To whom it may concern

Attn Dear Madam, Sir

RE: The Boot Factory 27-33 Spring St Bondi Junction

1.0 Introduction

We advise that DBCE have been commissioned to report upon the condition of the above noted building. Dr. Eric Smith of DBCE has carried out the investigation. No responsibility under the law of contract, tort or otherwise for any loss or damage is accepted.

The terms of our commission are as follows: “An objective assessment of the condition of the building and is it able to be restored and refurbished or is it about to fall down”.

We have received the following documentation:


. Specification for works to the Boot Factory from Clive Lucas Architects Sept 1984. This firm is now known as Clive Lucas Stapleton Architects, and

. smart design studio concept design for alterations and additions to the Boot Factory, undated.
We advise that Dr. Eric Smith (cv attached) attended the site on Tuesday 22nd October 2013. He was accompanied on his inspection by Steve Gillett of Waverley Council and Mr. Robert Speirs-Ferrari of Building Diagnosis Centre. We are grateful for the full assistance we received from them at that time.

2.0 Observations/ Discussion

As has been described by various parties, the Boot Factory was constructed in the late 1800’s. It is a three level brick and timber building. The lower level perimeter walls are constructed as a 340 mm thick, no cavity solid wall with the upper two levels and roof parapet as solid 230 thick wall, again no cavity. The building faces North-South with the entry to the North. The floors are constructed of hardwood timber flooring supported by joists at 450 mm centres which in turn are supported by the perimeter walls and internal timber bearers. The timber bearers are supported internally on timber columns and on the perimeter by engaged brick piers. Both bearers and joists are inserted into the perimeter brickwork. The roof is constructed as a timber frame with metal roof sheeting. Internal box gutters as well as a central valley gutter collected the rainwater. Cement rendered profiles delineate each level as well as breaking the façade down into three sections. This type of construction is very typical of such buildings constructed in the 19th Century.

The overall lateral stability of the building is provided by the brick perimeter walls. The floors provide lateral support to the walls by virtue of diaphragm action. To prevent the perimeter walls bowing out, one is required to rely upon the tying action of the bearers and joists. In many situations, steel tie rods are provided (generally below the floor and between joists) to give additional lateral support. These are often seen from the outside of the walls as a cross or rotated S shapes. One such S shape can in fact be seen on the Western wall of the Boot Factory.

The greatest dangers to the safety and wellbeing of buildings of this type of construction are water penetration, termite infestation, degradation of the bricks and mortar, rusting of arch bars and metal inserts, shrinkage of timber as well as foundation movement.

Water penetration, either through window flashings, partial failure of the roof and gutters or simple penetration through the non-cavity brickwork causes a variety of problems. Apart from a musty smell, wet carpets and unhygienic working conditions, the greatest issue is the potential rot of the joists and bearers. This can impact upon the stability of the perimeter walls as well as the vertical load carrying capacity of the floors themselves. Building Diagnosis Centre, in their sequential reports comment upon this continually. Carpets were wet; there was a musty smell and timber bearers and joists suffered from rot. Clive Lucas, in their work in 1984 had concerns with this with the resultant construction of a new steel roof, new gutters and repair to various timber joists and bearers. They had also provided for an external clear finish to the building, presumably a clear silicon finish to aid in reducing water penetration through the brickwork. The issue with these applications, particularly in the mid 80’s was their durability under u-v attack. A five year period of protection would be a good result. We understand now that there are clear applications with some fifteen year warranty. Numerous windows were replaced and repaired in the works of 1984. Taylor Thomson Whiting (TTW) in their report also commented upon this. They in fact recommended that State Forests be commissioned to undertake a full review of all timber work in order to establish the frequency of problem areas. We do note that in 1984, Clive Lucas had required a collapsed timber bearer to be replaced. It is obvious that water penetration has been an issue for some time. Clive Lucas Architects (CLA) also required that a full damp proof course be installed.
Termite Infestation has a similar result as water penetration. It impacts upon the structural integrity of the bearers and joists. This again is an area where BDC commented upon frequently. We are advised by Mr. Gillett of Council that a recent termite inspection revealed previous infestations but the site was currently free of termites.

