Determination 2018/048

Regarding the refusal to issue a building consent for alterations of an existing building at 25 Courtenay Place, Wellington

Summary

This determination considers fire spread across a boundary in relation to an existing commercial building that is being altered. The determination considers how distance is measured to the relevant boundary for the purposes of considering fire spread to other property in order to satisfy the requirements of Building Code Clause C3—Fire affecting areas beyond the fire source.

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, Katie Gordon, Manager Determinations, Ministry of Business, Innovation and Employment ("the Ministry"), for and on behalf of the Chief Executive of the Ministry.

1.2 The parties are:

- the owner of the property at 25 Courtenay Place who applied for the determination, Metro Investments Limited ("the applicant"), acting through an agent who is a Chartered Professional Engineer (Fire) ("the fire engineer")
- Wellington City Council carrying out its duties and functions as a territorial authority or building consent authority ("the authority").

1.3 As this determination concerns fire safety and fire-engineering practice I am also required to consult with Fire and Emergency New Zealand (FENZ) under section[2] 170 of the Act.

1.4 The determination arises from the authority's request for further information regarding the compliance of proposed glazed walls as described in paragraph 2.3 of this determination, and the authority's stated intention to refuse a building consent based on those application documents as submitted.

1.5 The authority is not satisfied with the interpretation of Acceptable Solution C/AS5 paragraph 5.5 'Table method for external walls' relied on in the fire report supporting the building consent application. The authority's concerns are specifically with regard to how distance is measured to the relevant boundary for the purposes of considering fire spread to other property across a relevant boundary to satisfy the requirements of Building Code Clause C3.3.

[1] The Building Act, Building Code, compliance documents, 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.
[2] In this determination, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

1.6 The matter to be determined[3] is therefore whether the authority's exercise of its power of decision in proposing to refuse to issue the building consent. In deciding this matter, I must consider how the Acceptable Solution C/AS5 is to be interpreted.

1.7 In making my decision, I have considered the submissions of the parties and the other evidence in this matter. I have not considered any other aspects of the Act, of the Building Code, or of the Acceptable Solution C/AS5, nor have I considered any other building elements other than in relation to external spread of fire with respect to the proposed glazed walls. The relevant legislation discussed in this determination can be found in Appendices A and B.

2. The building work

2.1 The existing building is a cinema with ground floor retail space. The building consent application proposed to significantly redevelop the building; demolish the cinema and construct two levels of office space, refurbish ground floor retail spaces, and create carparking spaces to the rear of the ground floor.

2.2 This determination relates to the existing southeast external wall ("the external wall"), which is located on the "relevant boundary"[4]. I note the wall is shown on the 'east' elevation drawing, and I follow this convention. The external wall, as existing, is a mixture of brick and concrete construction.

2.3 It is proposed to demolish part of the external wall and construct a glazed wall ("the glazed wall"), set back ("the setback area") from the external wall and relevant boundary by 3.0m, to create an open decked space. Refer to Figure 1.

2.4 The setback area is annotated (east elevation drawing of the fire report only) as a mixture of protected (i.e. fire rated) and unprotected areas; 'individual unrated areas up to 30% of the wall area, and permitted unlimited area of fire rated glazing'.

2.5 The fire report elevations show the glazed wall feature to the first and second floors.

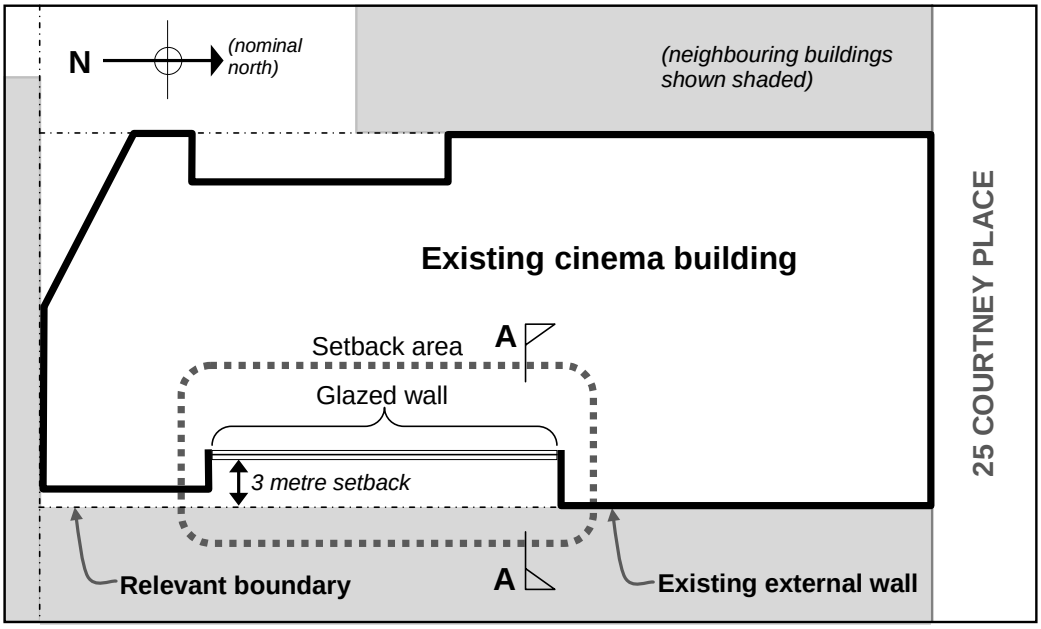


Figure 1 Outline site plan (not to scale)

[3] Under sections 177(1)(b) and 177(2)(a) of the Act.
[4] Relevant boundary as defined in Clause A1 and C/AS5.

