



Department of
Building and Housing
Te Tari Kaupapa Whare

Non load-bearing timber issues – guidance information for building consent authorities

December 2008



PURPOSE

This document provides guidance¹ for building consent authorities (BCAs) on how to check whether appropriate timber has been used in buildings for compliance with Building Code Clause B1 Structure. It is in response to recent concerns about allegations of non load-bearing timber being used in prefabricated frames and trusses.

Specifically, the document outlines the processes BCAs should use to:

- identify building projects under construction that may be affected by non load-bearing timber
- consider remedial options
- confirm compliance of buildings where suspected non load-bearing timber may have been used.

The document is also intended to help BCAs answer enquires from consent applicants, building practitioners and the general public.

The focus of the guidance is on the performance of the building and its compliance with the Building Code. It does not address contractual issues between the owner and contractor or supplier about whether the material specified and ordered has been supplied.

WHAT IS A PRE-FABRICATED FRAME AND TRUSS?

In New Zealand, most new houses, light commercial buildings and small public buildings, such as schools, are built using pre-nailed frames and roof trusses. Using them speeds up and simplifies the building process by reducing the amount of carpentry work required on site. A network of frame and truss manufacturers throughout the country serves this market. Many are members of the Frame and Truss Manufacturers Association of New Zealand.

BACKGROUND

In mid-November 2008 the Frame and Truss Manufacturers Association of New Zealand (FTMA) released a letter to its members alleging the use of non-load bearing timber in some trusses and frames. The letter also alleged that this practice may have been in use in the Auckland region for the past 18 months.

¹ This document has been prepared by the Department of Building and Housing (the Department) as guidance information in accordance with section 175 of the Building Act.

The Department of Building and Housing (the Department) investigated the alleged problem at the request of the Hon Maurice Williamson, Minister for Building and Construction.

The Department found evidence of non load-bearing timber used in frames and trusses in some new houses built in the Auckland region and Whangarei since April 2007.

The Department considers that there is no immediate life safety issue or danger of buildings collapsing from this use of non load-bearing timber.

The Department's enquires to date have indicated that this is a very localised and isolated issue.

The following guidance is provided for building consent authorities to deal with any suspected incorrect use of non load-bearing timber.

KEY ISSUES

- Non load-bearing timber has been used in frames and trusses in some new houses built in the Auckland and Northland area since April 2007.
- The Department considers that there is no immediate life safety issue or danger buildings collapsing. Independent tests undertaken on some of this non load-bearing timber support this advice. There may be a small increase in the movement of the building under load (ie, it may be slightly more flexible).
- The Department's enquires to date have indicated that this is a localised issue, potentially affecting only some buildings constructed in the last 18 months and primarily restricted to a small number of frame and truss manufacturers in the Auckland and Northland areas.
- In the industry there is currently a lack of consistency around how the strength/grade of the timber is actually marked on the timber. Red marks on timber do not necessarily mean the timber is non load-bearing. The Department's enquires to date indicate that some timber has been mechanically re-graded, and independently verified as structural timber, but has not been re-marked as such (and still may bear non load-bearing markings). Carter Holt Harvey has also stated that some of its structural load-bearing timber has also been accidentally contaminated with red paint marks.

WHAT TECHNICAL INFORMATION DO BUILDING INSPECTORS NEED TO KNOW?

In the first instance it is important to ensure inspection staff have good knowledge and understanding of timber-grading issues. Timber strength and grading issues should also be a current topic of discussion at regular technical meetings of building control staff.

As a starting point, all appropriate BCA technical staff and contractors should understand the processes used to verify timber properties. In summary these are as follows.

- To ensure compliance with the performance requirements of the New Zealand Building Code, timber used for structural purposes on site needs to have the structural properties that have been assumed by the designer in the design of the building.
- If the designer is using the Compliance documents to demonstrate compliance with the Building Code then there are three main classes of timber grading: machine stress graded and verified (MSG); visually stress-graded and verified (VSG) and visually graded and unverified (No. 1 Framing Grade).
- Structural timber used in frame and truss must be graded in one of three grading classes: machine stress-graded and verified (MSG); visually stress graded and verified (VSG); and visually graded and unverified (No. 1 Framing Grade).

