RoseConsultingEngineers

Park Nook
Barkisland
Halifax
HX4 0AP

01422 825155
eng@roseconsult.co.uk
www.roseconsult.co.uk

Structural Appraisal of Buildings B, C, D & G, Turnbridge Mills, Quay Street, Huddersfield, HD1 6QT

RCE6909

Paul Rose Consulting Engineers Ltd
Registered in England. Registration number: 5389430
VAT number: 857 1623 12

Partners:
Dr Paul Rose BEng(Hons) PhD CEng MIStructE MICE
Mrs Helen Rose

The Institution of Structural Engineers

RoseConsultingEngineers

Structural Appraisal of Buildings B, C, D & G, Turnbridge Mills, Quay Street, Huddersfield, HD1 6QT

RCE6909

Rev	Date	Description	By
-	30-01-25	Initial issue	PR
A	13-03-25	'*Comment on possible proposed development of Buildings B & D*' section added	PR
B	17-03-25	Minor amendments	PR
C	16-04-25	Minor amendments	PR

Client:

John L Brierley Ltd
Turnbridge Mill
Quay Street
Huddersfield
HD1 6QT

Inspection dates:

21st January 2025

Report compiled by:

.....
Dr Paul Rose BEng(Hons) PhD CEng MIStructE MICE

Contents

General Overview of Project

Brief

Mr I Brierley of John L Brierley Ltd appointed Rose Consulting Engineers to inspect, report and appraise the structures of Turnbridge Mills, Quay Street, Huddersfield.

Scope of Report

This report covers the condition of the structural elements of the development only and does not deal with other specialist elements (e.g. mechanical / electrical services; plumbing; drains; decorative finishes; etc.) unless they exhibit visible defects or are having an adverse effect on the structure.

Site Visit

The Turnbridge mill development was inspected on 21st January 2025.

Description of Site

The Turnbridge mill development is situated approximately 200m to the east of the A62 Huddersfield ring road. The mill development is bounded between Watergate to the west, Old Leeds Road to the north, the Huddersfield Broad Canal to the east and the new Sainsbury's development to the south. Quay Street crosses the Turnbridge mill development site.

Refer to Figure 1.

The site is situated at approximately 90m above sea level and is relatively flat.

The underlying geological stratum from the British Geological Survey is described as soft to firm consolidated, compressible silty clay overlying inter-bedded grey mudstone, siltstone and pale grey sandstone – being part of the Pennine Coal Measures.

It is not known if this area has been subjected to historic coal mining or quarrying of sandstone.

Listed Buildings

It is understood that the chimney on the site is grade (ii) listed. A grade (ii) structure is nationally important and is of special interest and affects not only the building of interest, but also the buildings which are associated with the building of interest. All listed buildings and associated buildings require 'listed building consent' in accordance with the Planning Act 1990. Even minor works such as painting or simple repair work in some cases can fall under the scope of the Planning Act. All repair works already undertaken should be checked to be compliant with listed building consent and all proposed future works should also be ensured to be compliant with listed building consent.

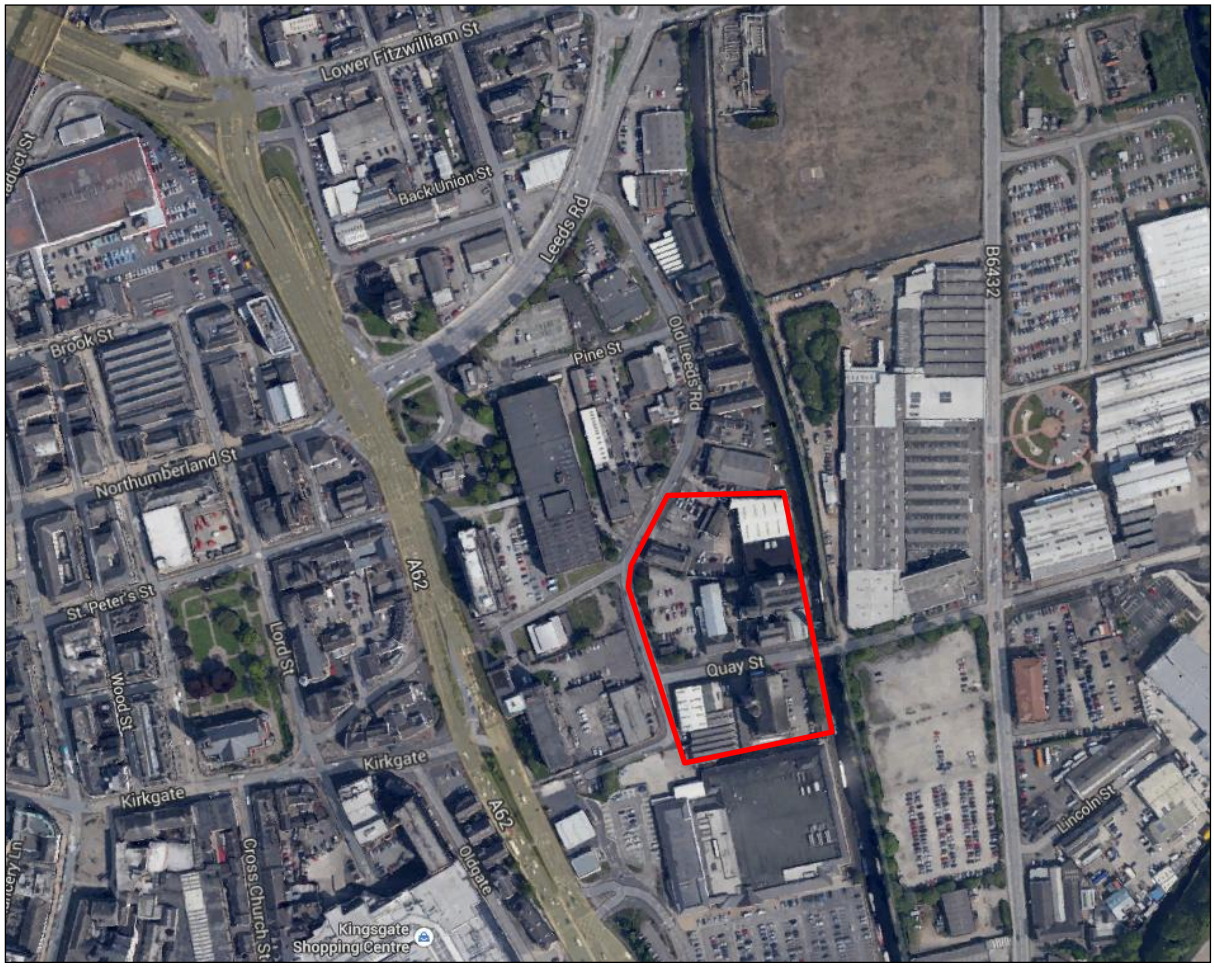


Figure 1 – Site location plan

Approach of Structural Appraisal Report

The appraisal has been undertaken on a building-by-building approach. The building references used are denoted in Figure 2.