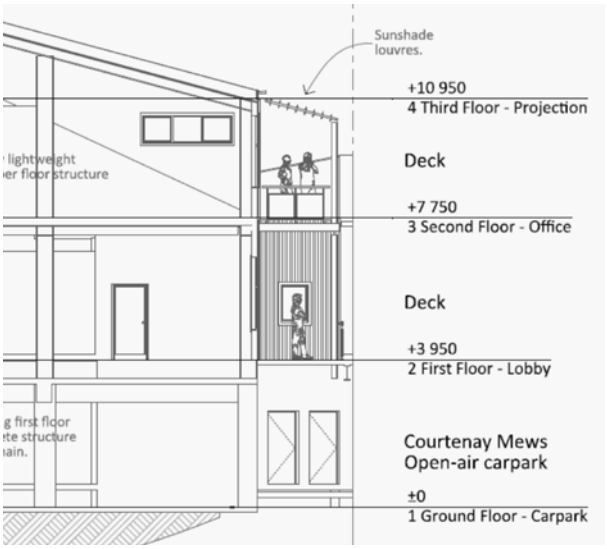


Figure 2 Section A-A (not to scale)

3. Background

3.1 During the processing of the building consent application, on 7 March 2018, the authority requested further information, among other things, but specifically:

> Please justify the 3M boundary distance when considering external spread of fire… we are not aware of a way to justify the use of that distance using the acceptable solution if each floor is a fire cell… The argument that the part of the building that keeps the weather out is the external wall by definition so can be considered the relevant distance to the boundary does not change the distance between the relevant boundary and the fire cell in question... council believes the compliance of the unrated glazing will need to be proved with calculations.

3.2 On 15 March 2018 the authority emailed the applicant reiterating their request for further information.

3.3 An application for determination was received by the Ministry on 19 March 2018.

4. The submissions and the draft determination

4.1 The initial submissions

4.1.1 The fire engineer included a submission in support of the application for determination that stated (in summary):

- Acceptable Solution C/AS5, specifically paragraph 5.5 ‘Table method for external walls’ (and Table 5.2/1), is the means of compliance.
- Acceptable Solution C/AS5, Table 5.2/1 has been applied to the proposed setback area/glazed wall. This wall is 3.0m from the relevant boundary, and therefore permitted 30% unprotected area, with the largest permitted size being $10m^2$.
- Verification Method C/VM2 calculations for thermal radiation are calculated from the external wall, not the firecell.
- The “majority of the [existing southeast external wall] is of concrete or masonry construction and… fully satisfies the required fire resistance rating of the acceptable solution”.

- A waiver[5] was initially requested as part of the building consent application, however this was subsequently removed from the proposal.

4.1.2 The fire engineer provided copies of the following documents with the application:

- 'Request for Information' letter from the authority, dated 7 March 2018.
- 'Fire safety report' titled "Assessment in Accordance with Section 112 NZ Building Act 2004" Project No. P4969/12 March 2018, which included some architectural drawings.
- Email correspondence from the authority, dated 15 March 2018.

4.1.3 The authority made a submission in response to the application for determination dated 23 March 2017 (in summary):

- The difference of view relates to "compliance with code clause C3 specifically C3.3 where the portion of the external wall of the firecell in question is off the boundary but the rest of the wall is on the boundary".
- The authority has not refused to issue the building consent at time of writing, but has "suspended" the issuing of the consent subject to a 'request for information' regarding the proposed building work, among other matters being responded to by the applicant.
- Acceptable Solution C/AS5 is the nominated means of compliance.
- The authority does not dispute C/AS5 Table 5.2/1 permits a maximum of 30% unprotected area when a wall is 3.0m from the relevant boundary.
- C/AS5 Figure 5.3 'Measuring distance to relevant boundary' requires the minimum distance of the firecell to the relevant boundary to be "the more onerous distance".
- The Acceptable Solution does not allow for "break[ing] up an external wall to take advantage of the individual sections and distances to the boundary".
- The authority acknowledged a waiver was initially proposed.

4.1.4 The authority provided copies of the following documents with their submission:

- The fire engineer's submission letter dated 15 March 2018
- Four versions of 'Fire safety report Assessment in Accordance with Section 112 NZ Building Act 2004 Project No. P4969', dated 26 September 2017, 16 January 2018, 12 March 2018, and 15 March 2018. (Refer to paragraph 0 for the basis of this determination.)

4.1.5 On 17 April 2018 I requested additional information regarding architectural section drawings. On the same day the fire engineer provided a drawing showing the requested section, dated 31 July 2017.

4.2 The draft determination and the submissions received in response

4.2.1 A draft determination was issued to the parties for comment on 6 August 2018.

4.2.2 The fire engineer responded to the draft determination on 7 August 2018 saying that he accepted the draft determination but noting one typographical error.

[5] A waiver of the Building Code in accordance with section 67 of the Act.

