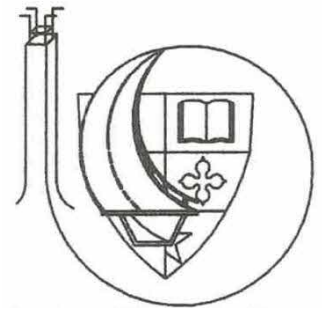


TURNBULL KYLE LTD

CONSULTING CIVIL AND STRUCTURAL ENGINEERS



FEASIBILITY STRUCTURAL REPORT

COVERING

PROPOSED CONVERSION AND REPLACEMENT BUILDINGS AT

THE ORCHARD CENTRE, 1 DOUGLAS CRESCENT, BONNYRIGG

FOR

ESK HOMES LTD

TURNBULL KYLE LTD
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
10 OLIVER PLACE
HAWICK
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TD9 9BG

15 April 2024

Ref.: 5804

1.0 GENERAL STRUCTURAL CONDITION AND PERFORMANCE SPECIFICATION

Structural Condition

The existing main building is formed primarily as traditional masonry construction. The roof is formed as slate on timber roof trusses. The first floor is formed as timber suspended. The ground floor is mostly suspended timber with localised areas of concrete slab. The existing single storey building to the north east of the site is formed as timber clad timber frame with a flat felt roof. Externals to the site are a combination of hard landscaping/asphalt and general grassed.

A non-disruptive structural inspection was carried out by this practice on 28/02/2024. In general, while the property has clearly been unoccupied for a few years and in need of refurbishment, the structural condition of the main traditional two storey building is good. Only minor hairline cracking was noted internally with the occasional evidence of leaks in the roof finishes etc. Minor cracking noted internally to the west corner of the first floor meeting room window. Externally the render is failing in several locations and the base courses to the south west and south east are showing signs of degradation through rainwater and likely road salts etc.

Access was available into the main roof space and was generally in reasonable condition, with the exception of leaks where slates have been dislodged or are missing. Several rainwater downpipes and gutters are deteriorating, with staining evident at leaks etc. Hairline cracks were witnessed in particular to the front curved entrance area which is to be expected of this type of property and age. No masonry movement joints are evident throughout the building. No evidence of any significant structural movement was witnessed in the property.

The single storey unit to the north east is in a significantly poorer condition, with many leaks and failing cladding evident. The ground floor suspended joists were also noted as being bouncy underfoot, potentially suffering from rot or decay. Several downpipes from this building are witnessed to drop below ground into below ground drainage.

An in-depth condition survey has been carried out by Lothian Built Environment Services. We are in agreement with the structural findings of this report.

Conclusion

Based on our inspection and review of the previously provided report we conclude that the existing two storey main property, subject to suitable minor repairs and remedial works as necessary, is structurally suitable for retention and conversion works to form a new housing development.

The existing single storey timber clad structure we would advise is likely beyond its intended design life and is unlikely to be suitable for retention or conversion.

Performance Specification for Future Development

Imposed loading to roof structures to B.S. 6399-1:1996

Roof uniformly distributed long-term imposed load: - 1.00 kN/m²
An allowance will need to be determined for local snow drifting.

Imposed loading to floors to BS 6399-1:1996

First and Ground floors within domestic areas:

A uniformly distributed long-term imposed load: - 1.50 kN/m²

Communal Corridors and Stairwells:

A uniformly distributed long-term imposed load: - 4.00 kN/m²

Imposed loading to external protective barriers to BS 6399-1:1996

Horizontal short-term imposed load on handrail - 0.740 kN/m
Horizontal short-term imposed load on infill panels: - 1.000 kN/m²
Horizontal short-term imposed point load on part of in infill panels: - 0.500 kN

Imposed loading to protective barriers to internal domestic areas to BS 6399-1:1996

Horizontal short-term imposed load on handrail	- 0.360 kN/m
Horizontal short-term imposed load on infill panels:	- 0.500 kN/m ²
Horizontal short-term imposed point load on part of in infill panels:	- 0.250 kN

2.0 FOUNDATIONS

A review has been carried out on the provided Phase 1 Site Investigation Report and Coal Mining Risk Assessment by Earth Environmental and Geotechnical dated February 2024.