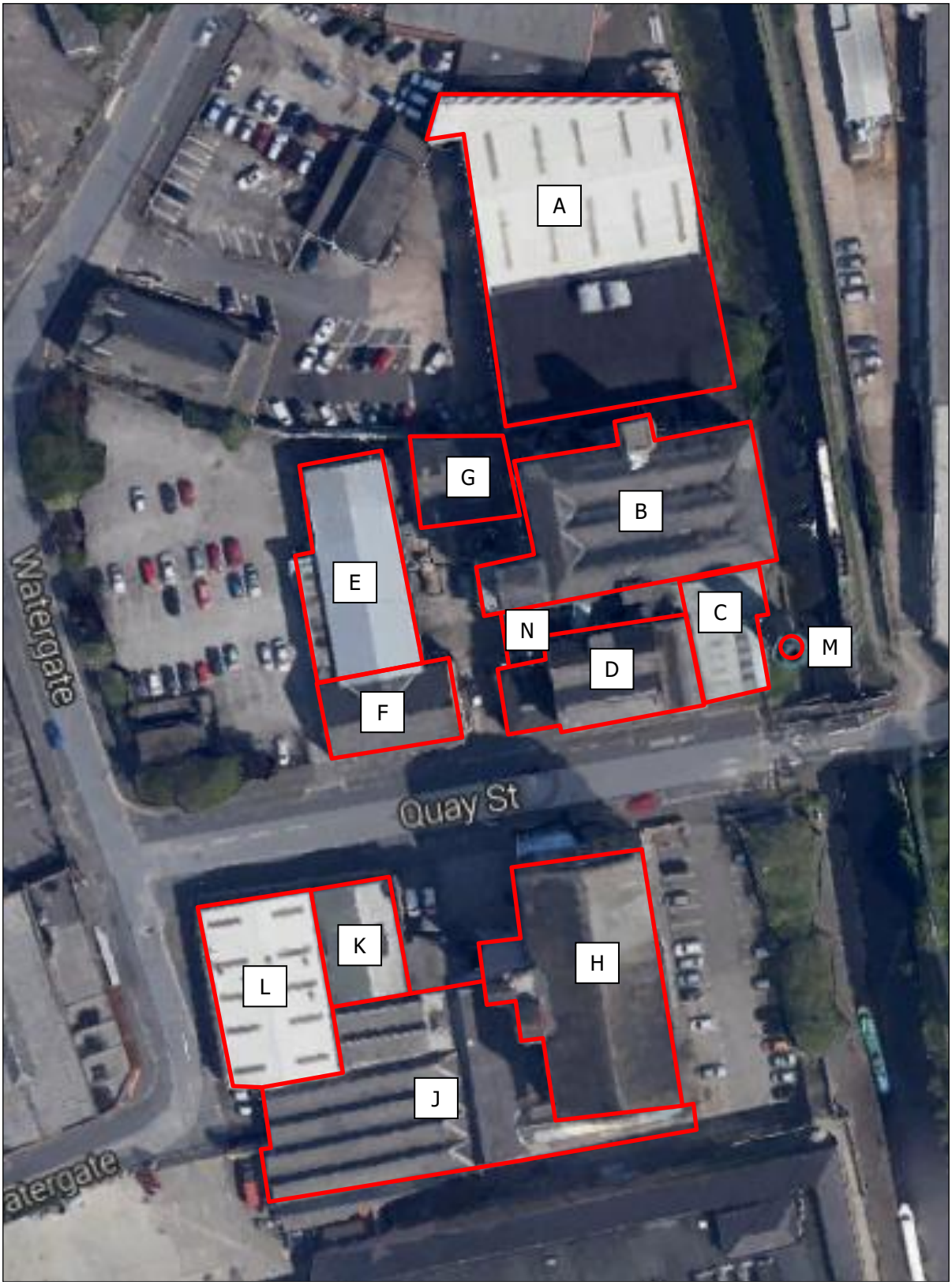


Figure 2 – Building Identification

Classification of Structural Elements

To assist with users of this appraisal, the following table provides a definition of the condition categories used during the survey of the mill development.

Condition	Description
Condition A	The element is as new and can be expected to perform adequately for its full life.
Condition B	The total element is sound, operationally safe and exhibits only minor deterioration which can be corrected by routine maintenance.
Condition C	The total element is operational but major repair or replacement will be needed soon, within say three years.
Condition D	Elements where there is an imminent risk of imminent breakdown or of their being unacceptable in health and safety grounds.

Building B

Description

Building B is a large old mill structure dated to approximately 1860. There are five floors and a basement. The roof consists blue slates on rafters and purlins on a three bay, hipped roof truss configuration. The roof and subsequent floors are supported off cast iron columns which extend to masonry walls at basement level. The floors consist of brick arches (presumably with a concrete infill) between secondary and primary cast iron beams. The basement has brick retaining walls which appear to extend below the level of the adjacent canal.

The staircase consists of masonry walls with stone flags for the treads and landings.

There is a steel link bridge spanning between buildings B and D.

To the west elevation there is a new structure containing toilet blocks which has been fitted adjacent to the main staircase. The structure consists of a roof and floors constructed of steel filler joists with concrete floor. The masonry is stone. This structure is assumed to be 100 years old.

Limitations

The inspection was visual only. No additional investigatory holes were made. No finishes were removed. It was only possible to observe the eastern elevations from the opposite side of the canal. There was no access onto the roof. There was no access onto the fourth floor. The basement appears to be only to part of the building (there was no visible access to any further sections of the building).

Defects Evident, Possible Causes and Required Remedial Works

Generally, building B is in a poor structural condition. The main walls are plumb and straight, the floors which are level with low resonance and structural members which visually appear in proportion. There are, however, several points which require addressing as follows.

