NZFS] [subject to agreement with the NZFS].

3.14 On 13 December 2010 a certificate of public use was issued subject to the installation of the proprietary louvre vents and the installation of fire hydrant design as approved by NZFS. Further certificates of public use were issued subject to the authority's acceptance of an amendment to the installation of the proprietary louvre vents and retaining the requirement for NZFS approval of fire hydrant design; with the final one issued on 9 March 2012 being altered to make those two requirements subject to the outcome of this determination.

3.15 At the request of the applicant, the fire engineer produced an 'addendum to [the] fire reports', dated 29 April 2011. The addendum referred to Determination 2010/105[5], which had been issued on 5 November 2010 and that found that the fire design did not comply with the Building Code in respect of the information provided to support the use of GRP panels. That determination also included a modification of the extent to which the building must comply with Clause C4.3.1, arising from the use of GRP panels as the means effective fire venting without evidence that provides reasonable grounds of the performance of the panels. The addendum set out what the fire engineer considered to be the similarities and differences between the two buildings in relation to effective fire venting and hydrants, and outlining the design methodology used.

3.16 In regards the GRP panels, the addendum noted that the roof has been constructed with 20% GRP panels 'with the fall-back position of later installing [proprietary louvre vents] in the roof if necessary' but that the fire engineer considered 20% GRP panels provided effective fire venting and that the proprietary louvre vents would be unnecessary.

3.17 In regards the fire hydrants, the addendum proposed a fire hydrant be provided alongside the western door to enable direct access for fire fighters to the 'small areas at the rear of the building which cannot be reached from the vehicle access points'. The fire engineer considered that this, along with existing vehicle access positions would achieve compliance.

3.18 On 2 May 2011 the applicant applied to the authority for a code compliance certificate.

3.19 The authority refused to issue the code compliance certificate and provided reasons for its decision in a letter to the applicant dated 29 June 2011. The authority commented that did not consider the issue of a modification of the Building Code to be appropriate, but that the process would require a formal amendment to the

[5] Determination 2010/105: The fire safety requirements for a large warehouse building at 8 Hautu Drive, Manukau, Auckland

building consent, and that the status of the application for a code compliance certificate was 'suspended awaiting further information (specifically the formal amendment application).'

3.20 Subsequent to a meeting on 5 September 2011, in a letter dated the same day, the authority confirmed its refusal on the grounds that it considered that 'the agreed work detailed in the applicant's letter 10 Dec 2010 is necessary to demonstrate compliance' (refer paragraph 3.13). The letter also noted that there was an agreement between the parties that a determination on the matter be sought.

3.21 On 27 February 2012 the Ministry received the application for determination from the applicant's legal adviser.

4. The submissions

4.1 The applicant

4.1.1 The applicant's legal adviser forwarded a comprehensive submission dated 23 February 2012 with the application that provided a description of the building and site, outlined the background events, and provided copies of

- certificate of titles and an overall site plan
- approved building consent documents, the building consent with attached addendum, guidance to the consent, and general notes
- the fifth fire report dated June 2010 prepared by the fire engineer and Addendum to fire reports, dated 29 April 2011
- correspondence from the owner dated 10 December 2010, correspondence from the authority dated 5 September 2011 refusing to issue the code compliance certificate, and various email correspondence between the authority, the fire engineer, the engineer who undertook the peer review of the design, and the architect for the project
- the NZFS memorandum dated 9 July 2010
- a copy of the Court of Appeal judgement *Logan v Auckland City Council*[6].

4.1.2 The applicant's legal adviser submitted that the authority incorrectly exercised its decision making power when it refused to issue a code compliance certificate on the basis of the authority's view that the work detailed in the owner's letter of 10 December 2010 (refer paragraph 3.13) was required to achieve compliance.

