METHODOLOGY

EPB methodology

The methodology to identify earthquake-prone buildings

MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

JULY 2017

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Ministry of Business, Innovation and Employment (MBIE)

Hīkina Whakatutuki Lifting to make successful

MBIE develops and delivers policy, services, advice and regulation to support economic growth and the prosperity and wellbeing of New Zealanders.

ISBN 978-1-98-851789-6 (Print)
ISBN 978-1-98-851790-2 (Online)

Enquiries about the content of this document should be directed to:

Ministry of Business, Innovation and Employment
PO Box 1473, Wellington.
Telephone 0800 242 243
Email: info@building.govt.nz

New Zealand Government

Introduction

This methodology is set by the Chief Executive of the Ministry of Business, Innovation and Employment under section 133AV of the *Building Act 2004*. *This methodology* is for the identification of earthquake-prone buildings, which are defined in section 133AB of the *Building Act 2004*.

This methodology is a disallowable instrument under section 38 of the Legislation Act 2012.

This methodology is part of the system for managing earthquake-prone buildings. The structure of the system is shown in Figure 1.

Figure 1: **The structure of the system for managing earthquake-prone buildings**

Building Act 2004	→	sets the core framework for managing earthquake-prone buildings
Regulations	→	define key terms including ultimate capacity and moderate earthquake, and set criteria for substantial alterations, characteristics for exemptions and categories of earthquake ratings
EPB methodology	→	sets out how to identify earthquake-prone buildings
Engineering Assessment Guidelines	→	set the technical methods for engineering assessments of buildings
EPB register	→	a national, publicly accessible register of earthquake-prone buildings

Document History

Status	Date	Alterations
Version 1	3 July 2017	
Version 1 – Reprint 1	30 November 2018	Engineering Assessment Guidelines source location changed to: www.building.govt.nz

Contents

Referenced document

This methodology refers to the following document:

> The Seismic Assessment of Existing Buildings: Technical Guidelines for Engineering Assessments, July 2017, Version 1, referred to as the *Engineering Assessment Guidelines within this methodology*.'

and its sections:

> Part A Assessment Objectives and Principles; referred to as *Part A* within *this methodology*
> Part B Initial Seismic Assessment; referred to as *Part B* within *this methodology*
> Part C Detailed Seismic Assessment; referred to as *Part C* within *this methodology*.

The *Engineering Assessment Guidelines* are available from: www.building.govt.nz.

Definitions

Building Act 2004 (Building Act)	is the principal legislation dealing with building controls in New Zealand.
Commencement	is the date that Subpart 6A of Part 2 of the *Building Act 2004*, and associated amendments to other sections, came into force.
Critical Structural Weakness	is the lowest scoring structural weakness determined from a *Detailed Seismic Assessment* meeting the requirements of *Part C* of the *Engineering Assessment Guidelines*. For an *Initial Seismic Assessment* meeting the requirements of *Part B* of the *Engineering Assessment Guidelines*, all structural weaknesses are considered to be potential *Critical Structural Weaknesses*.
Detailed Engineering Evaluation	An assessment carried out to evaluate buildings following the 2010-2011 Canterbury earthquake sequence. It was only intended for use following an earthquake that causes damage to buildings and is now called a Detailed Damage Evaluation.
Detailed Seismic Assessment	A seismic assessment carried out in accordance with *Part C* of the *Engineering Assessment Guidelines*. It is a comprehensive quantitative assessment of the strength and deformation capability of a building.
Earthquake rating	has the meaning defined in section 133AC of the *Building Act 2004*.
Engineering assessment	has the meaning defined in section 7 of the *Building Act 2004*.
High seismic risk	has the meaning defined in section 133AD of the *Building Act 2004*.
Initial Evaluation Procedure	The quantitative steps that are part of the *Initial Seismic Assessment* process.
Initial Seismic Assessment	A seismic assessment carried out in accordance with *Part B* of the *Engineering Assessment Guidelines*. It is the recommended first qualitative step in a *Detailed Seismic Assessment*.
Low seismic risk	has the meaning defined in section 133AD of the *Building Act 2004*.