- **Sloping floors**

  The outer bays of the mill floor can be seen to be sloping downwards to the perimeter walls (the centre bay is approximately horizontal). The out-of-level floors appears to be a longstanding differential settlement issue where foundations are probably onto different bearing strata (possibly due to the part basement).

  Refer to Photograph 3 and Photograph 4.

  Condition A

- **Staircase situated between buildings A and B not tied in**

  There is a large vertical crack to the interface of the staircase and adjacent mill which demonstrates that the staircase masonry is not tied in. The crack should be pointed using appropriate mortar.

  The crack should be observed during an annual maintenance programme, and should it appear to change, expert advice should be sought.

  Refer to Photograph 1 and Photograph 2.

  Condition B

- **Cracked lintel**

  To the fifth floor, there is a cracked lintel. It is imperative that should the window be changed that the lintel is changed prior.

  Refer to Photograph 14.

  Condition B

- **Cracking to east elevation**

  To the 2nd floor there is a vertical crack to the centre of one of the masonry piers. The crack is probably due to corrosion of the end of the cast iron beam, but this should be ratified by further inspections.

  Refer to Photograph 6.

  Condition C

- **Roof structure**

  Several repairs have been historically made to the roof. It appears that the gutters have probably not been well maintained, and that water ingress has caused the truss ends to rot. Some of these trusses are now in danger of collapse. Some of the truss ends are currently supported by props.

  It is recommended that a full timber and damp survey is undertaken by a suitably qualified and experienced specialist to ensure that the extent of the rot is treated. It may be necessary to incorporate additional steel shoes into the structure.

  The rainwater goods should be maintained as part of a regular maintenance programme.

  Major works to the roof are required. To properly repair the roof, it is estimated that approximately 50% of the roof is removed and replaced.

  Refer to Photograph 8 to Photograph 12.

  Condition D

- **West elevation toilet blocks**

  The west elevation toilet blocks are in a poor state of structural repair. It appears that water ingress has occurred through the roof and has affected the floors below causing the steel filler beams to corrode. The masonry wills are not tied into the main structure.

  Provided the water ingress issues have been resolved and the masonry is tied back to the main structure, the main structure should be acceptable.

  Due to the water ingress, the timber lintels appear to be deteriorating. The lintels should be replaced in due course using precast concrete lintels.

  Refer to Photograph 15, Photograph 16 and Photograph 28.

  Condition B

- **West elevation accommodation to second floor**

  To the second floor adjacent to the main staircase, there is a temporary accommodation on the original roof. The temporary accommodation is in very poor condition and plans should be made to remove the temporary accommodation and alternative accommodation be made available for users of the site.

  Refer to Photograph 17 and Photograph 18.

  Condition C

- **Removal of large textile machinery housings**

  To all four elevations, there are large projecting, cantilevering textile machinery housings. It was not possible to inspect these due to access.

  All the machinery housings will be constructed using steel or ironwork. It is suspected that these will have significantly corroded and will require removal.

  It is recommended that the machinery housings are removed for safety (they currently have no purpose).

  Condition C (assumed)

- **Cast iron water tank and tower**

  To the north elevation, there is a large cast iron water tank and tower.

  No access was available into the upper level of the water tower, or to the water tower.

  If the water tank is to be retained, it is recommended that access is gained and a full appraisal of the corrosion affecting the tank is undertaken. Full corrosion treatment should be undertaken, probably with painting to the external faces.

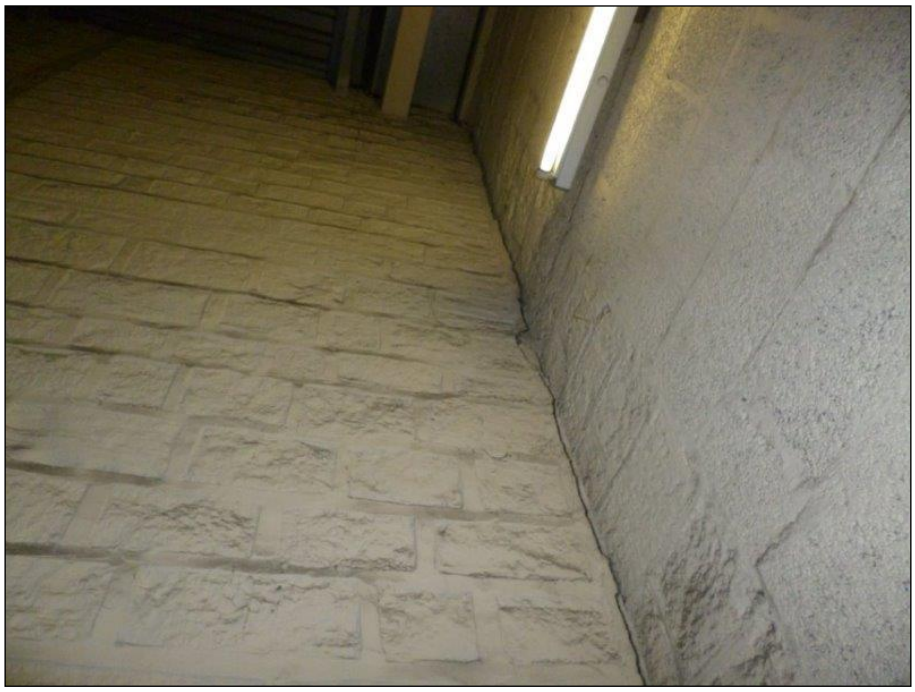
  Condition C (assumed)