4.1.3 The submission stated that as the issue of a code compliance certificate is against the consent, not the Building Code, and the building work accords with the approved plans and specifications, a code compliance certificate should be issued. The applicant's legal adviser is of the view that the consent conditions included in the building consent are not valid and not enforceable. The submission stated that conditions can only be imposed on consents issued under sections 67, 73, 77 or 113,

[6] *Logan* v *Auckland City Council*, 09/03/2000, Richardson P, CA 243/99

and also the consent conditions are not included as notations on the plans and specifications for clarification purposes and are therefore invalid and not conditions.

4.1.4 The applicant's legal adviser noted that the inclusion of the consent conditions effectively delayed the decision on compliance whilst the consent was granted and the building constructed. The submission also argued that the authority had, through the requirement for approval by the DRU, delegated its decision making power and that there is no provision in the Act for the DRU to be delegated an approved function; and that the DRU has no further role once consent is issued. The submission also disputed a number of items included in the DRU memorandum of 9 July 2010.

4.1.5 The applicant's submission also included a comparison of the buildings features with the building subject to Determination 2010/105, and concluded that the building as constructed is compliant with Acceptable Solution C/AS1.

4.2 The authority

4.2.1 The authority acknowledged the application for a determination and provided copies of the following:

- fire reports dated November 2009 and February 2010
- fire report dated May 2010 and addendum to report dated 30 July 2010
- fire report dated June 2010 and addendum to report dated 30 September 2010
- addendum to report dated 29 April 2011
- the authority's letter dated 29 June 2011 refusing to issue a code compliance certificate.

4.2.2 The authority's legal adviser provided a submission dated 4 May 2012, stating that the authority's position is that the building does not comply with the Building Code and will not do so until the issues of effective fire venting and fire hydrant positions are satisfactorily addressed. The submission acknowledged that in other respects the building work is complete and complies with the consent.

4.2.3 The authority's legal adviser submitted that the determination should establish whether the building as built complies with the Building Code or not. The submission noted that the consent conditions confirm aspects of the proposed work and those conditions are valid and integral to the consent; and that the dismissal of those conditions 'strikes at the validity of the building consent'. The authority considered the consent conditions to be critical to the issue of the consent in terms of establishing compliance with the Building Code.

4.2.4 The submission provided further background information and commented in detail on the authority's view as regards effective fire venting, interpretations of paragraphs 4.2.3 to 4.2.5 of C/AS1, the fire hydrant provision, and the validity of the consent conditions. The submission concluded that the provision of 20% of the roof area as GRP panels does not amount to effective fire venting for the purposes of paragraph 4.2.4 of C/AS1 and the building does not comply with C/AS1 or the Building Code.

4.3 The NZFS

4.3.1 The NZFS made a submission dated 3 May 2012, summarising the memoranda that DRU provided to the authority, and noting that it was of the view that without the matters identified in the consent conditions being addressed the building, as currently built, does not comply with the Building Code, and noted:

- effective venting: 'compliance with the performance criteria under the Building Code for [effective fire venting] has not been demonstrated, and the drawing of analogies to the building considered in Determination 2010/105 does not assist in that regard'
- provision of hydrants: 'the hose run distance from the hardstand likely to be used for vehicular access by fire appliances to the furthest point in the building is in excess of 75m, and the proposed fire hydrant system is insufficient to enable hoses to run to all interior parts of the building.'

4.4 The draft determination

4.4.1 A draft determination was provided to the parties for comment on 18 June 2012.

4.4.2 In a response received by the Ministry on 6 August 2012, the applicant accepted the draft determination in respect of the view expressed about fire cell size and effective fire venting, and did not accept the draft determination in respect of the view expressed about fire hydrant requirements. The applicants legal adviser requested that the conclusions with respect of the fire hydrants should be amended to take into account the further information and clarification provided by the fire engineer. The fire engineer provided the following information to clarify the hydrant design:

- No vehicle access to the western hydrant is required. Paragraph C2(a) of Appendix C of NZS 4510[7] states that 'External hydrants should be located… in a position that provides pedestrian access to the building for the fire brigade.' The western hydrant has direct pedestrian access from both the north and south.
- The draft determination refers to the location of the inlet for the western hydrant. The water for the hydrant is sourced directly from the adjacent 150mm diameter water main.
- The hose run lengths from the western hydrant are also shown on the fire coordination plan and they clearly reach and overlap the two small areas of floor which were beyond the 75 metre hose run length from the fire service vehicular access positions.
- The western hydrant has a flow of 1500 litres per minute at a pressure of 700kPa, which exceeds the requirement of NZS 4510.