- To be graded 'MSG', timber is passed through a stress-grading machine to determine the strength (point at which the timber breaks) and stiffness (the amount the timber will bend under a given load ie, flexibility). These results are then verified by physically testing samples on a statistical basis to ensure the stress-grading machine is calibrated correctly. The whole process must be independently audited.
- To be graded 'VSG', timber is visually graded in accordance with well-established rules that will limit the physical defects in the timber, such as knots, splits, etc. This is verified on a sampled basis by physically testing the strength and stiffness of each test sample. This ensures the visually graded timber will have adequate structural properties to meet the grading requirements. This process must also be independently audited.
- To be graded 'No. 1 Framing Grade', timber is visually graded according to the same visual grading rules as VSG. However, there is no subsequent verification or audit process. The structural design properties of this timber is limited to the lowest verified grade MSG 6.

The Department is aware of different approaches being taken in regard of non load-bearing timber. One of these the Department considers appropriate involves the following steps.

- Removing defects and low grade sections of the timber
- Re-stress grading through the stress grade machines
- Verification as required by NZS 3622
- Independent auditing of the process by independent verifiers

BCA technical staff should also be familiar with the following publications which provide more information and background to the processes described above.

- Standards New Zealand's guidance document: *Important additions and changes to Timber Framed Buildings – NZS 3604*. Available at: <http://www.standards.co.nz/NR/rdonlyres/0206C4B4-7E8E-4641-8E33-57E4DDA26857/0/3604brochurefinalJULY2006.pdf>
- The Department of Building and Housing's *Codewords* article, July 2007, 'New rules for timber framing for housing'. Available at: <http://www.dbh.govt.nz/codewords-21-article-6>
- The Department of Building and Housing's Building Controls Update, 14 September 2006: *Department references amendments to timber Standards in the Compliance Document for Clause B1 (Structure)*. Available at: <http://www.dbh.govt.nz/bcupdate-article-45>
- New Zealand Standard NZS 3622 (2004): *Verification of Timber Properties*. Available from Standards New Zealand.
- New Zealand Standard NZS 3631 (1988): *New Zealand Timber Grading Rules*. Available from Standards New Zealand.
- New Zealand Standard NZS 3604 (1999): *Timber Framed Buildings*. Available from Standards New Zealand.
- New Zealand Standard NZS 3603 (1992): *Timber Structures*. Available from Standards New Zealand.
- The Carter Holt Harvey bulletin provides guidance for the identification of possible non load-bearing timber. Available at: [www.laserframe.co.nz/UserFiles/Laserframe/file/Bulletin%20-%20Identification%20of%20NLB%20Timber%20\(Dec%202008\).pdf](http://www.laserframe.co.nz/UserFiles/Laserframe/file/Bulletin%20-%20Identification%20of%20NLB%20Timber%20(Dec%202008).pdf)

BCAs should ensure all inspectors sent on site are competent to do the inspection and are not working outside their technical limitations (regulation 9 of the Building (Accreditation of Building Consent Authorities) Regulations 2006 requires the allocation of work to competent employees or contractors).

If an inspector is in doubt, they should consult with their technical leaders or a recognised timber and Building Code Clause B1 specialist within their BCA, or a neighbouring BCA in the first instance.

STEP 1: How do you identify building projects under construction that may be affected by non load-bearing timber?

What signs should building inspectors and building practitioners look for?

