

PRELIMINARY DAMP AND TIMBER CONDITION

51-53 RICHMOND STREET, MANCHESTER

JOB NO. 213-41



EMINENCE DEVELOPMENTS LTD

12 SEPTEMBER 2022

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CONTENTS

- 1 Introduction
- 2 Executive summary
- 3 Observations and Recommendations

Appendices

- A Common decay organisms
- B Specialist search techniques and their limitations
- C Remedial building works and environmental control
- D Maintenance and monitoring
- E Photographs
- F Drawings

1 INTRODUCTION

1.1 AUTHORITY AND REFERENCE

Hutton+Rostron Environmental Investigations Limited carried out a preliminary damp and timber condition survey at 51-53 Richmond Street, Manchester on 12 September 2022 in accordance with instructions received from Kieran Hedges of Eminence Developments Ltd by acceptance of H+R Order Form dated 29 September 2022. Reference was made to drawings supplied by Stephenson Hamilton Risley Studio, reference 7593 for the identification of structures. For the purpose of orientation in this report, the principal elevation to Richmond Street was taken as facing north-west

1.2 AIM

The aim of this investigation was to identify damp and decay problems or relevant building defects and to give recommendations on any remedial works required to correct such problems and prevent damp or decay problems in the future using environmental means as discussed in Appendices **Error! Reference source not found.**, **Error! Reference source not found.**, **Error! Reference source not found.** & **Error! Reference source not found.**

1.3 LIMITATIONS

This survey was confined to the accessible structures. The condition of concealed timbers may be deduced from the general condition and moisture content of the adjacent structure. Only demolition or exposure work can enable the condition of timber to be determined with certainty, and this destroys what it is intended to preserve. Specialist investigative techniques are therefore employed as aids to the surveyor. No such technique can be 100 per cent reliable, but their use allows deductions to be made about the most probable condition of materials at the time of examination. Structures were not examined in detail except as described in this report, and no liability can be accepted for defects that may exist in other parts of the building. We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect or, in the event that such part of the property is not free from defect, that it will not contaminate and/or affect any other part of the property. The recommendations in this report are included to advise and inform the design team appointed by the client. The contents of this report do not imply the adoption of the role of Principal Designer by H+R for the purposes of the Construction (Design and Management) (CDM) Regulations 2015. No formal investigation of moisture distribution was made

1.4 H+R STAFF ON SITE

Chris Whitfield

1.5 PERSONNEL CONTACTED

Abdul Challah - Albert Jones (Textiles) Ltd

2 EXECUTIVE SUMMARY

2.1 OBSERVATIONS AND RECOMMENDATIONS

There was ongoing water penetration to the rear of the building caused by defects in the rainwater drainage system and the eaves gutter of the neighbouring flats (no. 43-49). This was providing the conditions for damp and timber decay in the underlying internal timber structures. However, where accessible and where tested no significant decay had yet occurred in the corresponding softwood timber floor or lintels beneath. There was no evidence of water ingress via the roof coverings and no significant timber decay was detected in the softwood roof structure. Staircase joists at lower ground floor level were damp and partially decayed by wood-boring weevil where embedded in the masonry below ground level

Both gable walls have been partially rebuilt and it is the understanding of the present owner that this was following bomb damage sustained during the 'Manchester Blitz' (September 1940 to May 1941). Extensive cracking through the brickwork especially at second floor level probably dates from this period. However, some of the cracking correlated with the locations of the tie rods/pattress plates installed at second floor level. These were probably installed during rebuilding of the gables to provide lateral restraint, but it was possible that some of the cracking could be attributed to their overtightening. The rear half of the ground floor suspended timber floor has also been replaced and charring of retained timbers indicated that this was in response to fire damage, possibly coincident with the bomb damage. The present owner was unaware of these repairs or any historical fires

Immediate temporary repairs should be undertaken to the rainwater drainage system. If water penetration continues and residual moisture remains in the structure damp timbers may suffer from fungal decay or insect infestation and require repair. Following purchase of the property and removal of stored goods and modern finishes H+R could undertake a detailed damp and timber condition survey and advise on appropriate conservations sensitive methods of repair and accelerated drying, where required

A Structural Engineer should be instructed to investigate the significance of the cracking in the brickwork and comment on the effectiveness of the rebuilt gables and performance of the lateral restrain tie bars/pattress plates

3 OBSERVATIONS AND RECOMMENDATIONS

3.1 EXTERIORS

See Figures 1-14 in the Schedule of Photographs at Appendix E. Photograph locations are identified on the Drawings at Appendix F