4.4.3 In a response received by the Ministry on 6 August 2012, the authority accepted the draft determination 'in respect of the broad conclusion', however expressed concerns about certain aspects of the draft. The legal adviser to the authority noted:

[7] NZS 4510: 2008 Fire hydrant systems for buildings

- the authority is of the view that the fire engineer is not properly a party to the determination, as he does not fall into any of the categories of person identified in section 176 of the Act
- there is not sufficient reasoning in the draft determination about how the view about fire hydrant compliance was reached; further reasoning is required and the parties should have an opportunity to provide comment on this
- the authority welcomes the comment that appropriate conditions can be applied to building consents, however, the authority considers that the issue deserves more extensive examination; in particular:
    - building consent authorities routinely issue building consents subject to conditions or notes and it would be useful for there to be some guidance as to the permissible scope of those devices, having regard to the statutory test for issuing a building consent and the various provisions within the Act that expressly provide for the imposition of consent conditions
    - as there is little case law or commentary in previous determinations about the permissible scope of building consent conditions under the Act, so any comments in this determination will be of particular interest to building consent authorities and other industry participants
- the proposed modification is somewhat circular and it is not particularly clear; and the inclusion of the words 'if any' raises a question as to whether a modification is granted at all i.e. is this a suggestion that the uncertain performance characteristics of GRP panels mean that a modification may not be required?
- the draft determination does not confirm whether the issue of effective fire venting is completely addressed by the modification of Clause C4.3.1. In other words the draft determination does not address whether the modification effectively cancels out the relevant condition of the consent, such that the provision of further fire design information (as required by the condition) or the installation of smoke louvres (as agreed by the applicant in December 2010) is not required for the purposes of obtaining a code compliance certificate.

4.4.4 In a response to the draft determination received on 8 August 2012, the NZFS commented that it agreed with some of the points made in the draft determination, however:

- the draft determination does not adequately take account of NZFS operational requirements and Clause C3.3.9 of the Building Code
- the NZFS is the entity that is best placed to describe its operational requirements
- the terminology used in the draft determination should be reviewed, as it refers to street hydrants, which is a reference to the vehicle access locations where appliances would access street hydrants
- the NZFS does not agree that paragraph 8.1.1 of Acceptable Solution C/AS1 is satisfied, which states that "where buildings are located remote from the street

boundaries of a property, pavements situated on the property and likely to be used for vehicular access by fire appliance shall: … (e) Provide access to within 19m of at least one side of each building, except that where a building is sprinklered and has only a fire riser main installed, access need only be to within 19m of the inlets to these systems.

- the four fire appliance locations cannot be accepted as independently satisfying paragraph 8.1.1 of C/AS1 because this involves
  - an assumption that a fire in the building will be attended by up to four appliances (i.e. to introduce pumped water at each of the fire appliance access locations)
  - or that some smaller number of appliances will be moved around the perimeter of the building as search and rescue and fire fighting operations are conducted
- neither assumption is compatible with NZFS operational requirements, as these dictate that only one of the designated locations is likely to be used for vehicular access by fire appliances as required by paragraph 8.1.1 of C/AS1. It cannot be assumed that more than one fire appliances will arrive at the site in the event of a fire
- a fire design involving a single vehicle access location and hydrants in locations where the interior of the building is covered by 60 metre hydrant arcs would allow fire fighters to conduct search and rescue operations though the building. Time would not be lost while fire fighters withdraw from the building, relocate the appliances, and undo/redo connections to the underground water supply at each fire appliance access location
- the NZFS does not consider that the decision to modify the requirements of Clause C4.3.1 for this building is appropriate.