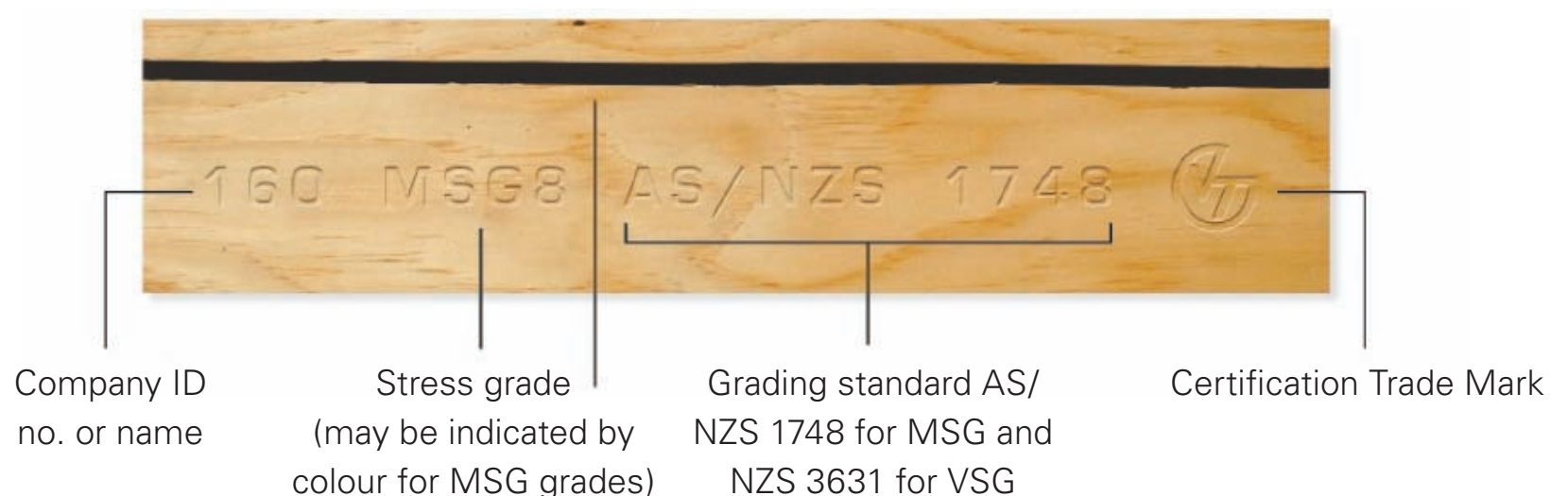
There are a number of key signs to look out for that could indicate a building may be affected by non load-bearing timber. These include:

- red markings on the timber (note: these don't always mean the timber is under strength)
- multiple colour markings or branding
- unmarked timber used in structural situations
- grade markings that have been obliterated or removed and replaced
- large knots in timber or other obvious defects in the timber (particularly if they are at the edge of the timber and exceed 50% of the width)
- visual signs of deformity to timber, particularly at the lower end of a chord of a truss
- no. 1 framing timber used for roof trusses
- documentation identifying the truss and frame manufacturer that gives you cause for concern.

Verified timber MSG and VSG graded must be marked with certain minimum information at 1500 mm centres, which includes:

- the identity of the grading organisation (represented by a number)
- the stress grade at close intervals along the length of each stick eg, 'MSG 8' or coloured paint markings along the timber (black for MSG 8, green for MSG 10)
- the grading Standard used (AS/NZS 1748 for machine stress-graded, NZS 3631 for visual graded)
- the date of production.

Figure 1: A model example of timber marking requirements.



What information should inspectors collect as part of the identification process?

BCA inspectors should identify, collect, and record in the consent file:

- the name and details of the original mill the timber was sourced from
- the manufacturer of the timber frames or trusses
- photos of the markings or branding (or lack of) on the timber
- photos of the timber's quality (eg, of any large or excessive defects such as large knots in the timber)
- what documentation exists on the timber frames and trusses (producer statements, frame and truss plans, specifications, etc).

Any other intelligence received from building suppliers, manufacturers, building practitioners or the public should be considered, recorded and filed. This could include:

- verbal conversations (phone or in person)
- letters/emails
- notifications from industry stakeholders (eg, press releases, articles)
- communications from other BCAs and guidance from the Department of Building and Housing
- relevant technical publications (eg, BRANZ).

STEP 2: What is the extent of the problem for each case?

Is the timber being used in an area of the building that actually needs structural timber?

Inspectors should consider the following issues.

- Where is the suspect timber located in the building? For example, timber used in structural situations (eg, roof trusses or load bearing walls) will need further investigation. However, if the timber is located in a non load-bearing and non-braced wall, then compliance with the Building Code may be achieved with non load-bearing timber.
- How extensively has the suspect timber been used throughout the building? For example, if only two studs have been identified as being potentially non load-bearing, then it may be a simple site instruction to replace the studs. However, if the suspect timber is used extensively throughout the building, then the options listed further in this document should be considered.
- Is the affected member redundant? In many parts of the building there are clusters of timber members located in areas such as wall junctions, columns, and openings in walls. Where a suspected non load-bearing timber member is used and is surrounded by structural timber, then this may easily comply with the Building Code.