- 1 Roof coverings: The pitched roof coverings were not visible from ground level but satellite view suggests the pitches were clad in natural slate with capped angle ridge tiles. The roof included a bituminous sarking felt beneath the common rafters. Relatively recently installed common rafters to the south-east pitch appeared to indicate the locations of earlier skylights. The roof appeared to be uninsulated. There was no evidence of water penetration via the roof pitches. However, the slates had a nominal projection over the gable walls and the verge mortar appeared to be in a state of disrepair. This increased the risk of water penetration via driving rain

Allow for a detailed inspection of the roof coverings and carrying out any urgent temporary repairs to maintain weathertightness. Upon refurbishment allow for re-roofing as a warm roof in line with Building Regulations

- 2 Rainwater drainage: The pitches were served by uPVC eaves gutters with downpipes located towards the south-west gable. The downpipe to the front elevation discharged via a shoe directly onto the footpath of Richmond Street and gradually drained into a surface drain in the road. The downpipe to the rear elevation discharged directly into the alleyway. There was no evidence of significant defect in the rainwater drainage to the front elevation. However, the rear gutter was inadequately sloped and was overflowing at its centre and in the east corner. The eaves gutter to the neighbouring flats (no's 43-49) was also blocked with debris causing it to overflow onto the east corner of the no. 51-53. These defects in the gutters appeared to be a longstanding issue and resultant water penetration was providing the conditions for damp and timber decay internally

Rainwater drainage goods should be serviced as soon as possible. The neighbouring property should also be informed of the defects in their rainwater drainage goods, and this should be rectified. Upon refurbishment it would be advantageous for the downpipes to discharge directly into drainage gullies rather than onto the ground

- 3 Chimneystack: The brick chimneystack was not visible from ground level but internal inspection identified that the stack had been rebuilt from Second floor level. Satellite view appears to show at least 5 no. chimney pots/flues. However, there were only 4 no. original fireplaces located internally which suggests some of the pots may have served chimney flues from the previous neighbouring building. None of the fireplaces were in use and all openings/flues had been blocked-up internally

Allow for a detailed inspection of the chimneystack following the provision of safe high-level access. All chimneys not in use should be capped so as to minimise water ingress but so as to allow maximum ventilation of the flues. Flues should be cleared and cleaned to remove blockages. Fireplaces and chimneybreasts should be opened or vented to allow through-ventilation of the flues. This prevents moisture build-up in the flues and helps interior ventilation by the stack effect

- 4 External masonry: External walls were constructed of solid red brick. Windows were spanned by brick arches and windowsills were of sandstone. Partial removal of the cementitious repointing mortar identified that the earlier/original lime mortar behind was in fair condition. Both gable walls have been rebuilt from Second floor level and H+R understand this this was bomb damage sustained during the 'Manchester Blitz' (September 1940-May 1941). The 3 no. pattress plates at Second floor level which correspond with tie rods concealed at floor level presumably date from this period. There was step cracking between the central window at ground-first floor level to the front elevation which had reopened following repointing. This suggested the cracking may be progressive. Inspection of the rear elevation was limited but the masonry was wet and supporting biological growth in the 2 no. areas of water penetration. There was widespread craze cracking in the render to the south-west elevation which appears to be due to original shrinkage. However, some cracks were supporting plant growth and tap-testing revealed pockets of render were poorly bonded to the brick substrate

Allow for a detailed inspection of the external masonry and render. It may be possible to carefully remove the existing cementitious repointing mortar without causing damage to the brickwork. Future repointing should be undertaken using a suitably specified lime mortar where required. The Structural Engineer should assess the significance of the step cracking and condition of the pattress plate/tie rod installation

3.2 INTERIORS

3.2.1 Second floor

See Figures 15-34 at Appendix E. Photograph locations are identified at Appendix F

- 1 Roof structure: All timbers were of softwood timber species. The roof was supported by a central raised tie truss which used tie rods in place of a king post and to replace the bottom chords of what would be a scissor truss. The truss supported 2 no. purlins to each pitch and the purlins supported common rafters. The raised ceiling joists previously supported a lath and plaster ceiling which had mostly been removed. The common rafters bore on a wall plate which also performed as the inner lintel to the Second floor windows. No significant timber decay was identified in the roof structure. Where tested, the deep moisture contents of timbers were below 10 per cent which was too low to support fungal growth or beetle infestation. However, the bearing end of the lower purlin to the north-west pitch was damp at its bearing end in the south-west gable wall. The probable moisture source was rainwater penetrating the defective verge mortar (as discussed above)