4.2.3 FENZ responded to the draft determination on 28 August 2018. In a detailed submission it said it agreed with the view that "for the purposes of Acceptable Solution C/AS5, the minimum separation distance from the unprotected area in question to the relevant boundary is 3.0m". However, FENZ also considered the determination's interpretation of C/AS5 would have a wider impact than on the subject case and that the matters having a bearing on that interpretation should be "robustly considered". FENZ said in summary that:

- C/AS5 does deal with linear walls, and walls that are at an angle of incidence between 0° and 90° to the line of the relevant (or notional) boundary, however "C/AS5 is not explicit as to its application to irregularly shaped exterior walls"
- C/AS5 is equivocal as to whether the Acceptable Solution applies to irregularly shaped walls as they are not expressly referred to [as an inclusion or exclusion], whereas the Acceptable Solution includes other 'interpretative' or language cues, for example 'part of an external wall', as specific wall arrangements covered by the Acceptable Solution.
- Taking an interpretative approach, the availability of C/AS5 paragraph 5.5.7 'enclosing rectangles' methodology, which expressly accommodates irregular shaped elevations, highlights a limitation to paragraph 5.5 'table method' to linear walls.
- "Figure 5.3 [of C/AS5] suggests a 'worst case' scenario should be used when determining the separation distance from an unprotected area to the relevant boundary." The closest point of the wall to the relevant boundary should be used.
- It queried whether a staggered/setback wall is "one wall, or several", or does C/AS5 paragraph 5.5.2 apply to "part of an external wall".
- The 'table' and 'enclosing rectangles' methodologies were noted. The determination's conclusion was not reached "through the compliance pathway advanced by the applicant or assessed by the [authority] or the interpretation of the 'table method'.

4.2.4 The authority responded to the draft determination on 6 September 2018 saying that it accepted the determination's findings but still considered that Figure 5.3 of C/AS5 was "misleading and is open to interpretation".

4.2.5 I have amended the determination as appropriate.

5. The Ministry fire engineer's advice

5.1 I took the advice of one of the Ministry's fire engineers ("the Ministry fire engineer"). The Ministry fire engineer's advice was received on 13 May 2018 and sent to the parties on 17 May 2018.

5.2 The Ministry fire engineer reviewed the submission from the fire engineer and supporting information described in paragraphs 4.1 and 4.1.2 and the authority's submission described in paragraphs 4.1.3 and 4.1.4.

5.3 The Ministry fire engineer noted;

> Several versions of the fire [safety] report were provided, with the most recent version identified as Project No. P4969/15 March 2018. In relation to the area of external wall in question, the most recent version of the report notes that "Wellington City Council has requested that this portion of glazing be fully fire rated". Therefore we have reviewed the previous version of the fire report identified as Project No. P4969/12 March 2018

I note, for the purpose of this determination, the fire safety report identified as Project No. P4969/12 March 2018 is the version of the document relied on in making my decision.

5.4 The Ministry fire engineer made the following observations and noted the following assumptions (in summary):

- Building Code Clause C3.3 and C3.6 are the relevant Functional and Performance requirements for the protection of neighbouring property from the effects of fire.
- The fire safety report incorrectly notes a primary risk group for the whole building. The Acceptable Solution requires the primary risk group to be determined for each firecell [my emphasis]. The Ministry fire engineer has therefore assessed the building work separately against C/AS4 Acceptable Solution for Buildings with Public Access and Educational Facilities (Risk Group CA), C/AS5 Acceptable Solution for Buildings used for Business, Commercial and Low Level Storage (Risk Group WB), and C/AS7 Acceptable Solution for Buildings Used for Vehicle Storage and Parking (Risk Group VP).
- The fire safety report does not mention the presence of intermediate floors, however the marked up plans indicate some stairs have smoke separations only. For the purpose of this determination it is assumed bounding construction of the stairwells achieves the required fire resistance rating, and therefore it is assumed each floor is a firecell.
- The fire safety report assumes the existing external walls provide an adequate fire rating, with no further supporting detail provided in support of that assumption. It is assumed the existing external wall provides the required level of fire rating performance and structural stability.
- The fire safety report does not indicate on the plans the requirement for external walls to be fire rated where they are located within 1.0m of the boundary.
- I note the Ministry fire engineer also made observations about matters outside the scope of this determination; I leave these matters to the parties to resolve in due course.

5.5 Specifically, in relation to how distance is measured to the relevant boundary, the Ministry fire engineer takes the following view:

- An interpretation of C/AS5 paragraphs 2.3.8, 2.3.9, and 5.2.1 allows the separation requirements to be measured from the location of the unprotected areas in external walls to the relevant boundary, not from the nearest external wall to the relevant boundary.
- Figure 5.3 of C/AS5 does not distinguish between whether the distance from the relevant boundary is to the external wall or the unprotected area, and is used where the wall is located at an angle to the boundary.

- Where there is a collection of unprotected areas that face onto the same relevant boundary, and those unprotected areas are located at different separation distances form the relevant boundary, then the shortest separation distance from an unprotected area within a firecell to the relevant boundary is to be used.
- If an assessment was proposed to determine the amount of radiation emitted from unprotected areas located at different separation distances to the relevant boundary, then specific engineering design calculations would need to be undertaken as such an arrangement is outside of the scope of the Acceptable Solutions. The Acceptable Solutions do not allow for determining the amount of radiation emitted from the unprotected areas located at different separation distances to the relevant boundary.