Medium seismic risk	has the meaning defined in section 133AD of the *Building Act 2004*.
Mode of failure and physical consequence	is the manner and extent to which any element scoring less than 34%NBS could collapse or fail and its physical consequence. There may more than one mode of failure and physical consequence.
Moderate earthquake	has the meaning defined in the Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005 (as amended).
Owner	has the meaning defined in section 7 of the *Building Act 2004*.
Previous assessment	An assessment carried out by an engineer before commencement of Subpart 6A of Part 2 of the *Building Act 2004*. A *previous assessment* may have been commissioned by a *territorial authority* or an *owner*.
Territorial authority	has the meaning defined in section 7 of the *Building Act 2004*.
This methodology	The EPB methodology, which has the meaning defined in section 7 of the *Building Act 2004*.
Ultimate capacity	has the meaning defined in the Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005 (as amended).
%NBS	The rating given to a building as a whole expressed as a percent of new building standard achieved, based on an assessment of the expected seismic performance of an existing building relative to the minimum that would apply under the Building Code (Schedule 1 to the Building Regulations 1992) to a new building on the same site with respect to life safety. A score for an individual building element is also expressed as a percent of new building standard achieved. This is expected to reflect the degree to which the individual element is expected to perform in earthquake shaking compared with the minimum performance prescribed for the element in Clause B1 of the Building Code (Schedule 1 to the Building Regulations 1992) with respect to life safety. The *%NBS* rating for the building as a whole takes account of, and may be governed by, the scores for individual building elements.

Section 1: Territorial authorities identify potentially earthquake-prone buildings

This section is for territorial authorities.
It covers:

- what the profile categories are and how to use them to identify potentially earthquake-prone buildings
- how to identify other buildings as potentially earthquake prone at any time.

1.1 Scope for identifying these buildings

This methodology sets out how a *territorial authority* must identify potentially earthquake-prone buildings.

The *territorial authority*:

i. must identify potentially earthquake-prone buildings that fall within the categories of buildings, known as profile categories, specified in section 1.2 of *this methodology* within the time frames specified in section 133AG(4) of the *Building Act*

ii. may identify a building as potentially earthquake prone at any time under section 133AG(3) of the *Building Act* if it has reason to suspect the building may be earthquake prone. Reasons that may cause a *territorial authority* to suspect a building may be earthquake prone are set out in section 1.3 of *this methodology*.

The *territorial authority* must notify the *owner* and request an *engineering assessment* in accordance with section 133AH of the *Building Act*.

Before applying the profile categories to identify potentially earthquake-prone buildings, a *territorial authority* should consider: how it has identified earthquake-prone buildings prior to *commencement* of the *Building Act*; whether buildings in one or more of the applicable profile categories have previously been identified as potentially earthquake prone or earthquake prone; and the information held about these buildings, eg a *previous assessment*.

Parts of buildings are only required to be considered in accordance with the scope of parts set out in section 2.4.1 of *this methodology* when an *engineering assessment* is required, ie when a building is not identified as potentially earthquake prone (and therefore an *engineering assessment* is not required), individual parts of buildings are not expected to be identified.

A building that is out of scope as defined in section 133AA of the *Building Act* cannot be identified as potentially earthquake prone or determined earthquake prone; ie most residential housing, farm buildings, retaining walls that are not integral to the structure of a building, fences, certain monuments, wharves, bridges, tunnels and storage tanks.

1.2 How to identify using profile categories

A *territorial authority* must identify buildings in its district that are within the following profile categories as potentially earthquake prone within the applicable time frames set out in section 133AG(4) of the *Building Act*.

