

# ***Determination***

## ***under the***

### ***Building Act 1991***

#### **No. 94/008: Alterations to a bridge**

##### **1. The matter to be determined**

- 1.1 The matter before the Authority was whether a bridge closed to vehicular traffic would, after being altered for re-opening to vehicular traffic, comply with relevant provisions of the building code to the required extent.

##### **2. The parties**

- 2.1 The application was made by two individuals as representatives of the residents in the street containing the bridge. For the purposes of this determination, the Authority assumes that those individuals are or represent the owners of property capable of being affected by the bridge, although that has not been accepted by the territorial authority. Those property-owners are regarded as being “the applicant” for the purposes of this determination.
- 2.2 If the applicant is entitled to be a party to the determination under section 16(d) of the Building Act 1991 then it may apply for a determination only “if the matter for determination relates to a provision of the building code that has the purpose of protecting [the applicant’s] property”.
- 2.3 The other party to the determination is the territorial authority concerned.
- 2.4 The territorial authority is a party to the determination under both sections 16(a) and 16(c) of the Building Act, being the owner of the bridge and having applied to itself for a building consent in respect of the alterations.

##### **3. The matter to be determined**

- 3.1 The applicant has the right to apply for a determination only because “the matter for determination relates to a provision of the building code that has the purpose of protecting [the applicant’s] property”. However, the Authority takes the view that the scope of the determination need not be confined to such provisions. Once an application has been made by a party entitled to do so, the Authority considers that it may consider any of the provisions of the building code that arise naturally out of the application. Determinations are not of the nature of adversarial proceedings in Court between parties, they are more of the nature of reviews of the technical aspects of disputed decisions by territorial authorities.

3.2 In this case, the Authority takes the view that it is being asked in effect to determine whether, after the alterations, the bridge concerned will comply with clauses B1 Structure, B2 Durability, and E1 Surface Water of the building code (the First Schedule to the Building Regulations 1992) to the extent required by the Building Act.

3.3 In making its determination, the Authority has not considered any of the provisions of the building code other than those mentioned in 3.2 above.

#### **4. The bridge**

4.1 The bridge is a single-lane road bridge, approximately 75 years old, having a timber deck on steel beams supported by timber piles or piers. The bridge has a length of approximately 35 m in four spans of approximately 8.5 m. The deck is approximately 6 m wide, and the roadway between kerbs is 3.68 m.

4.2 Over that 75 years the timber piles had apparently become eroded to less than half their original diameter, and in December 1991 the bridge was closed to vehicular traffic. Since then it has been used by pedestrians only.

4.3 The territorial authority subsequently decided to upgrade the bridge and re-open it to vehicles. The upgrading was to consist essentially of the replacement of three rows of three piles with three rows of four piles essentially in the same location and along the same line in relation to the span of the bridge. A pedestrian walkway and handrail were proposed to be added along one side of the bridge within the width of the original deck, narrowing the roadway from 3.68 to 3.30 m between kerbs.

4.4 The structural design for the alterations used a vehicle design loading of 0.85 times the current "Highway Normal" loading specified in the Transit New Zealand *Bridge Manual*.

4.5 The upgrading work was in fact commenced without a building consent, and a stop-work notice was issued to the contractor. The territorial authority then applied to itself for a building consent which was issued on 6 October 1994.

4.6 The application for determination and the territorial authority's acknowledgment of receipt of the relevant documents were dated 1 November 1994. Under section 17(4) of the Act, therefore, the building consent was deemed to be suspended from that date. The Authority understands, however, that the bridge was in fact opened to traffic on or about 22 November 1994.

#### **5. The parties' contentions**

5.1 The applicant contended that:

- (a) Re-opening the bridge to vehicular traffic would constitute a change of use for the purposes of section 46 of the Building Act.
- (b) The stability of the bridge (clause B1 of the building code) would be inadequate because "no proper engineering/geophysical investigations have been carried out"

and “the fact that new . . . piles for piers are being driven within 500 mm of the existing (cut at bed level), and reusing the existing 75 year old abutments . . . makes the structural failure highly probable”.