Degradation of bricks and mortar is again a common problem in many such heritage buildings. The bricks are attacked by air borne pollution or salts in the atmosphere. This results in fretting of the bricks with a loss of strength. The mortar used in the 1800’s was generally there to keep the bricks apart and often had little strength. Pointing of the brickwork did provide some level of protection against erosion of the mortar. Clive Lucas required, in their specifications that damaged bricks be removed and replaced and that mortar and repointing be carried out as necessary. Some 15% of brickwork was allowed to be replaced. The new mortars employed cement, which generally was not part of the early construction techniques for brick work. BDC have again commented upon this, 22nd Nov 2007 “masonry mortar joints are not suffering corrosion fretting”. This therefore does not appear to be an issue. In a subsequent report, 13th April 2013,”Water migrating through the external walls and from the roof area contributes to weakening the mortar joints strength within the non-cavity perimeter brick walls.” This therefore does appear to be an issue.

The rusting of metal inserts and arch bars generally cause horizontal or stepped cracks in the brickwork due to the expansion of the steel from buildup of rust. BDC have commented upon this but it does appear to be of little impact. Clive Lucas required various arch bars be cleaned and repainted.

Shrinkage of timber bearers and joists can have interesting results. As this construction consists of timber bearers supported on internal timber columns, any shrinkage of the bearer causes the floor to settle at the column position by the extent of bearer shrinkage. The floor does not go down level as the brick walls generally remain at the same level. As the bearer on the floor below shrinks, the drop in level is doubled and so on down the building. The impact of this is to have the floors slope downwards and if the bearers and joists are securely located in the perimeter walls, it can pull the brickwork inwards. Variable fixity can cause the floor plate to rotate with resultant differential movement of the perimeter walls. It can also cause slippage of the joist and bearer within its support socket. We are not aware of any floor levels being investigated. These results need to be considered over a period of time as no-one knows what the initial levels were when the building was constructed.

Foundation movement is perhaps one of the major issues that can impact upon a buildings safety. This movement may occur from a range of sources. The existing footings may be undermined by adjacent excavation, foundation material washed away due to broken storm water or sewer pipes or simply poor or inadequate construction. BDC have commented in their report of 9th April 2013 “as the brick walls have continued to settle outwards and inwards, including increased cracking ---“ and in 13th April 2013 “Cracking is slightly increasing including new cracking developing is as a result of building movements stemming from the foundation supports of the building structure”. To date there has been no foundation investigation, not even to find out what types of foundations were used or the foundation material. BDC have recommended however that a full investigation of surrounding storm water lines be carried out. We fully support this initiative. We understand that to date this has not occurred.

The benefits of continued inspections at regular intervals, particularly for old, listed buildings are that
a monitor of condition can be established. Survey control points can be developed and building movements documented and reviewed. Prior to carrying out any construction work, a dilapidation survey is usually required by Council in order to monitor or review damage or change of state to adjacent properties. This is an invaluable tool where by objective assessments can be made. Crack widths can be measured, the extent of cracking photographed and noted, out of vertical movement measured and noted etc. Unfortunately this has not been done on the Boot Factory. There has been no co-ordinated tabulation of building movement since the commencement of the reports back in 2007. Instead, we rely upon statements such as (10th Nov 2010) “We were able to further assess the bowing of the front wall to the Boot Factory structure. This was carried out by a string bob attached to the top of the wall that gave a very good visual indication of the wall movements. The wall is severely bowing outwards at the second floor level and tapers back to being plumb at the ground level whilst the parapet above the top level is leading inwards towards the roof direction.” It perhaps would have been better to provide a definitive value rather than provide an emotive statement. TTW in their report of 19th Aug 2009 state “the Northern façade displayed visually significant bowing”. This would therefore have been worthy of a structured approach to determining whether or not it was an issue.

Considering the above comments as a basis for our limited inspection, we offer the following review.

Our inspection was carried out after a period of dry, windy weather. The inspection was a visual one only and consisted of a walk around the base of the building as well as review of each of the three levels (ground, first and second). The roof space was not investigated.

The external review covered the following:

1. The brickwork appeared sound with some areas of fretting. The mortar joints again appeared sound but the underlying mortar was considered to be weak. This is as expected. No repair areas (CLA) were investigated. Whilst there are some hairline cracks in the brickwork, we observed nothing that would cause alarm. Inspection of the brickwork just above ground level did not reveal any untoward cracking. This would have been symptomatic of foundation rotation.

