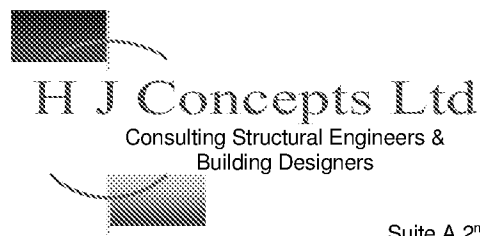


B5 Ltd
Site Office
Littlemead Business Centre
Tangmere
West Sussex
PO20 2EU



11 July 2018

Dear Mr Brooks

RE: 2-4 Waterloo Square, Bognor Regis PO21 1SU

BRIEF

Further to discussions with Mr Brooks regarding the buildings at 2-4 Waterloo Square Bognor Regis PO21 1SU, H J Concepts Ltd have made a second visit to review the condition of a steel beam on the front elevation over the ground floor opening. An initial visit was undertaken on 21st May 2018, but access to various point of the building were not available and this visit was undertaken due to additional opening up works being undertaken. This report should be read in conjunction with the review undertaken on 21 May 2018.

Experienced Structural Engineer Philip Hamblin IEng MICE AMIStructE of H J Concepts Ltd attended site on the morning of 9th July 2018 with B5 Ltd in attendance.

Record photographs were also taken during the visit to aid a balanced desk top review to be undertaken during the writing of the review.

LIMITATIONS OF REPORT

This report is a record of a very limited visual inspection carried out by H J Concepts Ltd of the structural supporting beam over the ground floor at the front of the building. The purpose was to assess whether it is has sufficient structural integrity to support the current loads.

At the time of writing no in-depth site review had been undertaken and no structural analysis undertaken or a recommendation for remedial works or reinstatement works.

A number of areas of the existing buildings were inaccessible, covered, unexposed and enclosed and as such have not been inspected and we are therefore unable to report that such parts of the property are free from defect.

No inspection was carried out on the wiring, plumbing or internal services of the structure nor any internal inspection of the external drainage (foul and storm water). All external observations were carried out by eye from ground level.

No reference to any damp penetration and wood infestation has been investigated and no inspections were carried out for deleterious materials, such as asbestos.

EXECUTIVE SUMMARY

The structural steel beam over the ground floor opening is showing signs of serious and extensive corrosion and in our opinion **the structure is not in a safe and stable condition and poses a threat to life**. It should also be noted that we are currently within the warmer months of the year, but once autumn / winter arrives we are likely to see the return of strong winds and a much more aggressive climate, which will not act kindly on the weakened structure we are currently seeing.

PROPERTY & INSPECTION



Waterloo Square View

The building which is located between Waterloo Square and Norfolk Street and is a three storey building, with commercial premises on the ground floor and residential units on floors one and two. Access for the upper floor is gain via a flat roof and stairs to the rear of the building.