- (c) The durability of the bridge (clause B2 of the building code) would be inadequate because “the 75 year old abutments are still being retained along with the other structural elements”.
  - (d) The protection of other property from surface water (clause E1 of the building code) would be inadequate. The bridge in its original state obstructed the waterway. The freeboard between the water level and the bridge beams was less than is required by the Transit New Zealand *Bridge Manual*, which would presumably result in floating trees and other debris forming a raft trapped against the bridge and increasing the upstream water levels (and also the horizontal loading on the bridge). There had been an “enormous increase” in the relevant storm water discharge since the bridge was first built. “Increase in the number and size of piles . . . would cause further substantial obstruction to the flood water.”
  - (e) The reduction in the width of the roadway for use by vehicular traffic was dangerous. The Authority took this to be a submission to the effect that, after the alteration, the bridge would no longer comply with clause D1 of the building code to the same extent as before.
  - (f) The chicanes on the bridge approaches “would cause further obstruction to the natural flow of water over the pavement . . . affecting the residential houses and endangering traffic safety”.
- 5.2 The applicant also pointed to various discrepancies between the application for building consent and the consent itself, to what were said to be inadequacies in the consent and accompanying project information memorandum, and to what were said to be breaches of the district plan. Those are not matters that can be considered by the Authority in a determination.
- 5.3 The territorial authority contends that the bridge is not undergoing a change of use but is merely being altered.
- 5.4 The applicant submitted extensive documentation, much of which had apparently been generated in the course of arguments about planning matters and particularly about the territorial authority’s reasons for deciding to strengthen the bridge and re-open it to vehicles. The Authority is not concerned with those matters but is limited by section 18 of the Building Act to considering the bridge in relation to the building code.
- 5.5 The territorial authority submitted information that had accompanied the application for building consent, including the design calculations and records of the maximum annual water levels at the bridge for the years 1960 to 1980 and at a point upstream of the bridge for the years 1958 to 1994. At the Authority’s request the territorial authority also supplied additional information about flood levels and the effect of past floods on the applicant’s property.

- 5.6 There were several instances of direct conflicts between information supplied by the applicant and information supplied by the territorial authority, particularly as to flood levels and the effects of floods. The Authority gave careful consideration to all of the information supplied, but feels no need to choose between the conflicting versions because even if the applicant's information is accepted uncritically the Authority considers, as explained below, that after the alterations the bridge will comply as nearly as is reasonably practicable with the relevant provisions of the building code.
- 5.7 The applicant wished to obtain documents referred to in the territorial authority's submissions as to flood levels, but the Authority considered that further submissions on flood levels were unnecessary. For the purposes of this determination only, the Authority assumes, without deciding, that the applicant's evidence about flood levels is to be preferred to the territorial authority's.

## **6. Discussion**

### *6.1 General*

- 6.1.1 The Authority must first consider to what extent the bridge, after the alterations, is required to comply with the relevant provisions of the building code, and must then consider whether it will comply to that extent.
- 6.1.2 The extent to which the bridge, after the alterations, is required to comply with the provisions of the building code depends on whether there is to be a change of use. If there is to be a change of use then section 46 of the Building Act would apply, and in its new use the bridge would be required by section 46(2)(a) to comply with those provisions "as nearly as is reasonably practicable to the same extent as if it were a new building". If there is to be no change of use then section 46 would not apply, and after the alteration the bridge would be required by section 38(b) to comply with those provisions "to at least the same extent as before the alteration".
- 6.1.3 The term "change of use" is not defined in the Building Act and the Authority therefore considers that it must be given its ordinary and natural meaning.
- 6.1.4 For the first 70 or so years of the bridge's life it carried both vehicular and pedestrian traffic. In 1991 it was closed to vehicular traffic, apparently because it could no longer safely carry the loadings involved. The alteration will restore the bridge's ability to carry such loads.
- 6.1.5 The Authority considers that the bridge did not undergo a change of use when it was closed to vehicles, and will not undergo a change of use when it is re-opened to vehicles after the alterations. It has been used as a bridge throughout its life and will continue to be used as a bridge, only the traffic restriction will change.
- 6.1.6 However, the question of whether the bridge is to undergo a change of use is ultimately a question of law, and this determination may be appealed to the High Court on a point of law under section 86 of the Act. Accordingly, although the Authority considers that there has not been a change of use, this determination takes account of the possibility that the Authority might be held to be wrong on that point.