5.6 The Ministry fire engineer concluded:

- The fire safety report only proposes smoke separations between the ground and first floors. Unless intermediate floors are permitted, the Acceptable Solution requires each level of the building to be constructed as a firecell.
- Where the existing walls are within 1.0m of the boundary and acting as fire rated external walls, the authority needs to be satisfied on reasonable grounds that the existing walls will provide the required fire rating performance on an as near as is reasonably practicable basis (in accordance with section 112 of the Act for alterations to an existing building).
- Spread of fire from the east wall (the external wall) can be assessed from the setback area that is approximately 3.0m from the boundary, on the assumption that the existing external walls within 1.0m of the boundary are fire rated and provided with structural stability to the property rating.

5.7 Response to the Ministry fire engineer's advice

5.7.1 On 17 May 2018, the fire engineer made the following submission in response to the Ministry fire engineer's advice (in summary):

- The requirements of C/AS4 and C/AS5 for fire safety precautions and means of escape are the same, and neither of these is in dispute.
- The Ministry fire engineer's reference to C/AS7 is unclear as no car parking is included in the provided fire safety report. (I note all versions of the fire safety report state "One of the ground floor bars will be removed to create a car park with 6 parking spaces".)
- Agreed with the Ministry fire engineer's conclusion in regards to spread of fire from external walls of buildings and further submitted that C/AS5 Table 5.2 and Figure 5.2 supports the conclusion as these only apply to walls more than 1.0m from the relevant boundary.
- The fire rating capacity of the existing exterior walls within 1.0m of the boundary is included in section 7 'Spread of Fire' of the fire safety report.

5.7.2 On 31 May 2018, the authority made the following submission in response to the Ministry fire engineer's advice (in summary):

- The matter to be determined is whether or not the proposed unprotected area [the glazed wall setback area] is supported by the use of the Acceptable Solution.

- The Ministry fire engineer's conclusion is "more in line" with the enclosing rectangles calculation associated with the Commentary to Verification Method Appendix A: Methodology for Horizontal Fire Spread.
- Acceptable Solutions are for 'nonspecific design', to be used by those with a 'moderate level of technical ability'. Acceptable Solutions are weighted conservatively; if a designer wanted a more accurate and cost effective solution, [other] methods with higher levels of analysis are readily available.

5.7.3 In a further submission on 31 May 2018, the fire engineer stated the authority's "comments are incorrect", and the fire engineer is of the view the authority has not presented a valid or relevant case for its view. The fire engineer further reiterated the matter to be determined "is in relation to compliance with the Acceptable Solutions".

6. Discussion

6.1 The matter to be determined is the authority's exercise of its powers of decision in proposing to refuse to issue the building consent. In deciding this matter, I must consider the interpretation of C/AS5 with regard to how distance is measured to the relevant boundary for the purposes of considering fire spread to other property across a relevant boundary to satisfy the requirements of Clause C3.3.

6.2 The legislation

6.2.1 The relevant clauses of the Building Code are C3.3 and C3.6.

6.2.2 A functional requirement of the Clause C3 is provided in Clause C3.3:

> Buildings must be designed and constructed so that there is a low probability of fire spread to other property vertically or horizontally across a relevant boundary.

6.2.3 Clause C3.6 provides the following performance requirement:

> Buildings must be designed and constructed so that in the event of fire in the building the received radiation at the relevant boundary of the property does not exceed 30 kW/m^2 and at a distance of 1m beyond the relevant boundary of the property does not exceed 16 kW/m^2.

6.3 Acceptable Solution C/AS5

6.3.1 Section 19 of the Act provides various means to establish compliance with the Building Code including, but not limited to, compliance with the relevant Acceptable Solution.

6.3.2 Acceptable Solutions are simple, conservative, and usually step-by-step instructions which do not intend to account for every situation. Acceptable Solutions are designed as complete documents, which if followed as a whole, provide one way of complying with the relevant Building Code clauses.

6.3.3 Acceptable Solution C/AS5 if followed in whole provides one way of complying with Building Code Clauses C1-6. Specific requirements of the Acceptable Solution cannot be assessed independently of the whole document, as the Acceptable Solution has interdependencies and key assumptions. For example, the requirements for horizontal spread of fire rely on some key assumptions about the building: the expected fireload[6], that each floor of the building is a separate fire cell, and construction within 1.0m of a relevant boundary has Fire Resistance Ratings. These

[6] Fireload as defined in Clause A1 and C/AS5.

key assumptions align with the intent of Clause 3.6 which is to limit the amount of radiation received at the relevant boundary.

6.3.4 The requirements of paragraph 5.2 of C/AS5 are therefore limited by key interdependence and compliance with other parts of the Acceptable Solution. Paragraphs 5.4 to 5.6 of this determination set out assumptions made by the Ministry fire engineer, I also take these as assumptions in making my decision.

6.3.5 The primary risk group of the firecell concerned is WB, and falls within the scope of the Acceptable Solution C/AS5 ("the Acceptable Solution").

6.3.6 I have not considered whether the building and the other proposed work has features that would mean the proposal falls outside the scope of the Acceptable Solution. For the purposes of this determination, it is assumed the building and proposed work is within the scope of the Acceptable Solution.

6.4 Paragraph 5.2 of C/AS5

6.4.1 With regard to fire spread to other property across a relevant boundary, the applicable section of C/AS5 is:

> **5.2 Horizontal spread from external walls**
>
> **Separation**
>
> **5.2.1** Specific separation requirements for *unprotected areas* in *external walls* shall be applied in the following circumstances:
>
> b) If there are *unprotected areas* in *external walls* facing a *relevant boundary* to *other property* at an angle of less than 90°.