4.5 The second draft determination

4.5.1 A second draft determination was provided to the parties for comment on 9 October 2012.

4.5.2 In a response dated 17 October 2012, the authority accepted the draft determination without comment.

4.5.3 In a response dated 31 October 2012, the applicant did not accept the draft determination in respect of the view formed about the fire hydrant requirements. The applicant submitted that:

- nowhere in NZS 4510:2008 is there any mention of hydrant requirements for low rise buildings
- the relevant provisions of Part 8 of C/AS1 (being Fire Service Vehicular Access and Fire Hydrant System at paragraphs 8.1.1 and 8.2.1 respectively) and, more specifically NZS 4510:2008, are all silent regarding the manner in which water should be delivered from a hydrant to a fire fighter hose except for an ambiguous note at the end of paragraph C1 of NZS 4510:2008 Appendix C (informative only) stating that “the fire service is required to supply the

necessary flow and pressure into the building hydrant system inlet." There is no indication at all that this would require a fire service vehicle to be positioned near the western hydrant in order to provide pumping capacity. Had this been clear in the standard then the applicant would not have installed the western hydrant and instead proposed a different solution

- there is no basis within the relevant documents for such an assumption. Indeed, extending the requirements of an Acceptable Solution by inferring assumptions based on an informative appendix is contrary to the statutory framework of how compliance documents work. A person is entitled to rely on compliance with such a document in order to comply with the Building Code. This is the basis on which the applicant prepared a fire design with a hydrant located at the western side of the building. In all respects that hydrant meets the express requirements of the Acceptable Solution and NZS 4510:2008
- furthermore, the effect of this assumption is that unless access for a NZFS pumper unit is constructed, the hydrant installed by the western doors is redundant for fire fighting purposes despite it being compliant with the standard
- whilst the applicant does not accept this assumption is a legal requirement, in order to progress the matter, the applicant has considered the options available for what is seen to be an operational concern of the NZFS, and the applicant's preferred option is to install a dry main between the northern and western doors. This will enable a pumper unit located near the northern door to control the water pressure and flow delivered to fire fighters from outlets near the western doors
- the decision should be amended to record that subject to the final design, a proposal with a 100mm dry main between the northern and western doors that will enable fire fighters to control pressure and flow to the western side of the building, is a solution that complies with NZS 4510:2008 for which a code compliance certificate can be issued; and the discussion should be amended to acknowledge that the assumption that an external outlet is part of a hydrant pipe work system that delivers water controlled by an NZFS pumper unit is not an express requirement of the Acceptable Solution and is therefore not legally binding, however, the applicant has voluntarily offered up a solution to assist NZFS operationally.

4.5.4 In a response to second draft determination received on 19 November 2012, the NZFS commented:

- fire fighters do not work directly from in-ground water mains because the connections are not compatible with NZFS equipment and there is no mechanism to control water flow and pressure
- only the fire appliance location within 18 metres of the fire alarm panel satisfies paragraph 8.1.1 of the Acceptable Solution; the NZFS may only be able to send a single appliance to the building in the event of a fire. Where it can be robustly demonstrated that a second appliance is likely to attend e.g. in built up urban areas, it may be feasible to agree to a specific second fire appliance access location