Such considerations will help inspectors make a decision about whether the timber actually needs to be of a particular structural grade and whether or not there is in fact an issue needing to be addressed.

STEP 3: What are the solutions for consent applicants?

If there are concerns that non load-bearing timber have been used and presents a problem, there are a range of options available to consent applicants. The Building Act 2004 and Building Code enable a range of possible solutions. The minimum three options a BCA should provide to all consent applicants are provided below.

- **Option 1.** Confirming that the properties of the timber being used are in accordance with the consented documents and the engineered truss design. Where the owner decides to provide information verifying that the timber installed is structural timber, this should not be considered an amendment to the building consent as it simply complies with the original consent documentation. However, records of this confirmation and any decisions around this must be well recorded by the BCA on the consent file.
- **Option 2.** Keep the suspect timber in place, but use an engineered solution to ensure sufficient structural integrity is still achieved for compliance with Clause B1 Structure of the Building Code. In some cases this engineered solution may involve remedial works, in other cases it may not. Where an engineered solution is sought, this should be considered as an amendment to the building consent unless the engineered solution simply verifies that the structural integrity is not prejudiced by the use of suspect timber. However, records of this confirmation and any decisions around this must be well recorded during inspection and processing by the BCA on the consent file.

- **Option 3.** Removing and replacing the suspect timber with new timber that has verified timber properties. Where the issue is caught early (eg, at pre-wrap inspection), this may be a sensible option for the owner to consider. Where the owner elects to remove and replace suspect timber, this should not be considered an amendment to the building consent as it simply complies with the original consent documentation. However, decisions around this must be well recorded by the BCA on the consent file.

A blanket policy approach where BCAs mandate only one solution (eg, requiring replacement and removal of the suspect timber in all cases) is inconsistent with the Building Act 2004 and considered inappropriate by the Department. The reason for this is that the Building Act 2004 allows a consent applicant to apply to amend a building consent. This amendment could include an alternative solution proposal or other compliance path that may show that compliance with the performance requirements of the Building Code is achieved.

STEP 4: How do you confirm compliance on buildings under construction?

If a BCA has reasonable cause to believe that non load-bearing timber may have been used on any given building project, then it is important that an appropriate process is undertaken by the BCA to confirm if this is the case and to then manage an appropriate solution.

Guidance for considering documentation

Producer statements or other statements from experts are tools that BCAs can use to help confirm the strength of the timber or that compliance with the Building Code is achieved. Examples include the following.

- A producer statement from a truss and frame manufacturer. Such producer statements should:
 - include an explicit statement that the timber grade/strength in accordance with the specific truss design
 - confirm the timber treatment used
 - be specific to the project (eg, identify the physical address or consent number)
 - be signed by an author who is appropriately competent to make the statement (eg, technical detailers, manufacturing supervisors)
 - confirm if any design standards have been used to establish compliance (eg, NZS 3622).
 - confirm what wind zone the frames and trusses have been designed for.
- A producer statement from an engineer. Such producer statements should:
 - include an explicit statement as to which Building Code clause compliance is achieved against (eg, confirming compliance with B1 Structure and B2 Durability)
 - be specific to the project (eg, identify the physical address or consent number)
 - be signed by an author who is appropriately competent to make the statement (eg, a chartered professional structural engineer)
 - confirm if any standards have been used to establish compliance (eg, NZS 3622).

All producer statements from engineers should be accompanied by design calculations that show a good engineering process has been followed. This will include:

- ensuring the engineering assessment has been carried out by someone with appropriate engineering expertise (eg, CPEng with experience in timber design)
- evidence that the material being used has been reasonably assessed for strength and stiffness properties (eg, adequate random sampling of the material tested to provide reasonable assurance of the nature of the material)