No timber decay related repairs identified at this time

- 2 Floor structure: All timbers were of softwood timber species. The floor was supported by a central floor beam which spanned front to rear and was visible at First floor level. The beam supported floor joists which were covered with square edge floorboards. The underside of the floor joists were concealed behind a lath and plaster ceiling. The floor had received heavy use in its history and the raised knots in the timbers was evidence of this. Removal of the floorboards to inspect the tie rods revealed that notches had been cut in the tops of the joists to allow passage of the tie

rods. Where inspected, the notching had only removed the upper 1/6th from the joists and this was unlikely to be of any structural significance. Inspection within the floor void revealed mild steel herringbone strutting 'X' bridging had been used for floor stiffening. No significant damp or decay was detected in the floor structure

No timber decay related repairs identified at this time. Structural Engineer to inspect and assess the performance of the lateral restrain tie bars

- 3 Walls: There was no evidence that leakage from the rear gutters was causing dampness in the masonry walls at Second floor level. However, there was widespread cracking in the brickwork which generally correlated with the locations of the tie-rods. In addition, corrosion of embedded metal in the chimneystack had caused jacking of the brickwork beneath the upper purlin to the south-east pitch. The brickwork was loose in these areas of cracking and daylight was also visible through the chimneystack cracking

Structural Engineer to inspect and assess the significance of the cracking in the brickwork

3.2.2 First floor

See Figures 35-46 at Appendix E. Photograph locations are identified at Appendix F

- 1 Floor structure: Floorboards could not be lifted and ceiling finishes at Ground floor level obstructed inspection of the floor structure. However, the floor was probably of the same construction as the Second floor but with metal tongued floorboards. Floorboards were damp to the centre of the south-east elevation where rainwater from the leaking gutter was splashing off the emergency exit door threshold and penetrating the interior. The bearing end of the central floor was damp where inspected at First floor level but no significant decay was detected on micro-bore drilling. However, timbers were vulnerable to fungal decay and beetle infestation whilst water penetration continued. There was also a risk of damp and timber decay in the floor timbers to the east corner, but stored goods impeded close inspection

The extent of decay can be confirmed by H+R following removal of stored goods and exposure from above or below. If water penetration is allowed to continue allow for repairs to the bearing end of the floor beam, say 5 no. joists and 2m² of floorboards

- 2 Lintels: All window openings were spanned by softwood timber lintels internally. No significant damp or decay was identified where accessible

No timber decay related repairs identified at this time

- 3 Walls: There was vertical cracking at either end of the south-west gable wall

Structural Engineer to inspect and assess the significance of the cracking in the brickwork

3.2.3 Ground floor

See Figures 47-54 at Appendix E. Photograph locations are identified at Appendix F

- 1 Floor structure: Inspection at Ground floor level was impeded by stored goods but inspection was possible from Lower ground floor level as there was no ceiling. The floor joists and floorboards to the south-east of the floor were non-original and appeared to have been replaced following a fire, possibly coincident with the bomb

damage. The central floor beam had been encased in timber boards and partial exposure revealed that the boards were concealing fire damage charring to the beam. The significance of the charring could not be assessed without exposure but there was no obvious evidence of structural failure in the beam. The repaired section of floor had received propping from pre-treated softwood posts and planks. The beam, planks and joists were all damp at their bearing end where embedded in the south-east wall but no significant decay had yet occurred.

No timber decay related repairs identified at this time. However, whilst water penetration continues, and residual moisture remains in the structure the bearing ends of floor timbers are vulnerable to decay. The extent of decay can be confirmed by H+R following purchase. However, at this stage, allow for repairs to the bearing end of the floor beam, say 5 no. joists and 4m² of floorboards

Allow for removal of the timber boarding and for H+R to assess the significance of the charring to the central floor beam. Structural Engineer to advise on the requirement of the plank and post propping arrangement

- 2 Lintels: All window openings were spanned by softwood timber lintels internally. The lintel immediately adjacent to the damp floor beam was damp and vulnerable to decay. Access was generally impeded by shelving and stored items at this level

No timber decay related repairs identified at this time. However, whilst water penetration continues, and residual moisture remains in the structure the lintel was vulnerable to decay. The extent of decay can be confirmed by H+R following purchase

3.2.4 Lower Ground Floor

See Figures 55-70 at Appendix E. Photograph locations are identified at Appendix F

- 1 Staircase: The bearing end of the staircase landing joists were damp and partially decayed by wood-boring weevil. The timbers were prone to damp as they were practically level with the external ground level

Allow for repairs to the decayed landing joists. Ideally, the timbers should be removed from the damp wall and re-supported on non-timber hangers/corbels so that no timbers are in direct contact with the damp masonry