- any other option would be bespoke solutions, which would need to address:
  - equipment would be unlikely to comply with any New Zealand safety standard. As such, this equipment would have the potential to jeopardise fire fighter safety
  - another option associated with an in-ground main would not be part of the building envelope and would be unlikely to be subject to as rigorous a maintenance process as services built into the building and inspected as specified systems
  - whether the equipment would be owned/controlled by the building owner or the public water authority responsible for the in-ground main would be unclear
  - training on the operation of bespoke flow and pressure control equipment and connections would be a drain on NZFS resources
  - as the NZFS upgrades its equipment, the bespoke solution may no longer be compatible and would also require upgrading.
- '… the removal of a requirement for a proven fire venting facility places fire fighters at risk when undertaking rescue operations. The sudden onset of flashover or even roll over could place fire fighters and any building occupants trapped at risk. If fire fighters are present during flash over, fire fighter (and other building occupant) deaths are likely. In addition, the absence of a proven fire venting facility can lead to the sudden and catastrophic structural failure of building elements. The [build up] of smoke will also prevent fire fighters from identifying the onset of early structural failure.'
- the applicant's response that NZS 4510:2008 does not make any mention of hydrant requirements for low rise buildings like the one in question
- Appendix C of NZS 4510:2008 clearly describes the design and operation requirements for a building hydrant system for a low rise building like a warehouse. It also clearly describes those systems as being distinct from in-ground, street hydrant systems. While Appendix C is not mandatory, it is notable that the applicant's original fire report was based on it.
- While some older building stock does provide dry building hydrant systems, they are no longer generally permissible under NZS 4510:2008. The NZFS understands the systems were removed from the Standard because they were generally considered to be more susceptible to corrosion and damage.

4.5.5 In a response to the NZFS comments on 19 November 2012, the applicant noted that it was willing to amend its voluntary offer to install a main between the northern and western walls by providing a wet rather than a dry system in accordance with the suggestion from the NZFS.

5. Discussion

5.1 Framework for considering the decision to refuse to issue a code compliance certificate

5.1.1 The authority refused to issue a code compliance certificate for the building and the submissions from the parties raise the following key issues for consideration:

- Fire hydrant requirements.
- Fire cell size and effective fire venting – fire safety precautions for large warehouse style buildings.
- Consent conditions.

5.1.2 In this discussion, I refer to previous determinations as follows;

Determination 2010/004: Firecell requirements for proposed alterations to a meatworks plant.

Determination 2010/105: The fire safety requirements for a large warehouse building.

Determination 2011/094: The Building Code compliance of fire safety design for a proposed warehouse and office building.

5.2 Fire hydrant requirements

5.2.1 The fire design cites Acceptable Solution C/AS1 as the means of compliance for this building, with a type 18c fire safety precaution being required for this building. An internal hydrant system complying with NZS 4510 is not required if the hose run distance from the NZFS vehicle attendance point is not more than 75 metres to reach all parts of all floors.

5.2.2 The principal NZFS attendance point at the main fire indicator unit near the entry at the front of the building provides fire fighter access into the building. The maximum 75 metre hose run distance from the attendance point covers most, but not all parts of all floors.

5.2.3 The fire design is such that a second fire fighter entry point on the west side of the building provides fire fighter hose run distance that covers the area shortfall not served by fire fighter hose run supplied via the main entry access point and therefore enables all floors to be covered by fire fighter adequate hose run distance. The fire design relies on a lesser hose run distance of not more than 60 metres as required by Appendix C of NZS 4510 for external hydrant systems intended to give coverage to low rise buildings where an internal hydrant system is either not appropriate or not feasible. I agree the application of NZS 4510 Appendix C to this building is appropriate. I have assumed that validation of the dimensions to give full coverage from the two locations has been carried out.

5.2.4 The second fire fighter access point is intended to be served by water for fire fighting supplied from a direct connection tapping into a 150mm diameter in-ground water main. No NZFS vehicle access is provided to this second hydrant location; fire fighter pedestrian access is provided.

5.2.5 The fire engineer provided the results of a water flow test of the pressure and water delivery rate that is available from the in-ground water main that would provide fire fighting water at the second fire fighter access point. It is not clear if this pressure and flow rate result would apply to the water delivered at the fire fighter hose connection at the second hydrant (taking into account losses associated with smaller pipe size, bends and losses up to the delivery point). However, compared with the expected minimum design values for flow rate and pressure stated in NZS 4510 the margin of available water flow rate and minimum pressure is sufficiently large to allay concerns about minor losses through fire fighter branch supply pipework. Therefore the second hydrant is capable of delivering supply of water for fire fighting at an adequate pressure and flow rate.