1.2.1 Categories of buildings for the different seismic zones

The following profile categories apply:

	High seismic risk areas and medium seismic risk areas	Low seismic risk areas
Category A	Unreinforced masonry buildings	Unreinforced masonry buildings
Category B	Pre-1976 buildings that are either three or more storeys or 12 metres or greater in height above the lowest ground level (other than unreinforced masonry buildings in Category A)	Pre-1976 buildings that are either three or more storeys or 12 metres or greater in height above the lowest ground level (other than unreinforced masonry buildings in Category A)
Category C	Pre-1935 buildings that are one or two storeys (other than unreinforced masonry buildings in Category A)	

1.2.2 Exclusions

The following buildings are excluded from the profile categories:

i. a building that is constructed primarily of timber framing without other construction materials providing lateral support

ii. a building strengthened to at least 34%NBS (or the equivalent of this) so that the building cannot be considered earthquake prone

iii. a building that a *territorial authority* has previously notified the *owner* in writing is not earthquake prone prior to *commencement*

iv. a building that the *territorial authority* has found to be earthquake prone and for which it has issued a notice under section 124 of the *Building Act* prior to *commencement* (and is therefore subject to Schedule 1AA of the *Building Act*)

v. a building for which the *territorial authority* has a *previous assessment* that has a *%NBS* reported for the building greater than 34%NBS and that meets the criteria set out in section 3.3 of *this methodology*

vi. buildings for which a *territorial authority* obtains information or a special study that shows a particular subset of buildings is not earthquake prone due to particular circumstances or special local characteristics, where there is a robust technical basis for this information or study.

1.2.3 Category details

Category A	Unreinforced masonry buildings. This includes: • strengthened unreinforced masonry buildings, unless there is evidence that the strengthening has achieved at least 34%NBS (or the equivalent of this) • a building of any construction type with a significant original unreinforced masonry section or part.
Description and streetscape building characteristics	Buildings originally constructed of masonry (brick, block, or stone) without any apparent form of reinforcement or independent lateral support. Streetscape building characteristics are: • solid brick or stone facades, with or without openings • buildings of unreinforced masonry bearing wall construction (and including buildings of any construction with unreinforced masonry parapets that are not obviously concrete or other forms of construction) • masonry walls that do not feature concrete column and beam elements • solid masonry gable end walls • brick chimneys.
Examples	Smaller commercial and industrial buildings, larger retail and hotel buildings, and buildings with complex features, eg churches.

Category B	Pre-1976 buildings that are either three or more storeys or 12 metres or greater in height (other than unreinforced masonry buildings in Category A)
Description and streetscape building characteristics	Buildings of heavy construction that are either three or more storeys or 12 metres or greater in height, and designed prior to 1976, and not constructed substantially of unreinforced masonry or timber framing. Most buildings within this category are likely to be of concrete or concrete encased steel construction, or of reinforced concrete masonry. Streetscape building characteristics are listed in an indicative priority order to assist with prioritisation for identification due to the number of buildings in this category. Streetscape building characteristics are: • buildings of five or more storeys • buildings of three or more storeys on corner sites • all other buildings of three or four storeys • buildings of one or two storeys and 12 metres or greater in height.
Examples	Commercial buildings including office, retail, hotel, and educational buildings. Hotels with an open lobby and retail arcades with an open ground floor (compared to upper floors). Churches, auditoria and cinemas (one or two storeys and 12 metres or greater in height).

Category C	Pre-1935 buildings that are one or two storeys (other than unreinforced masonry buildings in Category A)
Description and streetscape building characteristics	Buildings that are one or two storeys, and constructed before 1935, and not constructed substantially of unreinforced masonry or timber framing. Most buildings are likely to be of concrete construction or concrete encased steel framing. Streetscape building characteristics include facades and walls that feature concrete column and beam elements and concrete suspended floors.
Examples	Commercial buildings including office, retail, hotel and educational buildings.