6.1.7 In fact, as will be seen below, the Authority considers that the bridge, after the alterations, will comply with the relevant provisions of the building code as nearly as is reasonably practicable, which means that it will also comply with those provisions to at least the same extent as before the alterations.

6.1.8 The Authority expresses no opinion as to whether there has been a change of use for the purposes of the Resource Management Act.

## 6.2 *Structure*

6.2.1 The applicant said:

“in the absence of any geotechnical investigations/flood calculations the fact that the new 300 dia piles for piers are being driven within 500mm of the existing (cut at bed level) and re-using the existing 75 years old abutments for another 20-50 years makes the structural failure highly probable”.

6.2.2 The Authority does not accept that contention. The almost “like-for-like” replacement of the old piles by new ones is does not necessitate geotechnical investigations of a structure which has successfully remained in place for 75 years.

6.2.3 The Authority understands that the 0.85 “Highway Normal” loading used in the design of the proposed alteration is the loading used to simulate vehicles that comply with the loading limit required by the Heavy Motor Vehicles Regulations 1974. The Authority accepts that loading as appropriate.

6.2.4 The applicant contends that if the bridge were a new bridge then it would be necessary to provide more freeboard under flood conditions in order to comply with the structural design requirements of the *Bridge Manual*. That is debatable, but even on the assumption that it is correct the Authority does not consider that it is reasonably practicable to upgrade the bridge so as to provide that freeboard. It would be difficult and expensive to extend and if necessary enlarge the piles so as to raise the bridge the appropriate amount (the exact amount depends on whose information is accepted). It would also be difficult and expensive to raise and extend the abutments and alter the vertical alignment of the road at each end of the bridge. In the Authority’s opinion it would be unreasonable and impracticable to demand such drastic alterations to a bridge which has been in place for 75 years.

6.2.5 If it is unreasonable and impracticable to demand additional alterations, then it follows that the alterations as proposed will comply with clause B1 of the building code as nearly as is reasonably practicable.

### 6.3 *Durability*

#### 6.3.1 The applicant said:

“The existing bridge constructed in the 1920s ie nearly 75 years old has already completed its life and its use as part of the proposed structure for further 20 or 50 years would not satisfy the other objectives of the Building Code especially the structure. Whereas the piers are being reconstructed, the 75 year old elements are still being retained along with the other structural elements.”

6.3.2 The Authority considers that when considering a particular alteration it is inappropriate to consider the durability of building elements and components that are not proposed to be altered unless those elements or components are clearly dangerous to the point of needing immediate repair or replacement. In this case, the piles are to be replaced because they have been eroded to approximately half their original diameter. There is no information to suggest that the rest of the structure, including the abutments, need immediate repair or replacement.

6.3.3 The Authority accordingly considers that the bridge as altered will comply with clause B2 of the building code.

### 6.4 *Surface water*

#### 6.4.1 The relevant provisions of clause E1 of the building code are:

**E1.1** The objective of this provision is to:

(a) Safeguard . . . *other property* from damage, caused by *surface water*

**E1.2** *Buildings* and *sitework* shall be constructed in a way that protects . . . *other property* from the adverse effects of *surface water*.

**E1.3.1** Except as otherwise required under the Resource Management Act 1991 for the protection of other property, *surface water*, resulting from a storm having a 10% probability of occurring annually and which is collected or concentrated by *buildings* or *sitework*, shall be disposed of in a way that avoids the likelihood of damage or nuisance to *other property*.