5.2.6 It is my view that the Fire Service access location that is within 18m of the fire alarm panel is not the only fire appliance access location that can be considered. In respect of the fire appliance access locations, I am of the view that the provisions of paragraph 8.1.1 of the Acceptable Solution are met by the locations specified in the fire design.

5.2.7 The remaining unresolved issue is the degree of control that the fire fighters would have over fire fighting water supply at the second hydrant. Fire fighting water pressure and flow rate supplied to the fire fighter delivery hose is usually controlled by the pumper truck. In the case of water supplied from a street hydrant for direct delivery to the fire, the fire fighter hose is attached directly to the pumper unit and the water supply is boosted according to demand. In the case of water supplied to a building hydrant system the pumper unit supplies water to the hydrant pipework, the water supply is also boosted according to fire fighter demand. In both cases the fire fighters can communicate with the booster pump operator and achieve a degree of control over water pressure and delivery rate. In both cases the water pressure and flow rate can be increased from zero to full flow.

5.2.8 Details of the connection to the in ground water supply at the west side of the subject building are not clear. It appears to be intended that fire fighters would connect directly to an in ground hydrant. An installation that complies with NZS 4510 Appendix C assumes that an external hydrant is part of hydrant pipe work system that delivers water controlled by a NZFS pumper unit. This is where the solution proposed for the building deviates from strict compliance with NZS 4510:2008.

5.2.9 For the in-ground water supply at the second hydrant, insufficient pressure does not appear to be an issue from the perspective of adequacy for water supply. However, in the case of the proposed solution, it appears that once fire fighters connect to the water supply, the water pressure would be in the range of 700 to 800kPa at any time that the water is flowing. Fire fighters have no obvious way of regulating the water supply pressure and reducing the pressure if the high pressure proves difficult to

manage (higher water pressure introduces potential safety concerns and typically require more fire fighters to handle the hoses).

5.2.10 If NZFS vehicle access was made available to the hydrant connection on the in ground water main at the west side of the building, then a solution in accordance with C/AS1 could be achieved. The water supply at this location would be able to be boosted and controlled in the same way as the water supply serving the hose streams supplied by access from the east side of the building. There may be other options to provide more control at the in ground water supply. The NZFS would need to confirm that any non-standard water supply arrangements are acceptable for fire fighting.

5.2.11 I note that based on the submissions received following the second draft determination, and in response to the comments of the NZFS that a NZS:4510 compliant system should be installed with a wet main, rather than a dry main, the applicant has put forward a proposal to modify the hydrant system, by installing a wet main. The applicant is of the view that this work is voluntary, however, I continue to hold the view that I have expressed above and consider that a system compliant with the Building Code is required.

5.3 Fire cell size and effective fire venting – fire safety precautions for large warehouse style buildings

5.3.1 In previous determinations, I have considered in detail the issues about Building Code compliance for large warehouse style buildings, in particular compliance with Clause C4.3.1, and the interpretation of the Acceptable Solution C/AS1.

5.3.2 I note there are differences in this building to the buildings that I have considered in previous determinations.

5.3.3 I have studied the arguments presented by the parties in their submissions to me in terms of the applicability of various paragraphs of C/AS1, and I have come to the conclusion that no new arguments have been presented that would compel me to change the views that I have expressed in previous determinations with regard to the interpretation of C/AS1 and the requirements of the relevant Building Code clauses.

5.3.4 In considering this building, I note that the fire engineer has cited C/AS1 as the means of compliance, noting that the building is remote from the boundaries.

5.3.5 In my view, as in previous determinations, the application to this building means that notwithstanding that the building is remote from the boundary effective fire venting is required by paragraph 4.2.4 of C/AS1 for unsprinklered, single floor buildings, with unlimited floor area and non-rated roof elements. This provides a mechanism to limit the assault, as effective fire venting allows the fire to vent through the roof thereby reducing the temperature in the building and allowing structural elements to maintain their stability for a longer period of time.

5.3.6 As in previous determinations, I also consider that there is insufficient evidence to support the use of GRP panels to provide effective fire venting.