The report by Earth Environmental indicates that while mine working has historically been carried out in the area, there are no reported claims in the vicinity. In general the ground gas risk and contamination risk is low. The report indicates that a Phase 2 Site Investigation is recommended for future development to adequately advise on suitable foundation options for any extensions/new build etc. Based on the BGS information the ground is likely silty sandy gravelly clay, otherwise known as till or boulder clay.

While no guarantee can be given that coal related settlement won't occur, we would advise the risk to the property from mining related settlement is very low. The existing main property has been on the site for around 100 years with no evidence of settlement or ground movement. The existing single storey structure, while not as old, has also been on site for many years with no evidence of settlement or ground movement.

In general the new scheme is to form a new single storey, lightly clad, timber frame structure to replace the existing timber clad structure. The weight of the existing and replacement structures will be very similar and a shallow foundation option would likely be suitable, in a similar manner as the existing structure. It would be prudent to consider a raft foundation in this instance. The Phase 2 Site Investigation will better steer the final design however shallow foundations would be anticipated.

Typical Foundation Specification

Concrete in foundations and ground floor slab to be designated mix RC35 to table A.14 of BS 8500-1:2006 DC-1 AS-1. Blinding concrete to be designated mix GEN1 to table A.14 of BS 8500-1:2006. All in-situ concrete to be compacted thoroughly and cured to the recommendations of BS 8110-1.

All steel reinforcement specified to comply with BS4449 and/or BS4483 and cut and bent to BS8666. Nominal laps of mesh to be 400mm. Minimum bar lap length to be 40 times the smaller of the lapped bars. All reinforcement to be high yield ($f_y=500\text{N/mm}^2$) to BS.8666:2005. Contractor to detail spacers and chairs to provide adequate support to reinforcement, generally in compliance with concrete society report 'cs101' spacers for reinforced concrete 1989'.

Hardcore to below ground floor slab to be type 1 granular sub-base material to clause 803 of the specification for highway works. Sub-base material to be laid and compacted in layers not exceeding 110mm to clause 802 of this specification, without drying out or segregation.

UK Radon mapping has been reviewed and the radon potential for the site is less than 1%. No radon exclusion measures are required in accordance with BRE Report 211 - Radon: Guidance on protective measures for new buildings. The Phase 2 SI report may require a more onerous ground gas protection approach, however the Phase 1 SI indicated a low ground gas risk.

3.0 BELOW GROUND DRAINAGE

Given the anticipated glacial till nature of the subsoils on the site it is anticipated the site will have very low to no percolation.

Based on the Scottish Water Asset plans the only public sewer in the area is the combined sewer to Lothian Street. As all existing downpipes to the property appear to drop below ground the existing roof drainage and hard landscaped areas at present must discharge to the public sewer.

Since the property has not been occupied for many years and the new scheme is to be an improvement on the existing drainage system, rainfall should be attenuated on site prior to discharge to the public combined sewer. Surface water to be attenuated at the 1 in 200 year greenfield runoff rate and 1No. attenuation zone provided to the east of the site below the proposed carparking area. Scottish water will require consultation on the final drainage scheme. Given likely poor percolation on site and insufficient demand for full rainwater harvesting, attenuated discharge to the mains, we believe, is the only feasibly suitable option. Please refer to separate drawing 5804-96001 for proposed outline surface water drainage scheme.

All external areas are to be of porous construction; grassed garden ground, gravel access paths or porous paving etc. This represents a substantial improvement on the existing layout where all hard landscaping and 130m² of roof area discharges directly to the sewer. The new scheme represents a reduced roof area of 100m² discharging to the sewer after attenuation.

All new foul drainage would also require to be taken into the public sewer in the standard manner. Scottish water will require consultation on the final drainage scheme.

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15 April, 2024

Signed

DAVID KYLE MSc CEng MICE

DK/5804