2. Arch bars appeared to be not degraded except one exhibiting some rusting and brick movement on the Western façade. It was difficult to assess the upper level arch bars as the windows were boarded up. The overall impression however was one of sound construction and repair.

3. Stormwater collection pit had some settlement adjacent to it. This may be from local level issues or something more serious. We can only support BDC’s comment that the storm water lines being thoroughly investigated.

4. Foundations were not investigated as the area is paved apart from a few flower beds. It would however be a simple exercise to dig down through the flower beds and determine foundation material type and partial width of existing foundations.

5. The verticality of the walls was assessed by visually looking up at the walls from the sides and the
front. This is certainly not a scientific or a definitive approach but it did enable us to get a feel for the structure as a whole. The Northern wall (front wall) did appear to be out of vertical but the amount of out of plumb was hard to determine. We did note that there appeared to be survey pins installed on the Northern face. Perhaps there were some surveys conducted when CLA were carrying out the works in mid-80’s. If this is the case, there would be a good opportunity to determine if there is progressive movement. The other three faces appeared vertical. The parapet did appear to be sloping inwards to some degree. A survey of the walls verticality is clearly called for. We do note that brick parapets are notorious for being structurally inadequate. We were advised by Mr. Speirs-Ferrari that rectification work had been carried out under their instruction.

The internal review covered the following:

1. Ground floor was dry with much steelwork present. We understand that this has been recently installed due to concerns about the buildings stability and safety. All windows were boarded up so any degradation of the window frame was hard to determine. The level 1 floor was fully propped. The internal columns were strengthened with angles bolted through the timber. The columns were Oregon, probable strength grade F7. On the Northern face was bolted a vertical steel beam chemsetted to the internal north wall brickwork. The bearers seated on the engaged piers appeared sound. However we were unable to determine the tie in to the perimeter walls or if in fact that occurred at all. Similarly the joists appeared sound from below but the insert into the brick walls was an unknown.

2. Level 1 was much the same as Ground. Floor.

3. Level 2 was much the same as Level 1. The ceiling to the roof appeared sound but again, it was not possible to investigate the connection or adequacy of the bearers or ceiling joists connecting in to the perimeter walls. There did not appear to be any gaps between floor and perimeter walls.

The reports prepared by BDC come to the conclusion (13\textsuperscript{th} April 2013) that “In summary, the Boot Factory is in structurally unsafe condition as the brick walls have continued to settle and rotate outwards and inwards, including increased cracking since installing temporary wall supports in recent years” and “Sydney’s unprecedented rains and winds would continue to have a detrimental effect on the shell structure including continue to allow water to penetrate the structural timber floor beams including the unsatisfactory foundations and brick walls. As it is not economical viable, and includes more structural bracing as time progresses, demolishing the Boot Factory building will provide a safe adjacent community.”

It appears as if BDC have based their conclusions on the following”

1. The walls have continued to settle and rotate. There has been no continued documentation of wall movement, there has been no foundation investigation, there has been no documentation of extent of wall cracking and there has been no investigation as to the extent of rotted timber bearers and joists. We cannot draw the same conclusion as BDC as, in our opinion, there is insufficient investigation and evidence to confirm such a conclusion.
2. Sydney’s unprecedented rain and wind will continue to have a detrimental effect ….. We can only agree with this statement, not the fact that Sydney’s wind and rain is unprecedented, but rather that they will continue to have a detrimental effect. If the water is not prevented from entering the building, the building will, in time disintegrate. What is more telling is the next statement regarding economic viability. If economic viability was the only factor ever considered with respect to Heritage buildings, we as a community would have none left.

In the TTW report of 19th August 2009, they state: “If the degraded timber joists and the masonry walling are provided with an alternative means of support via structural remediation, based on the level of this review there is no evidence to suggest that the building will not continue to be suitable for its intended use”. We agree with this statement. The works proposed at that time are, in our opinion, still valid.

3.0 Conclusions/Recommendations

In conclusion we advise that there is insufficient evidence to declare the building unsafe and require demolition. There is a level of investigation that needs be carried out to determine the extent of necessary remediation but it is our opinion that such remediation, whilst necessary to prevent wholesale failure, is both practical and feasible. The option of doing nothing is not an option. The building, as it is now with the steel bracing would appear to be stable. We have not checked this and the responsibility for its structural integrity remains with BDC.