5.3.7 I therefore conclude that the fire design does not meet the performance requirements of Building Code Clause C4.3.1.

5.3.8 I note that there has been ongoing debate about the fire safety precautions required for this type of large warehouse building. I note that the new Building Code Clauses C1-C6 and supporting documents were introduced on 10 April 2012. I have consequently done some preliminary analysis using the new Verification Method C/VM2 (I note that the building does not comply with the new Acceptable Solution C/AS6 for risk group WS), and I note the following:

- The new Building Code Clauses C1-C6 are clearer and more specific about building performance requirements for protection from fire.
- Designs to meet the new Verification Method C/VM2 are required to achieve particular outcomes for the provided design scenarios. This is not to say the level of performance required to be achieved using the new C/VM2 is higher than a Building Code compliant design using the old Building Code Clauses C1 to C4, but that the outcomes required to be achieved are more specific and identifiable.
- Based on the preliminary analysis that I have carried out, the design would not comply with the new Verification Method C/VM2. The areas of non-compliance are the fire hydrant system and the materials used in the roofing/ceiling. The material group numbers required by C/VM2 to demonstrate compliance are unknown for the roofing materials, although are likely to be compliant for all materials other than the GRP panels.

5.4 Consent conditions

5.4.1 I accept that it is common practice for building consents to be accompanied by notes and conditions. It is my view that this practice is acceptable, provided the conditions are used appropriately to highlight specific areas for attention, and are used to clarify aspects of the building work and the processes that relate to it.

5.4.2 In respect of the provision of effective fire venting, the consent was conditioned requiring specific fire engineering design for the roof venting requirements to be submitted. It is my view that it was not appropriate for the design to rely on a draft determination (refer to paragraph 3.7), and the authority was correct to require further information about this aspect of the design.

5.4.3 In respect of the provision of fire hydrants, the consent was conditioned requiring agreement from the NZFS with regards to external fire hydrants. It is my view that the agreement of the NZFS to the fire hydrant and fire fighting facilities can be a relevant factor in considering Building Code compliance, and essentially the authority sought further information about this aspect of the design. I accept this approach.

5.4.4 I note that while an option was for the authority to refuse to issue the building consent in these particular circumstances, it elected to issue the building consent, subject to the consent conditions. I believe the authority has taken a practical and pragmatic approach by issuing the building consent subject to conditions, to allow construction to proceed.

5.4.5 In its submission in response to the draft determination, the authority requested that the issue of consent conditions be more extensively examined, and that it would be useful to building consent authorities for there to be some guidance as to the permissible scope of consent conditions.

5.4.6 I accept that guidance on this topic would be useful to building consent authorities. It is my view that it would be more appropriate for the Ministry to provide this outside of the determination process.

6. What is to be done now

6.1 Modification of the Building Code

6.1.1 I take the view that under sections 188(1) and 188(3)(a) of the Act I have the power to modify the authority's decision to grant the building consent by adding a waiver or modification of the Building Code subject to the appropriate conditions.

6.1.2 The relevant objective of Clause C4 is to 'Safeguard people from injury due to loss of structural stability during fire' and the relevant functional requirement of Clause C4 is to 'Allow fire service personnel adequate time to undertake rescue and firefighting operations'. Clause C4.3.1 requires that 'Structural elements of buildings shall have fire resistance appropriate to the function of the elements, the fire load, the fire intensity, the fire hazard, the height of the building and the fire control facilities external to and within them.'

6.1.3 In the circumstances, I consider it is reasonable and appropriate to incorporate a modification of Building Code Clause C4.3.1 in this determination. I have concluded that there is insufficient information to demonstrate that the fire safety design, using GRP panels to provide the necessary effective fire venting, complies with Clause C4.3.1.

6.1.4 I note that there are compensating features of the firecell design of this building with respect to a C/AS1 compliant design which include the provision of about 20% of the roof area provided with GRP panels.

6.1.5 I also note that the use of GRP panels as effective fire venting is common practice, there is empirical evidence that supports the use of this product, and historically the industry has been of the view that GRP panels melted to some extent to provide heat and smoke venting.