1.2.4 How to apply the categories

The following provides further explanation about the application of the profile categories:

i. The dates specified in the profile categories reflect the design dates of buildings and are applicable to the earliest designed section of the building, not subsequent work or additions to the structure. Design dates should be established based on existing records including drawings and calculations, approvals, permits and building consent dates, or could be inferred from other building information.

ii. The building heights specified in the profile categories are to be taken from the lowest ground level surrounding the building to the highest point on the roof structure.

iii. Plans, drawings or other existing records and a visual inspection are considered acceptable evidence to identify buildings that correspond with the profile categories. The visual inspection should confirm details.

1.3 How to identify at any time

A *territorial authority* may identify a building as potentially earthquake prone at any time under section 133AG(3) of the *Building Act*, if a *territorial authority* has reason to suspect the building may be earthquake prone.

Reasons that may cause a *territorial authority* to suspect a building may be earthquake prone include:

i. if a *territorial authority* receives an assessment or other material (whether undertaken for the purposes of considering whether a building could be earthquake prone or for any other purpose) that contains information about a building's seismic performance and that indicates the building may be earthquake prone

ii. if a *territorial authority* becomes aware of issues (by way of information provided to the *territorial authority* or other means) that could affect or impact on a building's seismic performance at moderate levels of earthquake shaking, such as:

- particular construction types, where the construction type is not included in the profile categories but is expected to contain some earthquake-prone buildings (eg a timber frame building of two or more storeys on a significant slope), or
- complex design or construction with known conditions that require further engineering analysis. This could include a building with non-ductile columns, a building with no effective connection between primary seismic structural elements and diaphragms, or a building with seismically separated stairs with ledge and gap supports, or
- ground conditions that could lead to a significant loss of support for a structure.

Section 2: Engineers carry out assessments of potentially earthquake-prone buildings

This section is for engineers.
It covers:

- what qualifications they need
- how to decide what type of assessment to do
- what technical requirements the assessment needs to meet
- what to include in the report.

2.1 Scope for engineering assessments

This methodology sets out how an *engineering assessment* of a potentially earthquake-prone building is required to be carried out.

If an *owner* receives a request for an *engineering assessment*, the *owner*, in accordance with section 133AI of the *Building Act*, must provide the *territorial authority* with an *engineering assessment* or a *previous assessment* (refer to section 3.0 of *this methodology*), evidence of a factual error with respect to the building's potentially earthquake-prone building status, or notification that an *engineering assessment* will not be provided (refer to section 3.1 of *this methodology*).

An *engineering assessment* must meet the following requirements:

i. the qualification requirements specified in section 2.2 of *this methodology*

ii. the requirements for determining the appropriate form of *engineering assessment* specified in section 2.3 of *this methodology*

iii. the technical requirements specified in section 2.4 of *this methodology*

iv. the reporting requirements specified in section 2.5 of *this methodology*.

If a *territorial authority* accepts a *previous assessment* (refer to section 3.3 of *this methodology*), the *owner* is not required to also obtain an *engineering assessment*.

This section of *this methodology* refers to *Part A*, *Part B* and *Part C* of the *Engineering Assessment Guidelines*.

2.2 Qualification requirements

An *engineering assessment* must be overseen and signed off by an engineer with relevant skills and experience in structural and earthquake engineering, and assessments of existing buildings. At a minimum, the engineer that oversees and signs off an *engineering assessment* must be a structural engineer who is chartered under the Chartered Professional Engineers of New Zealand Act 2002. Engineers undertaking an *engineering assessment* will need to be able to interpret and apply the requirements and technical methods set out in the *Engineering Assessment Guidelines*.

2.3 Determining the appropriate form of assessment

The engineer must determine whether an *Initial Seismic Assessment* or a *Detailed Seismic Assessment* as described in the *Engineering Assessment Guidelines* is appropriate for the building in accordance with the framework set out in Figure 2.

The *Engineering Assessment Guidelines* recommends, in most cases, that an *Initial Seismic Assessment* is carried out as the first step of a *Detailed Seismic Assessment*.