6.4.2 With respect to the setback area with the glazed wall, Paragraph 5.2.2 states:

> **5.2.2** Protection shall be achieved by using one or more of the following approaches:
>
> c) Limiting *unprotected areas* in *external walls* (see Paragraph 5.5).

6.4.3 Paragraph 5.2.7 states:

> **5.2.7** The analysis shall be done for all *external walls* of the *building* to check the permitted *unprotected area* in each wall.

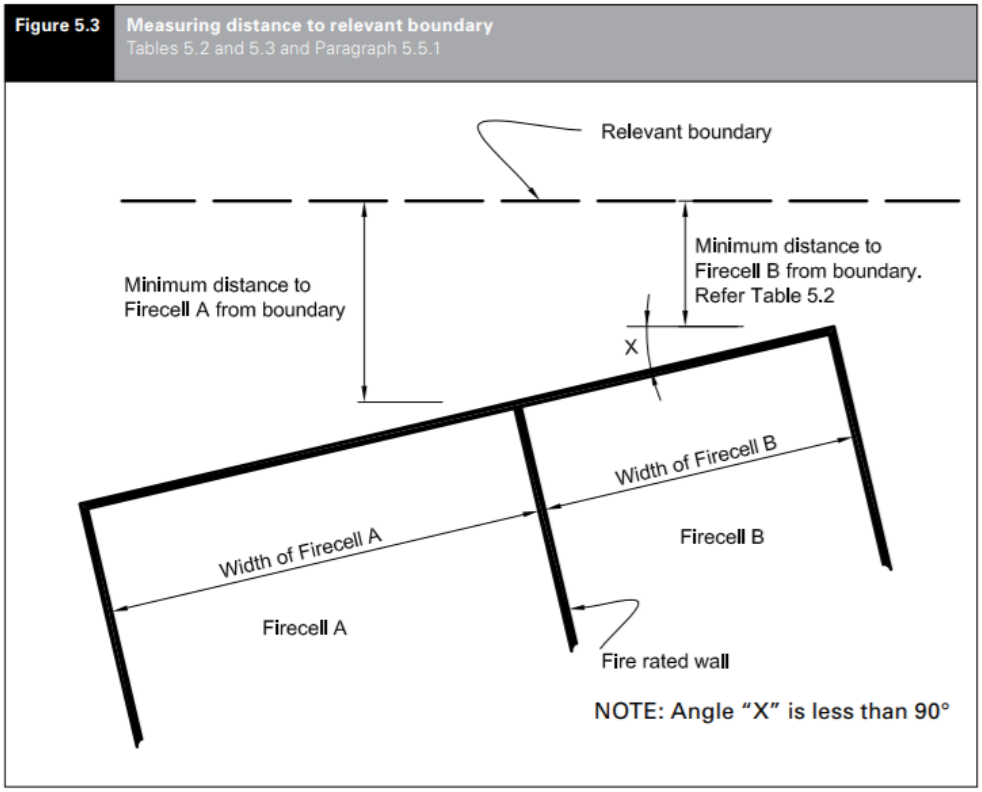
6.4.4 Paragraph 5.5 states:

> **5.5 Table method for external walls**
>
> **5.5.1** The table method for *external walls* is the means of satisfying the requirements of this Acceptable Solution for the control of external fire spread and shall be applied to *external walls of buildings* which are parallel to or angled at less than 90° to the *relevant boundary.* Table 5.2 [Tables 5.2/1 and 5.2/2] is split into three parts according to the angle incident between the subject wall and the *relevant boundary*…. (see Figures 5.2 and 5.3).

6.4.5 Paragraph 5.5.2 states:

> **5.5.2** The table method shall be used to determine the percentage of *unprotected area* in the *external wall* of each *firecell* depending on the distance to the *relevant boundary*.

6.4.6 Figure 5.3 of C/AS5 is as follows:



6.4.7 The fire engineer is of the view the distance to the relevant boundary for the purpose of establishing the requirements of the setback area is measured from the unprotected area, being the glazed wall. Taking this approach, the distance is 3.0m.

6.4.8 The authority is of the view distance to the relevant boundary is measured from the nearest part of the firecell (i.e. the distance for which the most onerous requirements apply), to the boundary as shown in Figure 5.3. In this case, with the addition of the setback area, the firecell in shape resembles the top half of the letter 'H'. As part of the firecell (the existing portion of the wall) is located on the relevant boundary, the most onerous distance from the firecell to the relevant boundary is 0.0m.

6.4.9 Distance to the relevant boundary is a crucial input to Table 5.2/1 (see Appendix B3) in order to determine the maximum percentage of permitted unprotected areas in external walls.

- Table 5.2/1 permits 30% unprotected area for external walls when the minimum distance to the relevant boundary is 3.0m.
- Table 5.2/1 permits 0% unprotected area for external walls when the minimum distance to the relevant boundary is less than 1.0m.

6.5 Interpretation of Acceptable Solution C/AS5

6.5.1 Acceptable Solution C/AS5 is not explicit as to whether irregular shaped exterior walls (i.e. elevations with setbacks) are included or excluded when considering horizontal fire spread from external walls.

6.5.2 Paragraph 5.2.1 of C/AS5 limits the horizontal fire spread requirements to 'unprotected areas in external walls facing a relevant boundary at an angle of less than 90 degrees'. The term 'firecell' or any limitation of wall geometry (i.e. irregular shaped elevations) are not included as a requirement or limitation.