6.1.6 While the fire safety design of the building does not demonstrate compliance of the GRP panels with the Building Code, I am of the view that the modification of the performance requirement C4.3.1 is minimal in this case in terms of the relevant objective and functional requirement of Clause C4, because of the compensating features. I also note that the probability of the performance of the venting in making a difference in terms of structural stability in a particular fire is relatively low, although not negligible. It requires a number of low probability and adverse circumstances, each to occur as part of a particular fire event, such as a worst case fire or fire service intervention occurring late in the fire sequence.

6.1.7 I acknowledge this building was consented and constructed during a period of uncertainty in the industry in terms of Building Code requirements and the solutions provided for by C/AS1 and the use of GRP panels as effective fire venting. I note that the Ministry has recently released the new Building Code Clauses for Protection from Fire C1 to C6 and the new Verification Method C/VM2 which sets out a method for specific designs to comply with the Building Code, and new Acceptable Solutions C/AS1 to C/AS7.

6.1.8 I have also considered section 4 of the Act and have considered the principles to be applied in performing functions or duties or exercising powers under the Act and I have taken account of the following principles:

- Section 4(h), which requires consideration of 'the reasonable expectations of a person who is authorised by law to enter a building to undertake rescue operations or firefighting to be protected from injury or illness when doing so'.
- Section 4(f), which requires consideration of 'the importance of standards of building design and construction in achieving compliance with the Building Code'.
- Section 4(b), which requires 'the need to ensure that any harmful effect on human health resulting from the use of particular building methods or products of a particular building design, or from building work, is prevented or minimised'.

6.1.9 I am of the view that the modification to the performance requirement C4.3.1 is minimal in respect of this building and does not adversely affect these principles.

6.1.10 Therefore, I consider it reasonable to incorporate a modification of Clause C4.3.1 in this determination. The modification of Clause C4.3.1 is, if any, a modification of the extent to which the building must comply with Clause C4.3.1. This modification arises from the use of GRP panels as the means of effective fire venting without evidence that provides reasonable grounds of the performance of the panels

6.1.11 In respect of the wording of the modification, I note that the modification to Clause C4.3.1 is required because I am not satisfied that the GRP panels meet the performance criteria in the Building Code. The words "if any" have been used in the proposed modification because I am unable to quantify the performance of the GRP panels. The GRP panels may in fact comply with the performance criteria but I cannot be satisfied this is the case because there is insufficient evidence to support such a conclusion.

6.1.12 In response to the authorities comments (refer to paragraph 4.4.3), I note that the modification addresses the same issue as the condition of the building consent that related to specific engineering design for the roof venting requirements. I am therefore of the view that by incorporating a modification of Clause 4.3.1, specific engineering design for the roof venting requirements is no longer needed. The applicant should make an application to amend the building consent, and the condition be removed accordingly.

6.1.13 The necessary evidence regarding the performance of GRP panels for fire venting may emerge at a later date and may enable the extent of non-compliance, if any, to be

quantified. However, in the meantime and in the absence of such evidence, a modification of Clause C4.3.1 is required because the evidence in support of the compliance of the GRP panels with the performance criteria for effective fire venting is insufficient to establish code-compliance.

6.1.14 In respect of the fire hydrant system, as set out in paragraph 5.2.11, an application to amend the building consent will be required.

7. Decision

7.1 In accordance with section 188 of the Act I hereby determine that the fire design submitted for the building does not comply with the Building Code in respect of the provision of hydrants and the provision of effective fire venting; I therefore determine that the authority correctly exercised its power of decision in refusing to issue a code compliance certificate for the building.

7.2 In respect of the provision of effective fire venting, I also modify the authority's decision to issue the building consent by incorporating into that building consent a modification of Building Code Clause C4.3.1 with respect to the GRP panels provided as the means of effective fire venting as specified in paragraph 6.1.10 of this determination.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 19 December 2012.

John Gardiner
Manager Determinations and Assurance