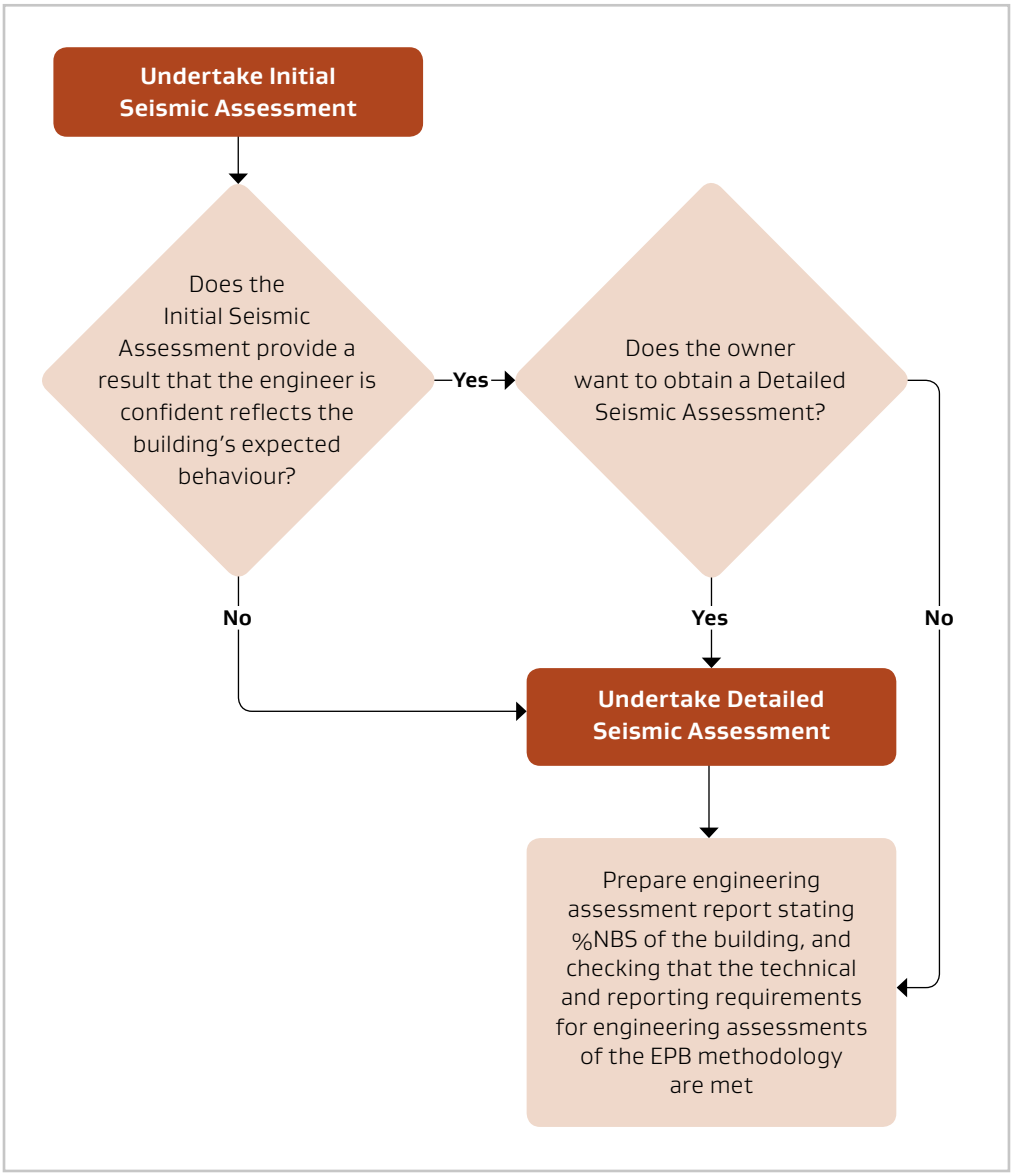
For an *Initial Seismic Assessment* to be used as an *engineering assessment* and therefore as the basis for determining whether or not the *ultimate capacity* of a building is exceeded in *moderate earthquake* shaking, the engineer must be confident that the result reflects the building's expected seismic behaviour.