6.4.2 It might be argued that, in the particular circumstances of this bridge, the 10 year return period flood is too frequent an event on which to base the protection of other property. However, as indicated in clause E1.3.1, regional and district plans under the Resource Management Act may provide for a greater degree of protection. The Authority itself, however, has no choice but to consider the matter in terms of the 10% probability event, which equates to the 10 year return period flood.

6.4.3 The Authority assumes, without deciding, that the bridge concentrates water that might cause damage or nuisance to other property, and in particular to the applicant's property, in the 10 year flood, but considers that the replacement of the piles would have a negligible

effect on flood flows. The Authority also assumes, without deciding, that the limited freeboard contributes to such damage or nuisance. Remedial action could include removing some or all of the piles, with consequential replacement of the beams by larger beams suitable for the longer spans. The bridge could also be raised as discussed in 6.2.4 above. In the Authority's opinion it would be unreasonable to demand such drastic alterations to a bridge which has been in place for 75 years.

- 6.4.4 If it is unreasonable and impracticable to demand additional alterations, then it follows that the alterations as proposed will comply with clause E1 of the building code as nearly as is reasonably practicable.

#### 6.5 *Width of the roadway*

- 6.5.1 The width of the bridge available to vehicular traffic was proposed to be reduced from 3.68 to 3.30 m between kerbs. The "lost" 0.38 m is to be occupied by the pedestrian walkway, which will extend to the edge of the deck to give a walkway width of 1.2 m.

- 6.5.2 The applicant contended that before the alteration the width was "the bare minimum to accommodate the 3.7 wide vehicles requiring no special permit". The applicant also contended that 3.30 m was too narrow for safe passage of vehicular traffic.

- 6.5.3 The Authority has been unable to identify the legislative reference to 3.7 m wide vehicles. However, the Authority notes that regulation 48B(1)(a) of the Traffic Regulations 1976 provides that no person shall operate any vehicle if the vehicle or its load or both exceed 2.5 m in width.

- 6.5.4 Clause D1.3.5(a) of the building code provides that vehicle spaces and circulation routes shall have dimensions appropriate to the intended use. The acceptable solution specified in paragraph 10.2 of Approved Document D1/AS1 requires a width of not less than 3.5 m for one-way circulation routes.

- 6.5.5 The applicant also contended that it would be dangerous for the bridge to be used by vehicles and pedestrians at the same time "as the wider vehicles will drag and kill the people on the footpath because of narrow deck width and no side protection". The Authority considers that to be unlikely, and in any case the provision of a separate pedestrian walkway will improve pedestrian safety. The Authority also considers that the roadway width of 3.3 m is adequate for this straight one-way bridge where traffic speeds will be reduced by the chicanes.

- 6.5.6 On that basis, the Authority considers that the bridge as proposed to be altered complies with clause D1 of the building code and therefore cannot be said to comply to a lesser extent than before the alteration.

#### 6.6 *The chicanes*

- 6.6.1 The Authority has no information about the chicanes except for the applicant's contention that they "would cause further obstruction to the natural flow of water over the pavement . . . affecting the residential houses and endangering traffic safety".

6.6.2 The applicant complained that the territorial authority had “not provided us with the copies of the bridge approach plans, including new chicanes to enable us to prove our concerns on safety and flood water nuisance”. The Authority notes that the applicant lives in the road concerned and is presumably familiar with the appearance of the chicanes in it. In the absence of any specific information, the Authority is not prepared to accept that the chicanes cause any danger to life or to the applicant’s property.

## **7. Conclusion**

7.1 For the reasons set out above the Authority considers that after the alteration the bridge will comply with the relevant provisions of the building code both to the same extent as before and as nearly as is reasonably practicable.

## **8. The Authority's decision**

8.1 In accordance with section 20(a) of the Building Act the Authority hereby confirms the territorial authority's decision to issue the building consent for the alteration of the bridge.

Signed for and on behalf of the Building Industry Authority on this 22<sup>nd</sup> day of  
December 1994

J H Hunt  
Chief Executive