- **Severe weathering of external faces**

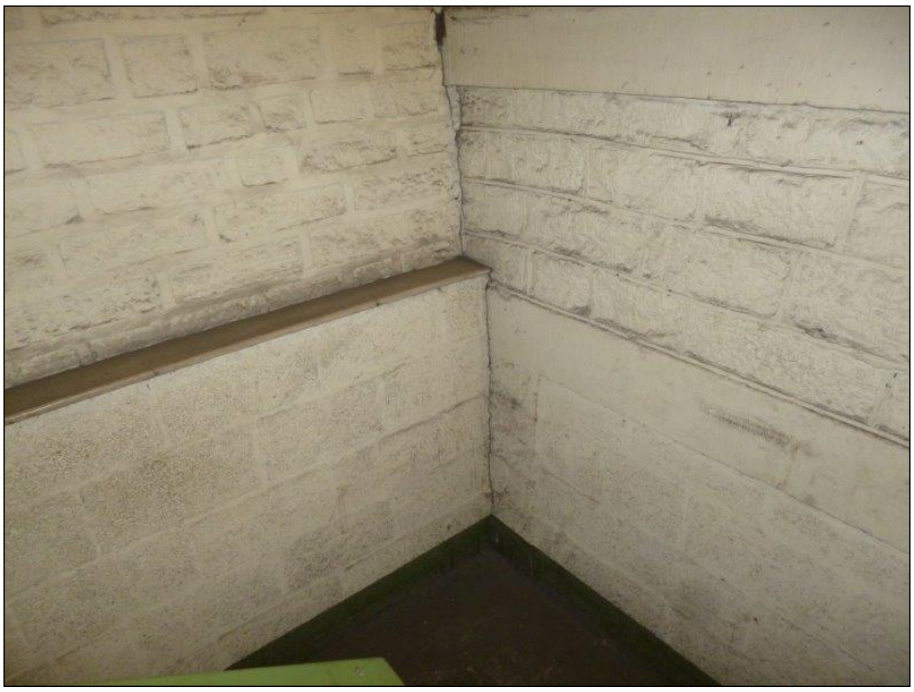
  Masonry and pointing to all the elevation has severely weathered.

  It is recommended that the external elevations are checked from scaffolding, any severely weathered stone units are to be removed and replaced on a like-for-like basis. The building should be repointed using a sympathetic lime mortar, applied by a suitably experienced, insured and qualified builder.