- 2 Lintels: All window openings were spanned by softwood timber lintels internally. All lintels to the south-east elevation were particularly vulnerable to damp and timber decay caused by the defective rainwater drainage. However, the lintels were inaccessible for tactile assessment as the floor height restricted access but there was visible surface charring to the timbers related to the historical fire

Allow for detailed assessment of the significance of charring. Whilst water penetration continues, and residual moisture remains in the structure the lintels were vulnerable to decay. The extent of decay can be confirmed by H+R following purchase. Allow for replacement of decayed lintels with concrete as specified by a Structural Engineer

- 3 Walls and floor: As the lower 1m of the solid external walls were below ground level they were susceptible to damp. The brickwork has also been inappropriately repointed with a hard cementitious mortar which had encouraged some spalling in the bricks below ground level. Film-forming paint finishes applied over the brickwork had failed. These finishes were inappropriate as they inhibited advantageous moisture equilibration and drying. The floor was covered with concrete and a cementitious

screed, but localised excavation revealed an earlier brick floor beneath. This brick floor may be the original floor covering

Allow for the careful removal of the cement repointing and the film-forming paint finishes. Severely damaged bricks should be replaced like for like. If the intention is for the lower ground floor to become dwelling space or similar dry accommodation, then allow for the installation of a maintainable 'Type C' drained protection waterproofing system in accordance with BS 8102 and Building Regulations

- 4 Drainage: The downpipe to the rear elevation entered the building and discharged into a drain in the lower ground floor. The soil vent pipe also appeared to be blocked and leaking sewage into the lower ground floor

Allow for a detailed CCTV drainage survey of the existing surface and foul water drainage system and for immediate unblocking. H+R assume a new drainage system will be installed during the redevelopment of the building

Appendix A

COMMON DECAY ORGANISMS

1 DRY ROT

Dry rot (*Serpula lacrymans*) belongs to the same group of fungi as most of the common mushrooms and toadstools. Reproduction is by means of spores which are produced in enormous numbers by the fleshy pancake-shaped fruiting body. These fruiting bodies generally only appear when the fungus is stressed or dying off. A well established infestation may produce fruiting bodies more than one metre across and be accompanied by thick layers of rust-coloured spore dust. Each minute spore has an outer coat which affords it some protection against heat and desiccation, and germination has been achieved after a twenty-year latent period. Dry rot spores are ubiquitous and there is no domestic or natural environment entirely free of them. They can be found throughout the environment from high up in the jet stream to the middle of the countryside

Spores will germinate and grow in timber with a moisture content of between 20 and 30 per cent. The fine fungal thread (hypha) digests the cellulose and hemi cellulose fractions of the wood, but is unable to attack the structural linings. These remain as a brittle matrix which cracks into cubes under differential stresses. Cuboidal cracking is also a characteristic of many wet rots and does not automatically indicate the presence of dry rot

Fungal hyphae may clump together into a variety of structures known as mycelia which take various forms depending on the surrounding conditions. They may fill a humid cavity as a cotton wool-like mass, or grow across the surface of the timber, as a grey-white skin. Active dry rot has a fresh white or greyish appearance and smells strongly of mushrooms. Distinctive patches of lilac or canary yellow pigmentation are usually present

Some hyphae group together to form conducting strands. These have a fairly impervious outer layer rich in chitin, the major constituent of insect cuticle. The strands, which may reach a centimetre in thickness, are flexible when moist, becoming progressively more brittle as they dry out. Their main function is the conduction of nutrients, through or across inert non-nutrient materials (brickwork etc) to other timbers. Their relatively impervious outer layer, together with an unusual alkaline tolerance, allows them to survive in the mortar layers within masonry and walls. An infested area may be full of dry rot strands. The dry rot fungus may tolerate relatively lower moisture contents and, through this, and other quirks in its biology, is potentially capable of considerable destruction. Realisation of this potential, however, requires a narrow range of environmental conditions and, in practice, several factors restrict growth

Dry rot hyphae may attack timber with a moisture content of about 18 per cent; however, spores would not germinate under these conditions. This moisture content is still 5 to 10 per cent wetter than timber should be in a healthy domestic building, and indicates water penetration or, perhaps, faulty plumbing. There is no evidence that dry rot can 'wet up' timber to any appreciable extent under conditions expected in a healthy building, although this is often claimed. The fine attacking hyphae, unlike the coarse conducting strands, are susceptible to desiccation and dry wood may disperse moisture faster than it can be transported. This means they cannot move through dry masonry and wood or across ventilated cavities

The total breakdown of wood by fungus produces considerable quantities of water. It has been suggested that dry rot can sustain itself on this 'metabolic' water alone. However, in practice, external drying factors disperse the moisture so that favourable conditions can be maintained only in exceptional circumstances such as behind impermeable finishes or in sealed cavities