In particular, the engineer must:

i. have a clear understanding of the structure and how it will respond in an earthquake, and

ii. be confident that there are no aspects of the structure that require more specific or detailed investigation and assessment; ie no potential *Critical Structural Weaknesses* that could lead to a *%NBS* that is less than 34%NBS.

Figure 2: **Framework for determining the type of engineering assessment required**



2.4 Technical requirements for the assessment

An *Initial Seismic Assessment* must meet the requirements of *Part A* and *Part B* of the *Engineering Assessment Guidelines*.

A *Detailed Seismic Assessment* must meet the requirements of *Part A* and *Part C* of the *Engineering Assessment Guidelines*.

An *engineering assessment* must:

i. include necessary inspections of the building:
   - an external inspection of the building, and
   - an internal inspection of the building where it is appropriate to do so.

ii. consider either the original building plans or calculations; or in lieu of plans or calculations, prepare and use appropriately justified assumptions in place of information that would have otherwise been obtained from the plans or calculations

iii. consider parts of buildings in accordance with the scope and definition of parts set out in section 2.4.1 of *this methodology*

iv. consider whether the potentially earthquake-prone building comprises a shared structural form or shares structural elements with any other adjacent titles, and, if this is the case, consider the extent to which the low scoring elements (ie those scoring below 34%NBS) affect or do not affect the structure as a whole, as described in the *Engineering Assessment Guidelines*

v. determine the *ultimate capacity* of the building and its parts, and the earthquake shaking demand to produce a *%NBS*

vi. for buildings less than 34%NBS, determine the *mode of failure and physical consequence* of the building or parts, and the nature of the significant life safety hazard and/or likely damage to other property.

2.4.1 Considering parts of buildings

The *Building Act* refers to a building and a part of a building. An *engineering assessment* of a potentially earthquake-prone building must consider parts of buildings as described below.

A building part is an individual building element that would pose a significant life safety hazard if it is able to:

i. lose support or fall, or

ii. cause another building element to lose support or fall from the building, or

iii. cause any section of the building to lose support or collapse.

A significant life safety hazard is an unavoidable danger that a number of people are exposed to.

An *engineering assessment* of a potentially earthquake-prone building must consider and include parts of buildings in accordance with *Part A* of the *Engineering Assessment Guidelines*.

An engineer will need to exercise judgement in applying the earthquake-prone building provisions to parts of buildings. Whether a particular building element is considered a part of a building will depend on the individual circumstances of the building and whether a significant life safety hazard is present. The justification or reasoning for inclusion or exclusion of a part should be clearly reported. However, the consideration of parts for the purposes of assessing potentially earthquake-prone buildings is not intended to be as broad in scope as the application of the term 'parts' for the structural design of new buildings.

Parts of buildings likely to be a significant life safety hazard that would be expected to be included in an *engineering assessment* are described in *Part A* of the *Engineering Assessment Guidelines*.

2.5 Reporting requirements

The resulting *engineering assessment* report must be provided to the *territorial authority*. In addition, a summary of the *engineering assessment* must be provided to the *territorial authority*, in the format prescribed by the *Engineering Assessment Guidelines*. The following information must be provided in the summary:

i. a statement of appropriate qualification and experience (supplemented with any relevant training attendance) of the engineer overseeing and signing off the *engineering assessment*

ii. the relevant building information

iii. a statement of confirmation that an external and internal inspection of the building was completed as part of the *engineering assessment*, or appropriate commentary where an internal inspection was not completed