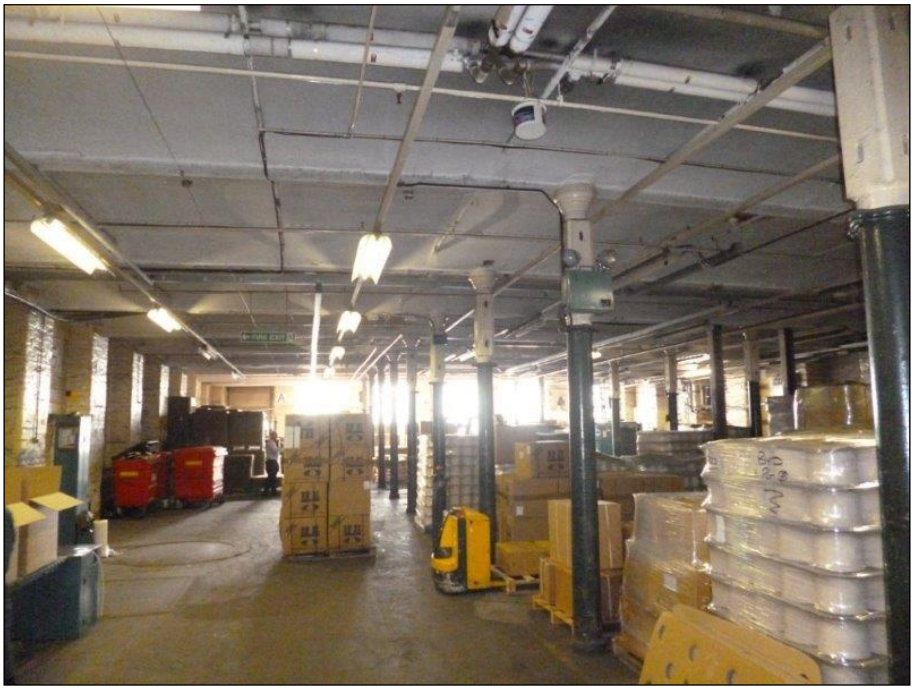
  Condition C



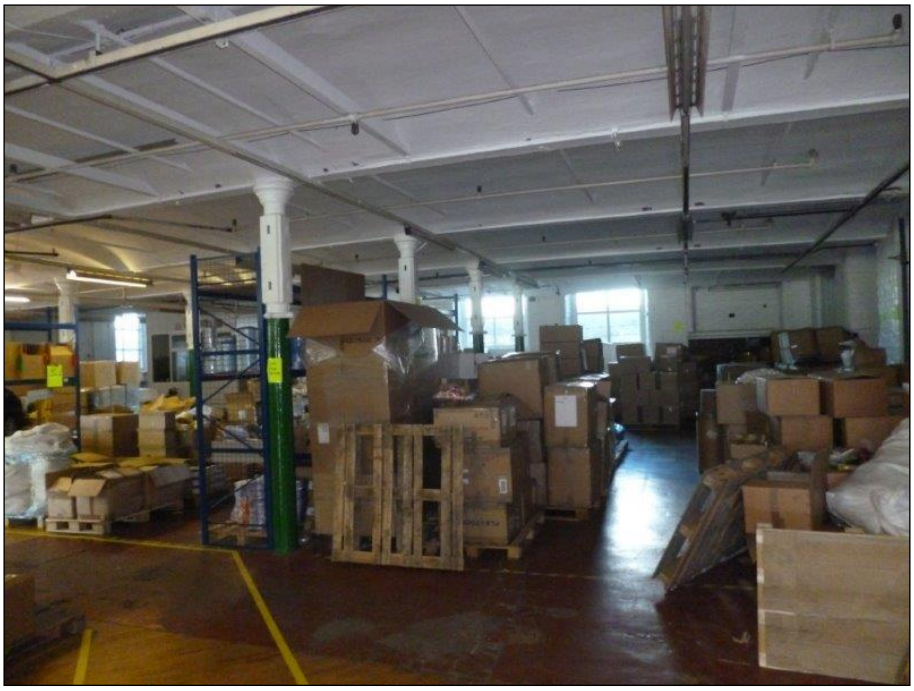
Photograph 1



Photograph 2



Photograph 3



Photograph 4

Photograph 5

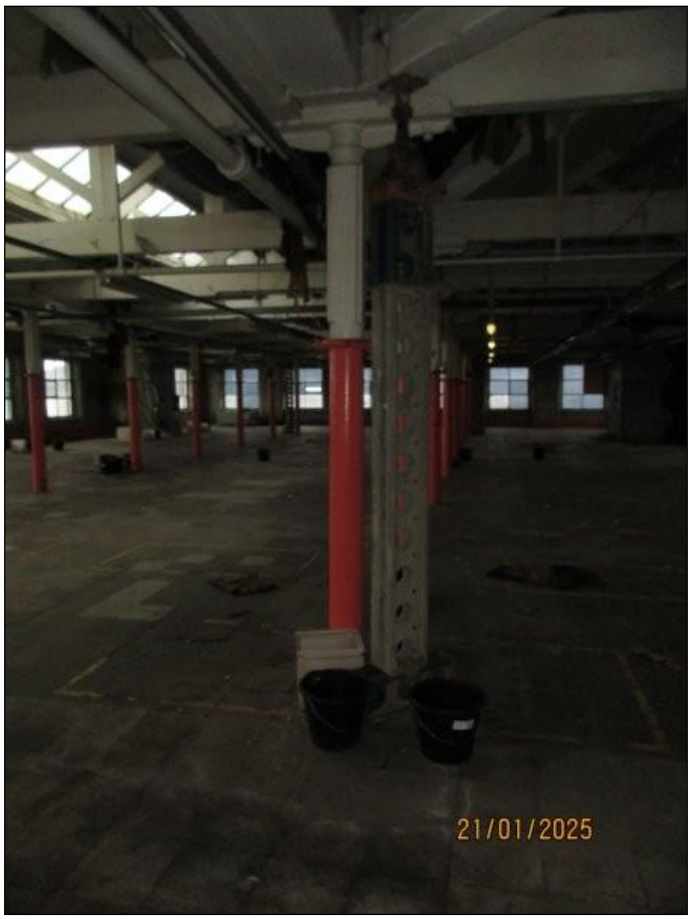
Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10



Photograph 11

Photograph 12

Photograph 13

Photograph 14

Photograph 15

Photograph 16

Photograph 17

Photograph 18

Photograph 19

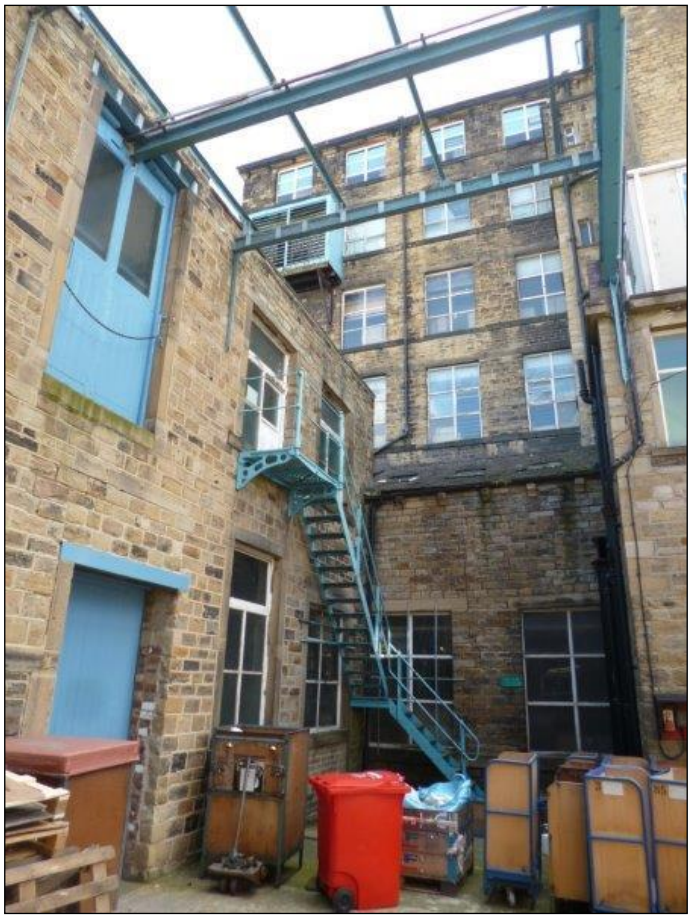
Photograph 20

Photograph 21

Photograph 22

Photograph 23

Photograph 24



Photograph 25

Photograph 26

Photograph 27

Photograph 28

Building C

Description

Building C is a single storey structure with a modern cladded roof with steelwork supporting purlins. The outer walls consist stone masonry. The ground floor appears to be concrete. It is suspected that the building used to be an old boiler / steam room.

Limitations

The inspection was visual only. No additional investigatory holes were made. No finishes were removed. It was only possible to observe the eastern elevations from the opposite side of the canal. There was no access onto the roof.

Defects Evident, Possible Causes and Required Remedial Works

Generally, building C is in a good structural condition with walls which are plumb and straight, floors which are level with low resonance and structural members which visually appear in proportion. There are, however, a small number of points which require addressing as follows.

- **Spalling of masonry**

  At low level there are areas of masonry which have spalled. Whether the spalling masonry is due to rising damp, steam or a combination, it is unknown. It is recommended that these areas are rendered in a suitable material to ensure the longevity of the structure.

  Refer to Photograph 35.

  Condition B

- **Bulging masonry to adjacent building D**

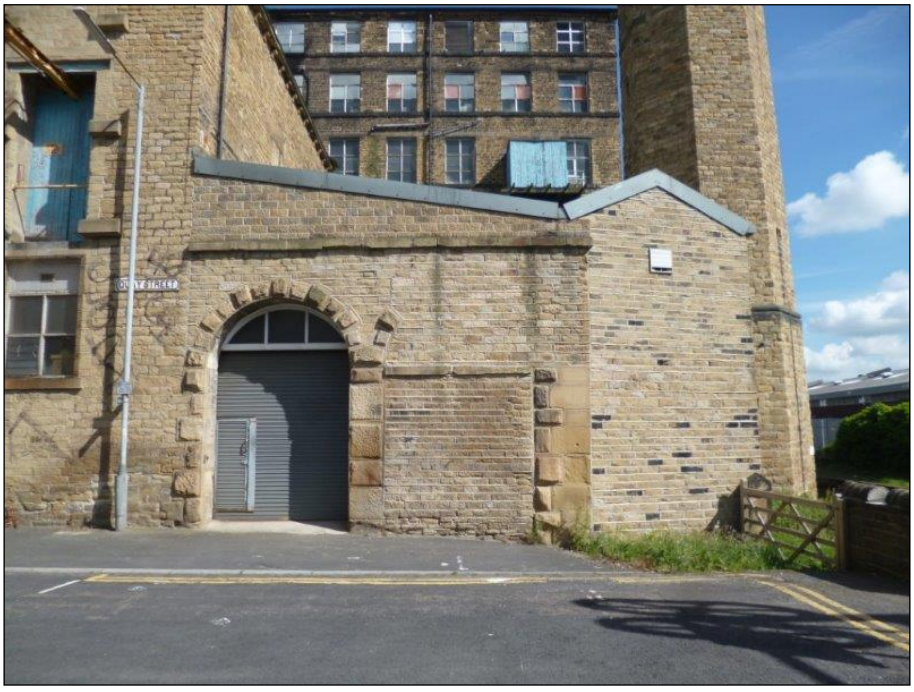
  The masonry wall between buildings C and D has a bulge in the upper sections.