6.5.3 Paragraph 5.5.1 first references Figure 5.3 in the context of determining the angle incident between the external wall and the relevant boundary (the angle incident is a critical input to Table 5.2, see Appendix B3). Paragraph 5.5.1 also does not include any explicit requirement or limitation that the minimum distance to the relevant boundary is measured from the firecell, nor does it include any limitation of wall geometry (i.e. irregular shaped elevations).

6.5.4 Figure 5.3, the interpretation of which is in dispute, does not provide any explicit information regarding the location of unprotected areas within the firecell or external wall, or any guide to interpret when unprotected areas are at differing distances to the boundary (i.e. irregular shaped buildings or elevations with setbacks). Figure 5.3 is simply an illustrative example of how to determine the minimum distance of a wall to the relevant boundary, when the wall has multiple firecells along the elevation of the wall and where the wall is located at an angle to (i.e. not parallel with) the boundary.

6.5.5 Figure 5.3 is also referenced by Table 5.2 'Minimum distance to relevant boundary (m)', with no further referenced text to suggest Figure 5.3 should be interpreted any differently to that which I have set out in paragraph 6.5.4 above.

6.5.6 Therefore, I take the view Figure 5.3 does not limit the Acceptable Solution to measuring the distance to the relevant boundary from the firecell, and does not include any limitation of wall geometry (i.e. elevations with setbacks). Rather Figure 5.3 is simply an illustrative example of the situation when an external wall has more than one firecell, or when the external wall is at an angle to the relevant boundary. The proposed building work is not comparable with the example illustrated by Figure 5.3 because the wall has one firecell, the proposed building work is parallel to the boundary, and has an irregular shaped elevation created by the setback area.

6.5.7 Where a figure illustrates a specific example and does not cover all the requirements set out in the text of the Acceptable Solution (as is the case with Figure 5.3) the text, as a more comprehensive description of the requirements, must take precedence.

6.5.8 Despite Figure 5.3 illustrating a specific situation, Figure 5.3 does illustrate and support paragraph 5.5.4 requiring 'the next lowest value for boundary distance'. In other words, distance is the closest or shortest distance (in the words of the authority and FENZ, the 'most onerous' or 'worst case' distance) to the relevant boundary. If there are two unprotected areas on the same external wall, of the same firecell, and the wall is at an angle (less than 90°) to the relevant boundary, the 'minimum distance to the relevant boundary' for the input to Table 5.2 (refer appendix B.4) for both unprotected areas, is the distance of the closest unprotected area to the relevant boundary. Figure 5.3 illustrates this requirement particularly for external walls that are not parallel to the relevant boundary.

6.5.9 My view is that paragraph 5.5.2 requires the percentage of unprotected area to be determined per external wall, and per firecell, depending on the distance from the unprotected area to the relevant boundary. I take the view that paragraph 5.5.2 also intends practitioners to measure minimum distance from the relevant boundary to an unprotected area rather than a fire cell. I also take the view paragraph 5.5.2 intends to explain that external walls, firecells and distance to the relevant boundary

can be configured in many different ways (for example, there may be more than one firecell per floor, or an external wall may form the enclosure of more than one firecell, or there may be varying distances to the relevant boundary) but that assessment of each configuration is required.

6.5.10 In conjunction with paragraph 5.5.2, paragraph 5.2.7 of C/AS5 requires 'analysis shall be done for all external walls of the building to check the permitted unprotected area in each wall'.

6.5.11 I note the definition of external wall in C/AS5 as 'any exterior face … intended to provide protection against the outdoor environment, but which may also contain unprotected areas' and firecell as 'any space including a group of contiguous spaces … which is enclosed by any combination of fire separations, external walls, roofs, and floors.

6.5.12 In the case of the subject building, the external wall (which in this case forms part of the enclosure of a single firecell) is parallel to, but varies in distance to the relevant boundary. Table 5.2 (in accordance with paragraph 5.2.5 of the Acceptable Solution) only applies to walls that are 1.0m or more from the relevant boundary. I note the remaining parts of the existing external wall (i.e. parts of the wall that are not included in the setback area) are within 1.0m of the relevant boundary. The remaining parts of the external wall are not permitted to contain unprotected areas so assessment is of the parts of the wall permitted to contain unprotected areas (i.e. the setback area).

6.5.13 I note the assessment of each external wall to check the permitted unprotected area must still satisfy the requirements of paragraphs 5.5.5 and 5.5.6 of the Acceptable Solution.

6.5.14 Based on my discussion above, I take the view, and concur with the Ministry fire engineer in this matter, that the minimum distance is intended to be measured from the unprotected area to the relevant boundary.

6.5.15 In summary of my discussion above, I take the view that the Acceptable Solution permits the following: Where there is a collection of unprotected areas that face onto the same relevant boundary, and those unprotected areas are located at different separation distances to the relevant boundary, then the shortest separation distance from an unprotected area within a firecell to the relevant boundary is to be used.

6.5.16 In the case of the proposed building work, the minimum distance to the relevant boundary is measured from the unprotected area (the glazed wall of the setback area). The minimum distance is 3.0m.

6.6 Paragraph 5.5.7 of C/AS5

6.6.1 Acceptable Solution C/AS5 paragraph 5.57 also provides an alternative method for the control of external fire spread.

6.6.2 Paragraph 5.5.7 states:

> **5.5.7** As an alternative to the table method the Commentary to Verification Method Appendix A: Methodology for Horizontal Fire Spread (Tabular Data) can be used. For this method the tables for *unprotected area* together with wing/return wall tables in the Commentary must be used together.