iv. a description of the engineering methodology used and key parameters (and if the *engineering assessment* is an *Initial Seismic Assessment*, a confirmation statement that the *Initial Seismic Assessment* provides a result that the engineer is confident reflects the building's expected behaviour)

v. sufficient detail about the building and any parts that score less than 34%NBS and therefore pose a significant life safety hazard to allow the *territorial authority* to evaluate the possible consequences of failure

vi. if the building comprises a shared structural form or shares structural elements with any other adjacent titles, information about the extent to which the low scoring elements (ie those scoring below 34%NBS) affect or do not affect the structure as a whole

vii. the *%NBS* for the building

viii. for buildings less than 34%NBS, a statement on the expected *mode of failure and physical consequence* of the building or part, and the nature of the significant life safety hazard, and/or likely damage to other property.

The *engineering assessment* report and summary must be accompanied by all documentation considered in undertaking the *engineering assessment* or, in place of appending this documentation, a list with specific references to the documentation used. This must include the building plans, and drawings and calculations considered; or in lieu of these, an appropriate justification of the assumptions used for information that would have otherwise been obtained from the plans, drawings or calculations.

Section 3: Territorial authorities decide on earthquake-prone buildings

This section is for territorial authorities.
It covers:

- how to accept an engineering assessment
- how to accept a previous assessment
- how to decide if a building is earthquake prone, and
- if so, how to decide the earthquake rating.

3.1 Scope for these decisions

This methodology sets out how a *territorial authority* is required to determine whether a potentially earthquake-prone building is earthquake prone and, if it is, its *earthquake rating* by specifying:

i. in sections 3.2 and 3.3, criteria that must be met by an *engineering assessment* or a *previous assessment* for a *territorial authority* to accept the assessment, and

ii. in sections 3.4 and 3.5, how a *territorial authority* is to determine if the building is earthquake prone in accordance with section 133AB of the *Building Act* and, if it is, its *earthquake rating*.

If a *territorial authority* identifies a building as potentially earthquake prone in accordance with section 1.0 of *this methodology*, and

i. the building has a *previous assessment* that was obtained by the *territorial authority* or provided by the *owner* prior to *commencement*, and

ii. the *previous assessment* meets the criteria set out in section 3.3 of *this methodology*,

before determining whether the building is earthquake prone or not, the *territorial authority* should notify the *owner* that the building is potentially earthquake prone and give the *owner* the option to either agree with and use the *previous assessment* (ie by relying on the *previous assessment* and the *%NBS* it provides), or obtain an *engineering assessment* in accordance with section 2.0 of *this methodology*.

If an *engineering assessment* or *previous assessment* is not accepted by the *territorial authority,* the *territorial authority* should advise the *owner* why it was not accepted.

If an *owner* has a *previous assessment* that does not meet the criteria set out in section 3.3 of *this methodology*, an *owner* may commission a suitably qualified engineer (as described in section 2.2 of *this methodology*) to revisit this *previous assessment* and address the missing criteria retrospectively. If the *owner* can

provide supplementary evidence from a suitably qualified engineer that addresses the outstanding criteria, *the territorial authority* can accept the *previous assessment*.

Under section 133AK(4) of the *Building Act*, if the *territorial authority* does not receive an *engineering assessment* within the time frame required, or is notified that the *owner* does not intend to provide an *engineering assessment* within the time frame required, the *territorial authority* must proceed as if it had determined the building to be earthquake prone.

3.2 Criteria for accepting an engineering assessment

An *engineering assessment* must meet the requirements set out in section 2 of *this methodology*, including being reported in accordance with section 2.5 of *this methodology.*

The *territorial authority* must accept the *engineering assessment* if these requirements are met.

If the *territorial authority* has concerns about whether the *engineering assessment* meets the requirements set out in section 2 of *this methodology*, the *territorial authority* may request further substantiation from the *owner.*

3.3 Criteria for recognising a previous assessment

A *previous assessment* may be in the form of an *Initial Evaluation Procedure*, an *Initial Seismic Assessment*, a *Detailed Engineering Evaluation*, or a *Detailed Seismic Assessment*. It may be held on record by a *territorial authority* before commencement or provided by an *owner* any time after *commencement*.