  It is suggested that the masonry bulge is visually monitored as part of a regular maintenance programme, and should it appear to change, expert advice should be sought.

  Refer to Photograph 36.

  Condition B

Photograph 29



Photograph 30

Photograph 31

Photograph 32

Photograph 33

Photograph 34

Photograph 35

Photograph 36

Building D

Description

Building D is a four storey mill structure currently being used as an engineer's workshop. The roof consists of slates on timber purlins and trusses. The outer walls consist of stone and brick masonry. The ground floor appears to be concrete; all other floors are timber beams, joists and boards. There is a lift shaft accessing all floors to the building.

Limitations

The inspection was visual only. No additional investigatory holes were made. No finishes were removed. There was no access onto the roof.

Defects Evident, Possible Causes and Required Remedial Works

Generally, building D is in a poor structural condition with walls which are out of plumb and are not straight. The floors, however, are level have low resonance and structural members which visually appear in proportion. There are, however, several points which require addressing as follows.

- **Roof structure**

  The roof structure to Building D is in a very poor structural state. The roof appears to have been poorly maintained along its valley gutters, and has leaked, causing rot to occur to the timber structure and corrosion to the supporting steelwork.

  Remediation works to the roof structure are potentially quite far reaching as the water ingress is affecting steel and timber structural elements two floors lower down.

  It is recommended that a suitably qualified, experienced and insured timber and dame specialist is employed to determine the extent of the timber damage, at which point the implications can be fully assessed.

  Refer to Photograph 37 to 43.

  Condition D

- **Western gable wall**

  The west elevation gable wall is bowing and appears to have a significant lack of restraint. The wall is constructed of 9" brick, which seems to indicate that perhaps at some point, the mill structure was to be continued at this wall was initially intended to be temporary.

  Unfortunately, the masonry gable wall seems to have bowed to an eccentricity more than 100mm from its original, plumb location. The 'middle-third rule' states that no tension will develop in a wall if the resultant force lies within the middle third of the structural element. This wall has moved such that the 'middle-third rule' has been exceeded and, as such, tensile forces will be developing in the wall for which it is not designed. The western gable wall is becoming structurally unstable.

  Following a design procedure, it is recommended that the western gable wall is demolished and re-built using appropriate materials, and using a fully qualified, experienced and insured builder.

  Refer to Photograph 58 to Photograph 62.

  Condition D

- **South wall**

  The south wall is bowing to the uppermost floor. The wall is constructed of stone and appears to be approximately 450mm thick.

  The wall seems to have bowed to an eccentricity more than 75mm from its original, plumb location. This is just on the cusp of the 'middle-third rule'.

  It is recommended that a steelwork supporting system is designed to prevent any further movement to the wall using wind posts resin bolted to the wall, and a wind girder positioned just below the ceiling line. These works should be designed and overseen by a chartered structural engineer.

  Refer to Photograph 47 to Photograph 51.

  Condition D

- **Kneeler to south-east corner**

  The kneelers to all corners have moved, the kneelers require properly tying back to the main structure.

  Refer to Photograph 45, Photograph 52 and Photograph 53.

  Condition D

- **Cracked lintels**

  There are cracked lintels to various windows throughout the structure. It is imperative that should the window be changed that the lintel is changed prior.

  Refer to Photograph 63 and Photograph 64.

  Condition B

- **Screed to timber floors**

  The screed to the timber floors has badly cracked. Screed on timber floors never works well.

  It is recommended that the screed is removed.

  Refer to Photograph 63 and Photograph 64.

  Condition B

- **Filler joist floor to west of Building D**

  The cellar to Building D seems to extend underneath the access road between the mill buildings. The roof to this section of cellar was probably constructed between 1900 and 1920, judging by the style of construction.

  The roof is constructed using steel or cast-iron joists at close spacings, between which a concrete infill has been cast.

  The steel or cast-iron joists are heavily corroded and are possibly liable to collapse imminently.

  It is recommended that the ceiling is propped immediately, with a long-term plan to remove the filler joist roof and to install a new roof or alternatively infill this section of cellar.

  Refer to Photograph 65.

  Condition D

- **MDF type material to ceiling of ground floor joists**

  The soffit of the ground floor timber joists has been covered over with what appears to be an MDF boarding. The boarding is starting to deteriorate from damp and has fallen off in some areas.

  The MDF ceiling may constitute a fire hazard, and the floor joists are exposed.

  It is recommended that the ceiling is removed, and a new, appropriately specified plasterboard ceiling is installed.

  Refer to Photograph 66.

  Condition D

- **Corroding beams in cellar supporting front gable wall**

  In the cellar, there are a pair of steel beams supporting the front gable wall which are badly corroded.

  It is recommended that they steel beams are removed and replaced on a like-for-like basis by an appropriately insured, experienced and qualified builder.

  Refer to Photograph 67.

  Condition D

- **Fire escape**

  The fire escape to the north elevation of Building D probably does not comply with the personnel loading that is expected of a modern fire escape, nor is it fire protected.

  It is recommended that the fire escape is removed and a new fire escape constructed.

  Refer to Photograph 68.

  Condition D

- **Fire compartmentation**

  There is no fire compartmentation to floors (fire compartmentation is a fire safety strategy where a building is divided into smaller, fire-resistant compartments to limit the spread of fire, smoke, and heat).

  Fire compartmentation is achieved by constructing fire-resistant walls, floors, and ceilings, as well as installing fire doors and other sealing mechanisms. The primary goal is to protect occupants, prevent damage to property, and allow firefighters time to respond effectively.