The necessary investigations include the following

Carry out survey of floor levels as well as perimeter wall verticality

Investigate storm water lines

Investigate degree of rotting timber, both bearers and joists.

Investigate and document level of roof decay. We do note that BDC have recommended that gutters be replaced in the roof.

Investigate foundation material and type.

Please contact either Dr Eric Smith or Mr. Dennis Bunt for further information. We would be pleased to sit with you and more fully explain our review and conclusions

Yours faithfully

Reviewed,

Dr Eric Smith                        Dennis Bunt, Director

for Dennis Bunt Consulting Engineers Pty Ltd.
RESUME

Eric Smith

Year of birth 1948
Profession Engineer
Position Consultant
Nationality Australian/ British
Languages English

Education and professional qualifications

Qualification
FIEAust 1991 — Fellow — Institution of Engineers Australia
Chartered Engineer
ACSE Past President
Ph.D 1974 — Doctorate of Philosophy — University of New South Wales
B.Eng 1969 — Bachelor of Engineering (Civil) Hon1, University Medal — University of New South Wales

Key experience

Eric has experience in a wide variety of projects through all stages of development — covering feasibility studies, costing and financial planning, design and preparation of documents and site supervision. His experience includes model and computer studies of structures, design, documentation and site attendance of all structures from bridges, heritage structures, carparks, shopping centres to high rise residential and commercial developments. Eric’s design experience covers both reinforced and prestressed concrete and steel with associated welding technology. He also worked with Industry in the development of a testing regime for Autoclaved Aerated Concrete.

Professional history

Year
2006 — Date Consultant
2000 — 2006  Director — Hyder Consulting Pty Ltd, Sydney
1990 — 2000  Director in Charge Building Structures — Hyder Consulting Pty Ltd, Sydney
1976 — 1990  Director — Acer Wargon Chapman, Sydney
1974 — 1976  Associate Director — Wargon Chapman Partners, Sydney
1972 — 1974  Design Engineer — Wargon Chapman Partners, Sydney
1969  Graduate Design Engineer — Rankine & Hill, Sydney

Projects summary

2006 — Date  Consultant, Building Structures
Eric has been involved in carrying out Project Reviews, legal work, insurance claims, structural engineering and continued work on Centrepoint redevelopment.

1990 — 2006  Hyder Consulting Pty Ltd — Director, Building Structures
Following company reorganisation in 2000 in Global Sector and Function Groups, Eric became Group Property and Building Structures Director for Hyder Consulting. In December 2005 Eric became a Consultant. Prior to this he was Project Director for the following:

- Project Board of Burj Dubai: the 705m, 160 storey building will be the tallest building in the world.
- Dubai Festival City: Project value AUD 600 million.
- Jumeirah Beach Residential: Project value AUD 300 million.
- Sydney Director for design and documentation of Mei Foo and Nam Cheong Stations on Airport Rail link Hong Kong
- Latitude Development, Sydney: Project value AUD 250 million.
- Citibank Tower, Sydney: Project value AUD 250 million.
- Citibank, including School of Arts Restoration
- Emirates Project, Dubai: Project value AUD 900 million.
- AMP Tower Sculptures: Project Director for this Olympic gift to Sydney.
- Westpac Building, Sydney Heritage Restoration
- POW Clinic and Car park: Project Director for AUD 70 million design and construct extensions.
- Secondment to Acer (Hong Kong) for specific projects including structural advice related to Airport rail link and fire damage at development LAMTIN.
- Warringah Mall Stage 1: Project Director for AUD 180 million extension.
- James Hardie Warehouse, Rosehill: Project Director for AUD 12 million facility, constructed over an existing tip.
- RAS Zone 1: Project Director for new showground zone 1 works including Showring, Woodchop, Outdoor Theatre and various pavilions.
- Prospect Council Head Office, Huntingwood: Project Director for AUD 50 million office/communication centre, including a 65 m communications tower.
- Macquarie Shopping Centre Extensions: Project Director for AUD 18 million extensions to large Sydney shopping centre; carried out during full centre operation.
- Wollongong Tax Office: Project Director for AUD 15 million office building won on design/construct basis.
- Northern Development, Darling Harbour IBIS Hotel/No. 1 Darling Harbour, Park Apartments: Project Director for mixed hotel/residential project in Sydney valued at AUD 80 million.
- Highgate: Project Director for conversion of 17 level office building to 27 level apartments.
- Earlville Shopping Centre: Project Director for AUD 70 million upgrade of the shopping centre in Cairns.
- 400 George Street Office Development for Banker’s Trust: Project Director for this high rise commercial.