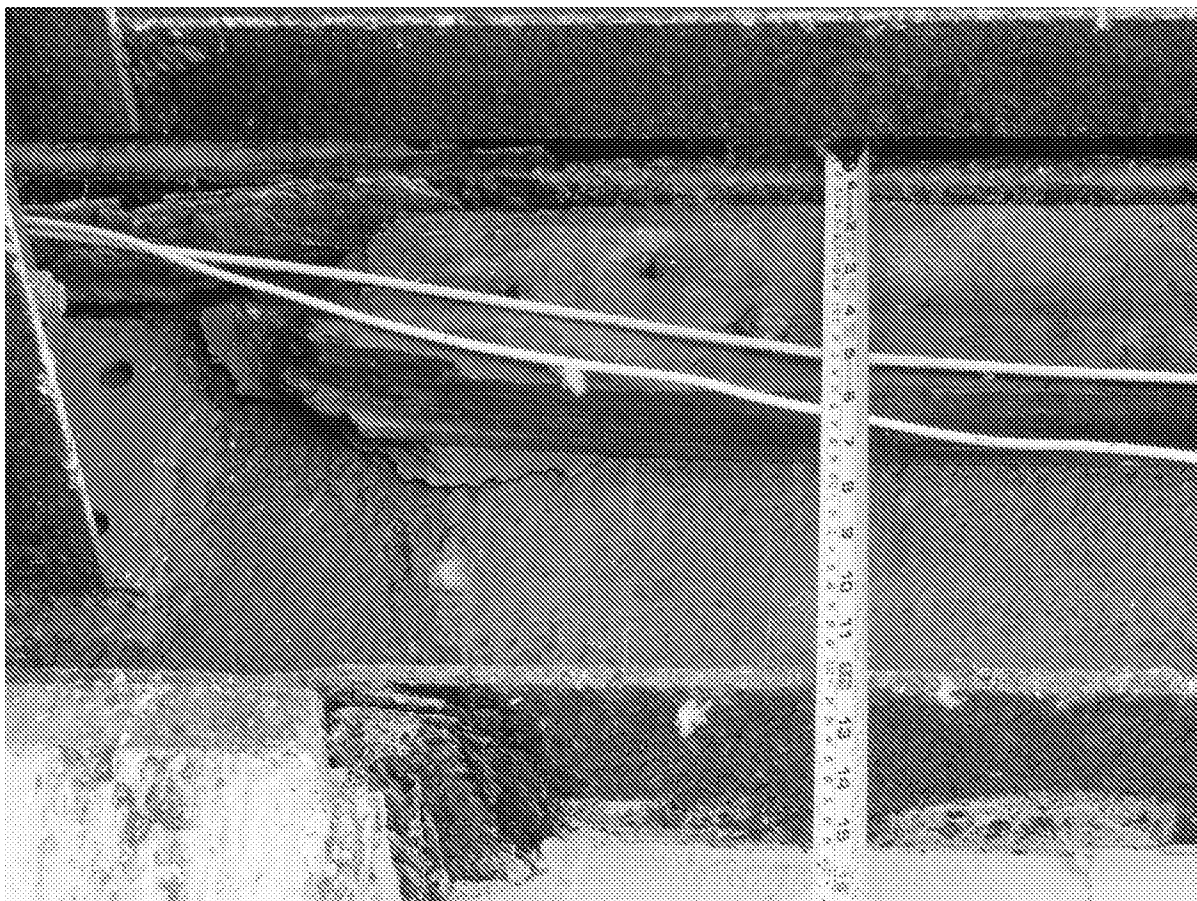
The structure on the Waterloo Square elevation are formed principally by load bearing masonry with structural beams over large openings and timber floors, and a pitched roof. The ground floor appeared to be of timber construction. The external walls are of rendered masonry, actual thickness and makeup unknown.

DISCUSSION

The beam in question is over the front ground floor external opening and has a clear span between the masonry supports of 5.180 m with the underside of the beam at 2.875 m above external ground level. The beam measures 300 mm deep by 150 mm wide with about a 10-12 mm flange. (Dimensions approximate due to access and corrosion)

The beam has serious and extensive corrosion and de-lamination to the top flange over both supports and de-lamination of the web section of the beam with physical separation. Parts of the top flange have disintegrated totally leaving no structural element in tact and as such the top flange at the bearings has lost all of its structural integrity and it's only the bottom flange providing any sort of structural resistance. Other areas of the beam are also showing extensive corrosion to the steel with de-lamination to the top central section of the flange. The photos below clearly show the extent of the corrosion and loss of essential structural steel. The steel support shims under the bearings also have serious levels of corrosion. The supporting piers at each end are rendered and no access was available to see the structural condition

The primary cause of corrosion appears to be water ingress from the aggressive coastal environment, with salt water ingress and entrapment. The buildings have been neglected for many years and as such the exterior of the building has been unable to protect the inner structure.



External Structural beam after wall construction (left hand Support)



External Structural beam prior to wall construction (left hand support)



External Structural beam after wall construction (Right hand Support)

The outer beam is one of a pair of beams that supports the internal floors and the external masonry walling. At this time it is unknown whether the external wall is of part solid masonry or part cavity construction. It is assumed to be of brick construction with cast metal wall ties.

The condition of the inner beam is unknown but given that the extensive and prolonged water ingress that has entered from above the bearing it is highly likely that the inner beam will have suffered the same extensive corrosion as the outer beam. The water would also have a very high salt content which will exacerbate the corrosion.

The extensive corrosion is at both ends of the beam seriously compromises the shear resistance and load bearing capacity of the beam.

A temporary masonry wall has been constructed to the underside of the outer beam but does not provide adequate support due to the masonry off to the vertical line by 110 mm plus the lack of structural ground floor bearing support for the wall.

A knee braced steel frame balcony is also supported off the beam with a steel cleat welded to the main support beam. The knee braces are a steel box section, which are also showing serious levels of corrosion, as is the rest of the balcony structural steelwork.