6.6.3 I note paragraph 5.5.7 is supplemented with the comment "This method requires a higher level of understanding of spread of fire to other property and should only be used by suitably qualified and experienced designers". I note in this case the fire engineer is a Chartered Professional Engineer (Fire).

6.6.4 This clause permits additional methods for the control of external fire spread by referencing "Commentary to Verification Method Appendix A: Methodology for Horizontal Fire Spread (Tabular Data)"[7] ("The commentary"), a guidance document issued by the Ministry under section 175 of the Act.

6.6.5 Appendix A of the commentary includes four 'methods' for limiting unprotected areas in external walls. Methods range from 'small openings and fire rated glazing' to 'enclosing rectangle' methods (which specifically provides for irregular shaped buildings), to 'Return walls and wing walls'. The enclosing rectangle method explicitly requires that the distance to the relevant boundary "shall be the shortest distance between that boundary and the closest projected unprotected area [my emphasis]".

6.6.6 Some of these methods allow for a more granular assessment, measuring distance to the boundary in 0.1m increments, as opposed to the 1.0m increments used in the Acceptable Solution (Table 5.2). These methods provide an 'in-between' of the Acceptable Solution and the radiation calculations of the Verification Method C/VM2.

6.6.7 In the case of the proposed building work, using the enclosing rectangle method, the minimum distance is from the unprotected area (the glazed wall of the setback area) to the relevant boundary. The minimum distance is 3.0m.

6.6.8 I note FENZ has submitted that the availability of C/AS5 paragraph 5.5.7 (which includes methodologies which specifically accommodate irregular shaped elevations) highlights a limitation to paragraph 5.5 'table method' to linear walls. I note paragraph 5.5.7 was inserted into C/AS5 in Amendment 4 which came into effect January 2017, some five years after the first publication of the Acceptable Solution. Taking into consideration paragraph 5.5.7 was inserted some years after the original version of C/AS5 was drafted and came into effect, I consider C/AS5 did not intend to provide several methodologies which applied to different situations. I therefore consider the simple availability of paragraph 5.5.7 does not limit paragraph 5.5 'Table method' to linear walls.

6.7 Conclusion

6.7.1 Taking into account the evidence and reasoning outlined above, I conclude that the authority is incorrect in its interpretation of the Acceptable Solution C/AS5 with regard to how distance is measured to the relevant boundary for the purposes of considering fire spread to other property across a relevant boundary.

[7] https://www.building.govt.nz/assets/Uploads/building-code-compliance/c-protection-from-fire/asvm/cvm2-protection-from-fire-amendment-2-commentary.pdf

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the authority was incorrect in proposing to refuse to issue the building consent on the basis of its interpretation of C/AS5 with respect to fire protection of other property.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 2 October 2018.

Katie Gordon
Manager Determinations

Appendix A: The legislation

A.1 The relevant clauses of the Building Code are Functional Requirement C3.3 and Performance Requirement C3.6.

C3—Fire affecting areas beyond the fire source

Functional requirement

C3.3 Buildings must be designed and constructed so that there is a low probability of fire spread to other property vertically or horizontally across a relevant boundary.

Performance

C3.6 Buildings must be designed and constructed so that in the event of fire in the building the received radiation at the relevant boundary of the property does not exceed 30 kW/m^2 and at a distance of 1m beyond the relevant boundary of the property does not exceed 16 kW/m^2.

Appendix B: The Acceptable Solution

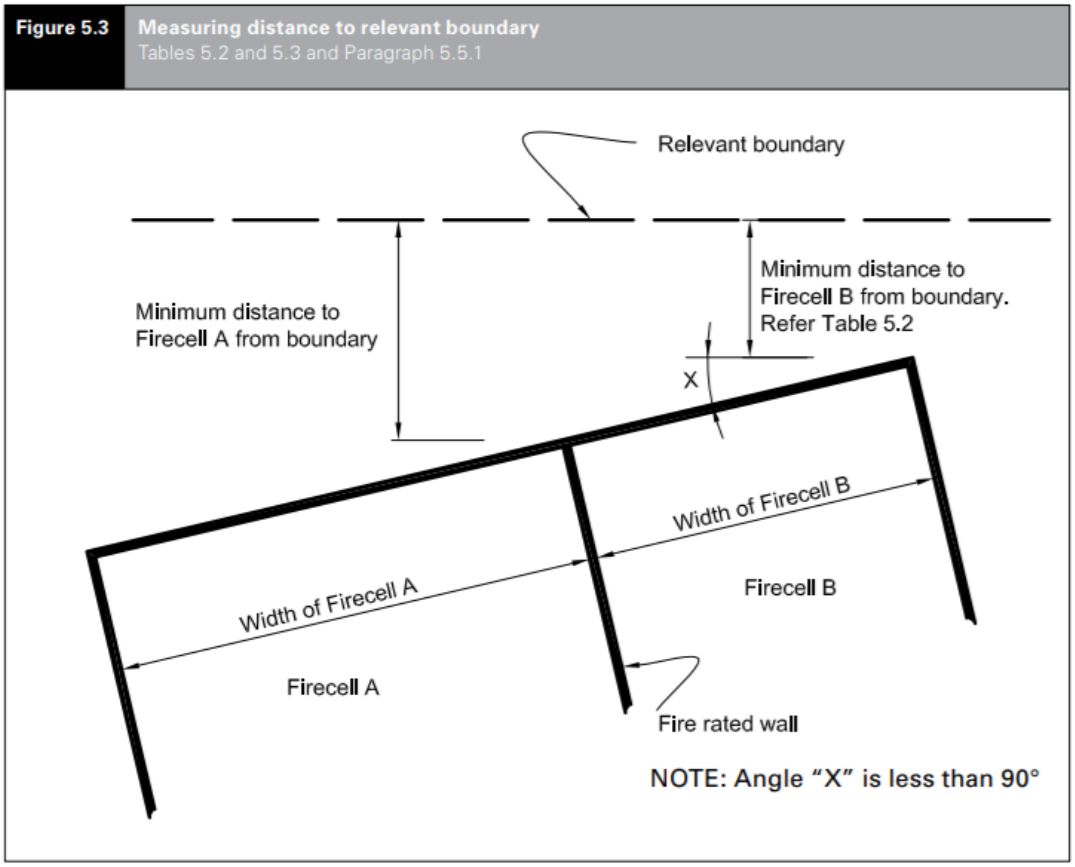
B.1 The relevant definitions in the Acceptable Solution, C/AS5, include:

> **External wall** Any exterior face of a *building* within 30° of vertical, consisting of *primary* and/or *secondary elements* intended to provide protection against the outdoor environment, but which may also contain *unprotected areas*.
>
> **Firecell** Any space including a group of contiguous spaces on the same or different levels within a *building*, which is enclosed by any combination of *fire separations*, *external walls*, roofs, and floors.
>
> **Unprotected area** In relation to an *external wall* of a *building*, this means:
>
> a) Any part of the *external wall* which is not *fire* rated or has less than the required *FRR*, and
>
> b) Any part of the *external wall* which has combustible material more than 1.0 mm thick attached or applied to its external face, whether for cladding or any other purpose.

B.2 The relevant paragraphs of the Acceptable Solution, C/AS5, include:

> **5.2 Horizontal spread from external walls**
>
> **Separation**
>
> **5.2.1** Specific separation requirements for *unprotected areas* in *external walls* shall be applied in the following circumstances:
>
> b) If there are *unprotected areas* in *external walls* facing a *relevant boundary* to *other property* at an angle of less than 90°.
>
> …
>
> **5.2.2** Protection shall be achieved by using one or more of the following approaches:
>
> c) Limiting *unprotected areas* in *external walls* (see Paragraph 5.5).
>
> …
>
> **5.2.7** The analysis shall be done for all *external walls* of the *building* to check the permitted *unprotected area* in each wall.
>
> …
>
> **5.5 Table method for external walls**
>
> **5.5.1** The table method for *external walls* is the means of satisfying the requirements of this Acceptable Solution for the control of external fire spread and shall be applied to *external walls of buildings* which are parallel to or angled at less than 90° to the *relevant boundary.* Table 5.2 [Tables 5.2/1 and 5.2/2] is split into three parts according to the angle incident between the subject wall and the *relevant boundary*. If the wall is parallel to the boundary or the angle is less than 45°, then columns 2 and 3 shall be used (see Figures 5.2 and 5.3).
>
> …
>
> **5.5.2** The table method shall be used to determine the percentage of *unprotected area* in the *external wall* of each *firecell* depending on the distance to the *relevant boundary*.
>
> …
>
> **5.5.7** As an alternative to the table method the Commentary to Verification Method Appendix A: Methodology for Horizontal Fire Spread (Tabular Data) can be used. For this method the tables for *unprotected area* together with wing/return wall tables in the Commentary must be used together.

B.3 The relevant figure from C/AS5 (Figure 5.3):



B.4 The relevant Table from C/AS5 (Table 5.2/1):

Table 5.2/1	**Maximum percentage of unprotected area for external walls**											
Risk group WB	**Firecells other than warehouses with storage height greater than 3.0 m but less than 5.0 m**											
	Percentage of wall area allowed to be unprotected											
	Column 2		Column 3		Column 4		Column 5		Column 6		Column 7	
Minimum distance to *relevant boundary* (m) (see Figure 5.3)	Angle between wall and *relevant boundary* up to 45°				Angle between wall and *relevant boundary* 46° to 60°				Angle between wall and *relevant boundary* 61° to 89°			
	Width of unsprinklered *firecell*		Width of sprinklered *firecell*		Width of unsprinklered firecell		Width of sprinklered *firecell*		Width of unsprinklered *firecell*		Width of sprinklered *firecell*	
	Up to 10 m	Greater than 10 m	Up to 10 m	Greater than 10 m	Up to 10 m	Greater than 10 m	Up to 10 m	Greater than 10 m	Up to 10 m	Greater than 10 m	Up to 10 m	Greater than 10 m
Less than 1	0	0	0	0	0	0	0	0	0	0	0	0
1	20	20	40	40	20	20	40	40	25	20	50	40
2	25	25	50	50	30	25	60	50	35	25	70	50
3	30	30	60	60	40	30	80	60	40	30	80	60
4	40	35	80	70	50	35	100	70	50	40	100	80
5	50	40	100	80	65	40		80	60	50		100
6	60	50		100	80	50		100	75	60		
7	75	55			90	60			90	75		
8	90	60			100	70			100	90		
9	100	70				80				100		
10		80				90						
11		90				100						
12		100										

A. The authority's view of percentage of permitted unprotected area

F. The fire engineer's view of percentage of permitted unprotected area