1976 — 1990 Acer Wargon Chapman (NSW) — Director
Director in charge of a wide range of building structures ranging from residential to multi-million dollar commercial developments. Projects include:
- Sydney Tower: Responsible for completion of structural work and on-site supervision role for this significant structure that opened in 1981.
- Penrith Police Station: Project Director for this major facility co-ordinating the police activities in Sydney’s greater west, incorporating helipad and transmission tower.
- Park Plaza Development: Project Director for this major retail/commercial development valued upwards of AUD 500 million. This project incorporates connection to and development with the adjacent Town Hall Station.
- OTC Head Office Sydney: Engaged by OTC to design, review and provide site attendance for this AUD 70 million commercial development.
- Nikko Hotel Potts Point: Project Director for structural design/documentation and supervision for 15 level major hotel in Sydney’s Kings Cross area.
- Novotel Hotel Darling Harbour: Project Director for this AUD 100 million 500 key hotel opened in 1990 at Darling Harbour.
- Mount Penang Maximum Security Detention Centre: Project Director for Prison for Young Offenders at Gosford, was on a design and construction tender.
- Thomas Holt Drive Office Park: Project Director for three office buildings ranging from four storey to ten storey development all with associated civil works.
- Charter Grove St Leonards: Project Director of AUD 20 million suburban commercial development with associated leisure facilities.

- 370 Pitt Street, Sydney: Project Director for 17 level, totally precast office building constructed atop Sydney rail line.

- Kotara Shopping Centre: Project Director for AUD 50 million shopping centre/car park development at Newcastle. This work included subsequent structural review of entire centre following Newcastle earthquake of 1989.

- The Berkeley Sydney: Project Director for twenty level residential tower in Sydney CBD.

- Electricity Commission NSW Subsidence of Transmission Towers: Project Director for assessment of likely damage to 330kv transmission tower in areas subject to long wall mining subsidence. This was part of our on-going relationship with Elcom.

- W & J Sales & Services Centre Mount Thorley: Project Director of AUD 15 million centre for distributors of Caterpillar equipment in Hunter Valley mining area.

1974 — 1976  Wargon Chapman Partners — Associate Director
Associate responsible for design/documentation/supervision of a variety of building structures including:

- Prince of Wales Psychiatric Centre: An extensive three level medical centre.

- Mascot Carpark: A 2,000 car parking station at Sydney’s domestic terminal.

- Morisset High School

- Riley Island Bridge: A bridge connecting two islands in Brisbane Waters to allow a private major residential development.

1972 — 1974  Wargon Chapman Partners — Design Engineer

- Continued PhD studies part-time leading to submission and conferral of PhD 1974.

- Design Engineer on Wind Tunnel Studies (in conjunction with Prof Vickery of the University of Sydney) for erection stages of Sydney Tower, a 330 m telecommunication and tourist observation tower.

- Design Engineer on Sydney Tower particularly related to construction techniques associated welding technology and structural design.

1970 — 1972  University of New South Wales — PhD Student

- Doctoral dissertation on “Flexural Characteristic of Flat Plate Structures”. The work included a detailed literature survey of current research and code requirements, the preparation of a Finite Element Plate Bending programme including development of elements (this work was the first such FEA programme in Australia), the construction and testing of an instrumented flat plate 2 bay model with subsequent comparison between model results, and computer analysis leading to a detailed computer simulation of flat plate structure in vertical and horizontal load combination.

1969  Rankine & Hill — Graduate Design Engineer

- Design Engineer on team for structural design of Hilton Hotel, Sydney. A 35 storey building in Sydney CBD.
Also participated in design of miscellaneous small projects.

**Papers and publications**

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<th>Year</th>
<th>Title</th>
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<tr>
<td>1996</td>
<td>‘Concrete Can Be Beautiful’ — Smith.</td>
<td>Smith</td>
<td>CIA Conference, Brisbane</td>
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<td>1994</td>
<td>‘Structural Use of Precast Concrete’ — Smith.</td>
<td>Smith</td>
<td>CIA Conference, Sydney</td>
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<td>‘Precast Concrete, Recent Developments’ — Smith.</td>
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