As is common with a lot of older building stock, there is typically very little to no structural linkage between the various elements (beams, floors and external walls) resulting in no robust tying. This in turn results in destabilising forces, which typically come into play when one key element fails for whatever reason. In this case a primary structural beam that supports the first floor and structural first floor piers. A typical example would be an external wall sat on a steel beam or beams, which is not fixed mechanically to its bearing, but purely relies on its own dead weight to maintain its position on the pier or wall. In this instance when the wall moves due to the beam starting to rotate, buckle and deflect (fail), the wall then becomes an accelerant and generates additional eccentric forces, thus the beam fails quicker than it would have done, had the other elements had a degree of restraint, if the wall and beam had a degree of lateral restraint.

This is the situation we have with this building. Should the beam fail, the facade wall and piers above have no structural tie back into the building, thus resulting in the masonry becoming a destabilising force and load and ultimately assist in the buildings collapse. The floors provide no lateral restraint to the façade or flanking walls and as a result the complete external wall collapses with the beam.

As can be seen from the images the beams also have no environmental protection and given the nature of the very aggressive environment it is highly likely that all the steelwork within the building is suffering with corrosion and delamination resulting in a loss of structural capacity.

Salt water and salt spray are among the worst elements that can be thrown at a building and once they start to penetrate the exterior of the building they can create a significant and harmful environment for the buildings key structural elements both ferrous and non-ferrous

Another key concern is the weather. The building is in a prominent position right on the sea front and will be the subject of very high wind forces as the wind comes off the sea. These wind forces create large pressure and suction forces on the corners and gables of buildings as there is no natural shielding or diffusion of the wind these forces will have a greater effect on the structure and in particular the external masonry envelope. Gable end suction is a common cause in older buildings as the top edge of the masonry is not laterally restrained by the building as it is in all modern buildings.

In these instances it would only take the gable end to be sucked out and this would result in movement of the external envelope which due to its lack of lateral tying would generate sufficient horizontal forces to destabilise other areas of the buildings masonry. Given that the beams are already in a very poor state of repair this would hasten the collapse of other elements.

Other unknown elements include:

- the state and condition of the wall ties given the high exposed location
- The state of the internal timber floors and their connection to the external walls
- The condition of the masonry and bed / perpend joints beneath the render
- The state of the roof and its lateral restraint to stop roof spread
- The condition of any concrete lintels and carbonation of reinforcement
- The structural capacity of key elements given the change in climate and uses within the building
- Any contamination from ACM's
- The state of foundations

All of which need careful considered, as they all have a role to play on overall stability and structural robustness.

In essence the building of this condition will require extensive works to enable it's refurbishment and provide a long term robust structure in such an aggressive atmosphere which may well be uneconomic in terms of the space in yields.

Another key and current issue but separate from the structural one is histoplasmosis, which is a respiratory disease, caused by a fungus that forms on and in dried bird droppings. The building is full of pigeons and this will need to be fully dealt with ahead of any structural works being carried out.

The building also has ACM's (Asbestos containing materials) and these again will need to be dealt with prior to any structural works.

CONCLUSION

Due to the serious and dangerous condition of the exposed structural steelwork, it is our opinion the structure is not in a safe and stable condition and poses a risk to life should the beam fail and immediate action should be taken to stop the beam from failing. There are elements within the building that are hidden and inaccessible till works commence these are likely to require attention, resulting in a vastly growing repair situation

The masonry under the beam will not provide sufficient restraint or support for the beam due to its positioning under the beam and it's foundation support. Temporary acrows props have be installed to provide some additional structural support, but these are only a temporary measure.

It should also be noted that we are currently within the warmer months of the year, but once Autumn arrives we are likely to see the return of strong winds and a much more aggressive climate, which will not act kindly on the weakened structure we are currently seeing

Given that a pre-enquiry to replace and re-generate the building and adjoining site has already been submitted to Arun District Council following the fire last year, it would seem a waste of resources (work, material, time and money), not to mention the disruption to the seafront tourist area in the short term to repair one element of the structure, when there are countless others that may well need attention, given the general condition of the building and its key structural elements. We believe that the structure has past it's useful life and that any repair work to restore the building to a functional sustainable long term enhancement to the area would be uneconomical.

Due to the visual condition of the exposed structural steelwork, it is our opinion that the structure is not safe and is a risk to life

Yours sincerely

A solid black rectangular box used to redact the signature of Philip Hamblin.

Philip Hamblin IEng MICE AMIStructE
For & on behalf of H J Concepts Ltd