  Condition D

Photograph 37

Photograph 38

Photograph 39

Photograph 40

Photograph 41

Photograph 42

Photograph 43

Photograph 44

Photograph 45

Photograph 46

Photograph 47

Photograph 48

Photograph 49

Photograph 50

Photograph 51

Photograph 52

Photograph 53

Photograph 54

Photograph 55

Photograph 56

Photograph 57

Photograph 58

Photograph 59

Photograph 60

Photograph 61

Photograph 62

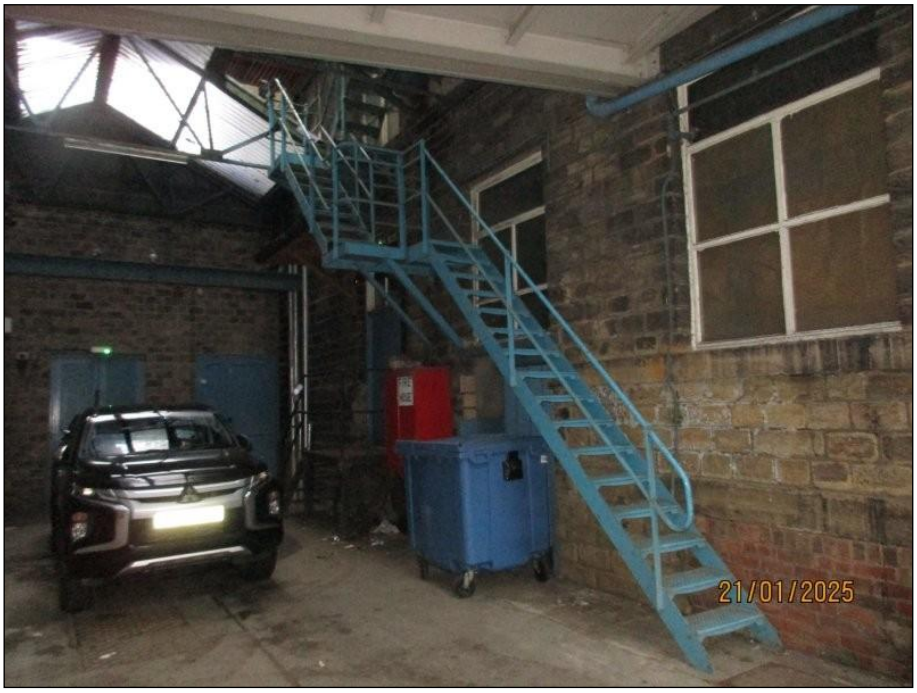
Photograph 63

Photograph 64

Photograph 65

Photograph 66

Photograph 67



Photograph 68

Building G

Description

Building G is an old mill structure dated to approximately 1900. There are two floors and a basement. The roof consists blue slates on rafters and purlins and trusses. The concrete floors are supported off steel columns. The floors consist of concrete slabs between secondary and primary steel beams.

There is a steel link bridge spanning between buildings E and G.

Building G connects to building B.

Limitations

The inspection was visual only. No additional investigatory holes were made. No finishes were removed. There was no access onto the roof.

Defects Evident, Possible Causes and Required Remedial Works

Generally, building G is in good structural condition with walls which are plumb and straight, floors which are level, have low resonance and structural members which visually appear in proportion. There are, however, a small number of points which require addressing as follows.

- **Fire escape structure to first floor**

  The fire escape is supported off gallows brackets which have only one level of bolts. The fire escape is clearly not of a strength suitable for the requirements and should be removed and replaced prior to the first floor taking occupancy.

  Refer to Photograph 69.

  Condition D

- **Leaking and rotting roof structure**

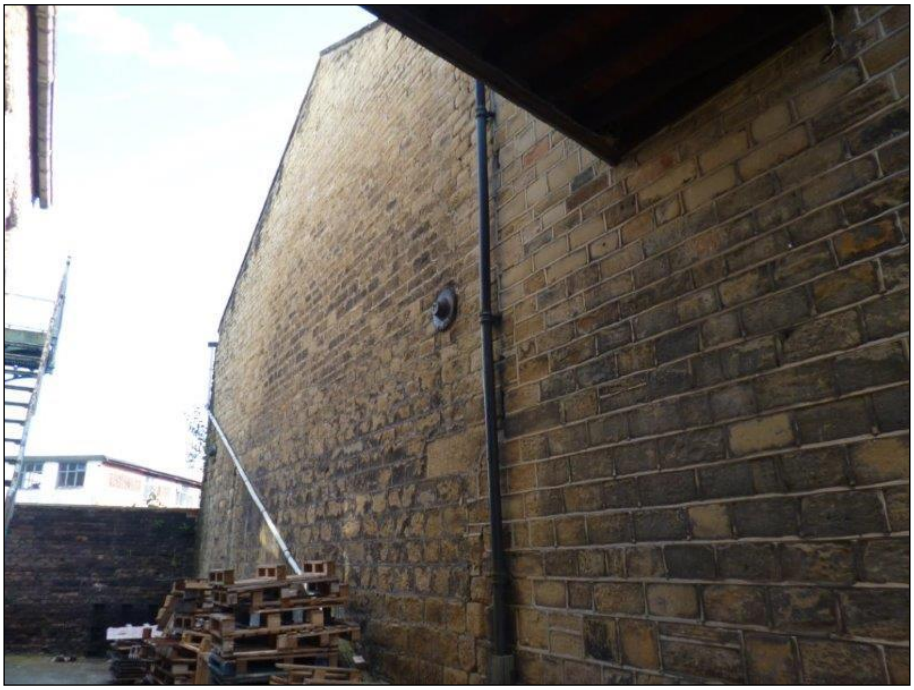
  The roof structure to Building G is badly leaking and is rotting such that it now presents a danger to enter. The danger is further compounded by the pigeons and the commensurate guano present due to the open roof (and presumably other vermin).

  It is recommended that the roof is completely removed and reinstated.

  Refer to Photograph 72 to Photograph 73.