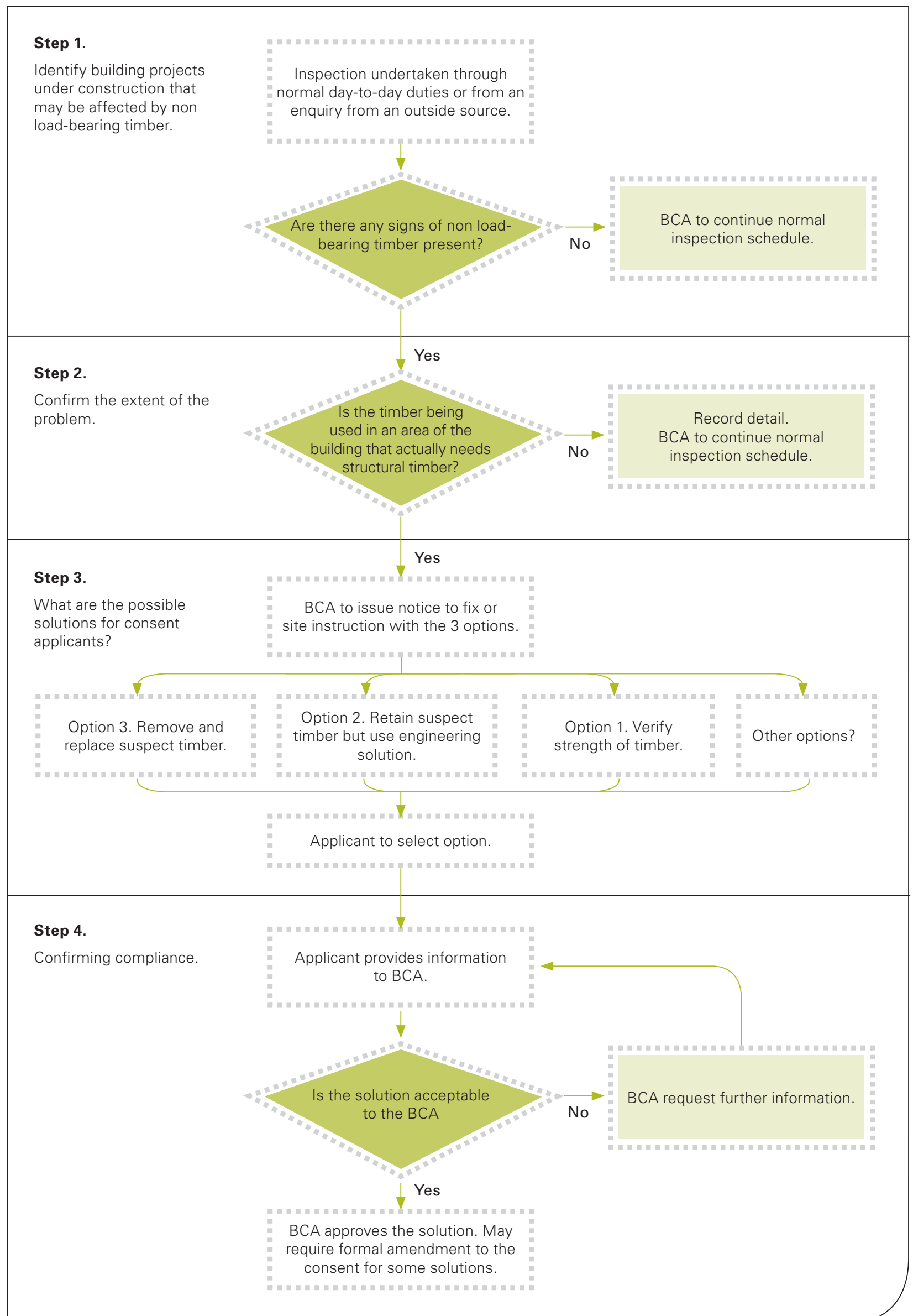
- the design has been recalculated using realistic material properties from testing undertaken. For guidance on the use of producer statements please refer to the *Building consent authority (BCA) update* - October 2008 Available at: <http://www.dbh.govt.nz/bca-update-october-2008>

- Written statements or reports on timber or timber re-grading processes from suitably qualified parties such as recognised independent timber grading specialists/verifiers. These include organisations such as: GradeRight (NZ) Limited, Bureau Veritas, and Verified Timber.