A *territorial authority* may accept a *previous assessment* if either:

i. the *previous assessment*:

- was undertaken by a suitably qualified engineer with relevant skills in structural and earthquake engineering and assessments of existing buildings. As a minimum requirement, the engineer is expected to be a structural engineer who is chartered under the Chartered Professional Engineers of New Zealand Act 2002, or equivalent (for example a Registered Engineer prior to 2002), and who held that status at the time the assessment was undertaken, and
- contains evidence that an external and internal inspection was carried out as part of the assessment, or appropriate commentary where an internal inspection was not completed. Where no internal inspection has been carried out or appropriate commentary provided, the existing assessment report may be submitted with supplementary evidence from a suitably qualified engineer to confirm that an internal inspection has been completed retrospectively and the results of the *previous assessment* have not altered as a consequence of that inspection, and

- references the relevant standard or guidelines for acceptable engineering methods in effect at the time, for example the Assessment and Improvement of the Structural Performance of Buildings in Earthquakes guidelines produced in June 2006 by the New Zealand Society for Earthquake Engineering, or a draft version of the *Engineering Assessment Guidelines* released for use in June or August 2016, and
- clearly states the assessment outcome, reported as a *%NBS,* however

if a *territorial authority* has concerns about whether the *previous assessment* meets the requirements set out above, the *territorial authority* may request further substantiation from the *owner*

or,

ii. there is evidence that the *previous assessment* has undergone an independent review by a Chartered Professional Engineer

or,

iii. the *previous assessment* was undertaken as part of a programme of assessments (by either the *territorial authority* or the *owner*) that was subject to a moderation process with appropriate technical input and programme oversight from a suitably qualified engineer or engineers with relevant skills in structural and earthquake engineering and in assessments of existing buildings.

3.4 Determining if a building is earthquake prone

If a *territorial authority* accepts an *engineering assessment* in accordance with the criteria in section 3.2 of *this methodology* or a *previous assessment* in accordance with section 3.3 of *this methodology*, the *territorial authority* must determine whether or not the building is earthquake prone in accordance with sections 133AB and 133AK of the *Building Act*.

3.4.1 Section 133AB(1)(a)

Section 133AB(1)(a) of the *Building Act* is met if the assessment of the *ultimate capacity* of the building and its parts, and the relationship of this to *moderate earthquake* shaking, is less than 34%NBS, ie the *%NBS* in the *engineering assessment* report.

3.4.2 Section 133AB(1)(b)

Section 133AB(1)(b) of the *Building* Act is met if:

i. access to the building is not likely to be difficult, limited or infrequent; and that access is to an area affected by the *mode of failure and physical consequence* identified in the *engineering assessment* report, or

ii. the *mode of failure and physical consequence* identified in the *engineering assessment* report would be likely to cause damage to other property, or

iii. there is another reason why the collapse of the building or failure of the elements identified in the *engineering assessment* report would be likely to cause injury or death to a number of persons in or near the building, or damage to other property.

This decision should be informed by consideration of the following information:

i. the current and possible occupancy of the building

ii. the possible accessibility to the building, or site of the building; ie whether people can approach or enter the building

iii. if there are any neighbouring buildings and the proximity of these, and

iv. the *mode of failure and physical consequence* of the building identified in the *engineering assessment* report.

3.5 Determining the earthquake rating

If a *territorial authority* determines a building is earthquake prone in accordance with section 3.4 of *this methodology*, the *territorial authority* must assign an *earthquake rating*.

The *earthquake rating* of the building will be the *%NBS* specified in the *engineering assessment* report. The *earthquake rating* will correspond with an earthquake rating category prescribed in the Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005.

That earthquake rating category will determine the form of EPB notice that is to be issued.