  Condition D

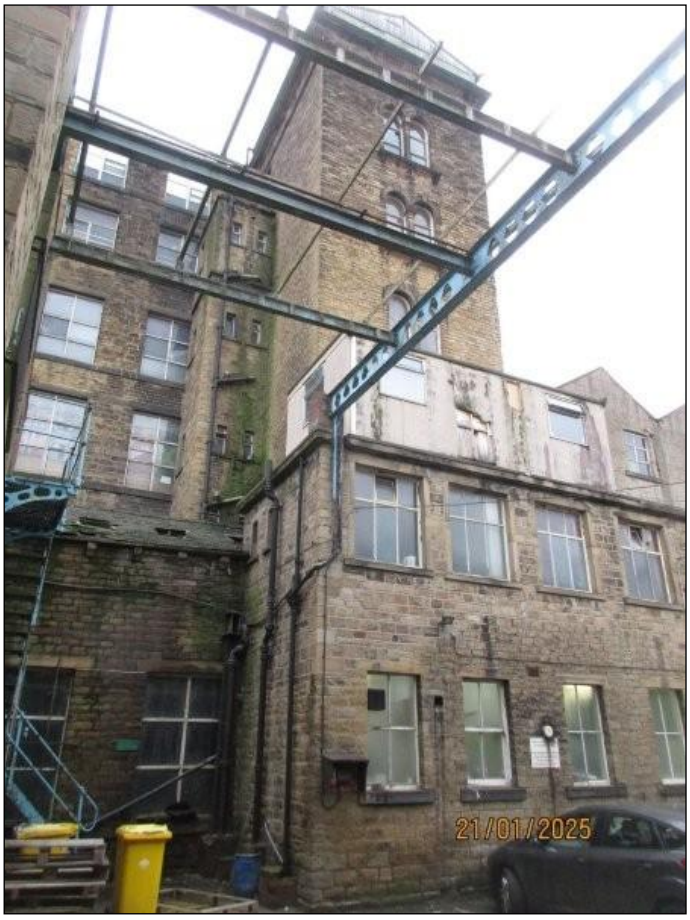
Photograph 69



Photograph 70

Photograph 71

Photograph 72



Photograph 73

Comment on possible proposed development of Buildings B & D

Proposals to develop the site are being developed. Following are comments that should be considered regarding the proposed development of the estate.

Building B

If, hypothetically, Building B was to be retained long-term, the following should be considered:

- Building B is over 18m in height, and this will move the building classification into the 'Higher Risk Building' category as defined by the Building Safety Act. (In the context of the UK Building Safety Act, "higher-risk buildings" refer to buildings that pose greater potential risks to the safety of occupants and the public due to various factors, such as height, occupancy, use, and construction materials.)
- A new one-hour fire partition will be required dividing each floor. To keep the loadings low, it would be best to undertake this using stud-walling. The capacity of the floors and supporting beams should be checked for the capacity and reinforced if required.
- Two new staircases and a new lift will be required to the building. One staircase and the lift will be in the centre of the building, and the other staircase will be to the south-east corner of the building.
    - Except for the foundations, the staircase to the centre of the building should be reasonably straightforward as the structure can be designed as self-supporting and just the central floor bay structure can be removed.

      The foundations will cause issues because they will clash with the existing foundations to the mill centre columns. It may be that the mill needs to be pinned and propped so that the centre column foundations can be underpinned.
    - The staircase to the south-east corner is much more problematic as the floor to be removed will be lending lateral support to the masonry across the seven floors (when basement is included).

      There will be similar issues with the foundations as discussed above, however, this case will be worse because of the proximity of the masonry wall. The effects of the canal on the foundations are not known currently.
- As the building is proposed to be redeveloped, it is probably now classified as Class 2b for disproportionate collapse (refer to Table 11 of Approved Document A of the Building Regulations) and will require to be upgraded accordingly.

  (Disproportionate collapse, also known as progressive collapse, occurs when the failure of one structural element in a building leads to the failure of other elements, resulting in a collapse that is significantly larger than the initial cause. This can happen if one part of a building fails, causing a chain reaction that leads to the collapse of multiple parts or even the entire structure.)

  Class 2b requires effective horizontal ties for load-bearing construction, together with effective vertical ties. Given the historic nature of this building, it simply will not be adequate to meet these requirements in its current form.

  To achieve the tying requirements, steel columns will need to be placed in front of every perimeter masonry pier and a perimeter ring beam installed to each floor level. The existing cast iron column and beam connections would also to be strengthening, but how

this can be done is unknown as the floor structure consists of brick arches which cover the connections.

Building B will be extremely costly to develop so that it meets current regulations.

Building D

The prospect of Building D being developed as a commercially viable enterprise is significantly easier than Building B (No division into units on the same floor is required.) The following should be considered:

- Building D is under 18m in height, and this will keep the building classification out of the 'Higher Risk Building' category as defined by the Building Safety Act. As this building has timber floors, it is structurally simpler to carry out alterations to form office accommodation as the proposed scheme.
- As the building is proposed to be redeveloped, it is probably now classified as Class 2a for disproportionate collapse (refer to Table 11 of Approved Document A of the Building Regulations) and will require to be upgraded accordingly.

  Class 2a requires effective horizontal ties for load-bearing construction, together with effective vertical ties. Given the historic nature of this building, it simply will not be adequate to meet these requirements in its current form.

  To achieve the tying requirements, steel columns will need to be placed in front of every perimeter masonry pier and a perimeter ring beam installed to each floor level. The existing cast iron column and beam connections would also to be checked that they adequately tie across the building.
- Protection against fire risks to occupants needs to be addressed. Fire compartmentation and escape routes particularly should be considered.

Summary

Except for the roof to Building B, Building D and Building G, the general structural condition of the buildings on the site are acceptable with minor maintenance. It is recommended that a maintenance review programme is set up so that the buildings are observed on an annual basis.

The structural elements where there is an imminent risk of imminent breakdown or of their being unacceptable in health and safety grounds (condition D). These elements are:

- Building B – Roof structure (Page 8)
- Building D – Roof structure (Page 30)
- Building D – Western gable wall (Page 30)
- Building D – South wall (Page 30)
- Building D - Kneeler to south-east corner (Page 30)
- Building D – Filler joist floor to west of Building D (Page 30)
- Building D – Corroding beam in cellar supporting front gable wall (Page 30)
- Building D – MDF type material to ceiling of ground floor joists (Page 30)
- Building D – Fire escape (Page 30)
- Building G - Fire Escape (Page 50)
- Building G – Leaking and rotting roof structure (Page 50)

Regarding any proposed development of Buildings B & D, it should be noted that Building B will be extremely costly to develop so that it meets current regulations.