For guidance on the assessment of alternative solutions please refer to *Means of establishing compliance: alternative solutions*. Available at: <http://www.dbh.govt.nz/UserFiles/File/Publications/Building/Guidance-information/pdf/alternative-solutions.pdf>

For guidance on assessing and actioning amendments to building consents, please refer to the Department's *Guide to building consent amendments*, available at: www.dbh.govt.nz/publications-about-the-building-act-2004

SUMMARY OF THE PROCESS



APPENDIX 1

Answers to anticipated questions from building practitioners and the public

The responsibility for establishing compliance with the Building Code sits with each local building consent authority (BCA). The Building Act 2004 provides BCAs with the tools to do this (eg, building consents and amendments, notices to fix and building inspections).

BCAs need to reassure building owners that these are rare cases and the likelihood of failure is small.

Question: I have an existing house built in 2004. Could this contain non load-bearing timber?

Answer: Buildings older than two years are unlikely to be affected.

Question: My house in Auckland was built within the last two years and approved by Council. How can I be sure I do not have non load-bearing timber in it?

Answer: BCAs need to reassure homeowners that these cases are not widespread and the likelihood of failure is small. However, there are some key questions that the BCA can talk over with the person (see below). If, after discussing such questions, the homeowner is still concerned, then you could advise them that there are technical specialists they could employ to provide further advice (eg, a structural engineer or a timber grader/verifier).

Question: What does the affected timber look like?

Answer: There are a number of signs that may indicate that the timber could be non load-bearing. These include:

- red markings on the timber (note: these don't always mean the timber is under strength)
 - multiple colour markings or branding
 - unmarked timber used in structural situations
 - large knots in timber or other obvious defects
 - visual signs of deformity to timber, particularly with the lower chord of a truss.
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Question: What are local and central government agencies doing about it?

Answer: Councils are putting in place processes to identify and deal with cases of suspected non load-bearing timber during construction. The Department of Building and Housing has investigated and provided advice and guidance to local councils so they can handle this issue on a case-by-case basis.

Question: Is my house going to fall down?

Answer: There is no immediate life safety issue. There is currently no evidence indicating that buildings affected pose a risk of collapsing from non load-bearing timber.

Question: If non load-bearing timber is found to be in my house under construction, what are my options?

Answer: Three options are detailed, for buildings under construction, in the information provided below.

- **Option 1** – Verifying the strength of the timber on site is in accordance with the consented documents and the engineered truss design. Where the owner decides to provide information verifying that the timber installed is structural timber, this should not be considered an amendment to the building consent as it simply complies with the original consent documentation.
- **Option 2** – Keep the suspect timber in place, but use an engineered solution to ensure sufficient structural integrity is still achieved for compliance with Clause B1 Structure of the Building Code. In some cases this may involve remedial works, in other cases it may not. Where an engineered solution is sought, this should be considered as an amendment to the building consent, whether remedial works are required as part of this solution or not.
- **Option 3** – Removing and replacing the suspect timber with new timber of a confirmed strength. Where the issue is caught early (eg, at pre-wrap inspection), this may be a sensible option for the owner to consider. Where the owner does elect to remove and replace suspect timber, this should not be considered an amendment to the building consent as it simply complies with the original consent documentation.

Question: How can I tell if my house or building project may contain non load-bearing timber?

Answer: BCAs should talk to the person and obtain some basic information to help narrow down whether it could be a problem. The following questions could be asked:

- Is your building under construction? *If it is, then BCAs should look at timber-strength issues during their building inspections.*
- How old is the building concerned? *Buildings older than two years are unlikely to be affected.*
- Where is the building?
- Does the person know who the truss and frame manufacturer is, or can they find out? *At the moment this appears to be localised to a small number of frame and truss manufacturers in the Auckland region.*
- What kind of marks are on the timber? *Colour, branding stamps, etc*

Question: Who is going to pay to fix my problem?

Answer: You should seek independent legal advice.

FURTHER INFORMATION FOR BCAS

Depending on the answers to such questions, BCAs will need to consider whether further investigation is warranted.

If **building officials** in BCAs have any further questions around processes for handling these issues **they** can call the Department's Consent Authority Capability and Performance Group for advice on 0800 242 243 or email: info@dbh.govt.nz attention the Consent Authority Capability and Performance Group.