In order to thrive, dry rot requires a moisture content in timber in excess of 20 per cent, and a relative humidity above 95 per cent. Below these levels the fungus will cease to cause current decay problems. Temperature is also a strong regulating factor, and growth ceases at about 25°C, a temperature frequently exceeded in roof spaces, for example. Large radiators can be particularly lethal to dry rot and measurements of 30°C with 20 per cent relative humidity are not unusual in their immediate vicinity

Dry rot is attacked by many other decay organisms which cause particular damage when the fungus is under stress will eventually destroy it. However, under dry conditions, dead dry rot does not disappear. Strands may eventually darken and the fungal mats may lose their fresh appearance, becoming tinged with brown, and leathery or papery in texture. The decayed wood becomes powdery as it dries, shrinks and distorts, which can be the first sign of decay having occurred behind paint finishes

2 WET ROT

Wet rot is caused by a number of basidiomycete fungi of which the most important are *Coniphora puteana* (cellar fungus), *Poria fungi*; *Fibroporia vaillantii*, *Poria placenta*, *Amyloporia xantha*, *Geophyllum trabeum*, *Phellinus contiguus*, *Donkiporia expansa*, *Pleurotus ostreatus*, *Asterostroma* and *Paxillus panuoides*. They attack both softwoods and hardwoods causing a darkening of the timber (brown rot) or bleaching (white rot). Wet rot fungi usually occur in persistently damp conditions, needing an optimum moisture content of 50 to 60 per cent. Unlike dry rot, the conducting strands of wet rot fungi do not extend far from their nutrient wood, hence they cannot travel through masonry and brickwork. The fruiting bodies occur rarely in buildings. Wet rot has been known to hollow out giant beams. Wet rot *Coniphora puteana* is responsible for up to 90 per cent of wood decay within buildings but raises less concern than dry rot, possibly because it is more easily controlled by standard building techniques. Some wet rots are also called soft rots as they destroy both cellulose and lignin, leaving the colour of the wood largely unaltered, but producing a soft felty or spongy texture. Soft rot is caused by *Chaetomium globosum* and a number of other fungi also found growing on wet wood in buildings

3 WOOD-BORING INSECTS

The common furniture beetle (*Anobium punctatum*) has a life cycle consisting of four stages - egg, larva (which causes all the damage), pupa and adult. The eggs are laid in end grain or in existing flight holes and hatch in 4 to 5 weeks and the new larvae bore directly into the wood. The larvae feed and grow within the wood creating a network of tunnels closely packed with frass (small ellipsoidal pellets). The larvae are whitish, curved, approximately 6mm in length and have well defined dark-brown jaws. When fully grown the larva excavates a small chamber and pupates producing a beetle after 6-8 weeks which bores through a thin layer of wood producing the characteristic emergence holes 1-2mm in diameter. Emergence usually occurs between May and August. The life cycle depends on the condition of the wood, the temperature and humidity. The life cycle usually takes a minimum of 3 years within buildings. Attack is usually confined to the sapwood of softwoods and hardwoods but may occur in the heartwood in timbers such as beech, birch, spruce or in timbers modified by fungal decay. As sapwood only makes up a small cross section of the majority of structural timbers in older buildings, attack is often of little or no structural importance. In most instances of suspected attack, the infestation has died out long ago due to unfavourable environmental conditions. Careful checking is therefore required to establish that living woodworm are present

In cases of active infestation the environmental conditions are often marginal allowing the life cycle to continue but at a very slow rate. Small changes in the environmental conditions can tip the balance against insects. Woodworm attack is often very localised to small areas of high humidity or especially 'palatable' timber and further spread is highly unlikely

In the British Isles, death watch beetle (*Xestobium rufovillosum*) infestations occur most commonly in oak, probably because this wood used to be extensively employed in construction, but infestation can also occur in elm, walnut, chestnut, elder and beech. The life cycle is similar to that of the common furniture beetle but can take many years to complete from one year under experimental conditions, to ten years or more in a building (Ref 11). The hatched larvae wander over the surface of the timber before burrowing into it. When it is fully grown it pupates and changes into the adult beetle which does not emerge until the spring of the following year producing a 3mm diameter hole

In old buildings severe damage can be caused under favourable environmental conditions. Softwoods are occasionally infested where they are in close proximity to damp infected hardwood. Infestation is confined to fungal decayed or damp affected timbers. Many existing cases probably arose from the reuse of infected timbers from demolished buildings and from the use of unseasoned timbers used in their construction. Attack is not confined to the sapwood and often the heartwood is entirely consumed causing severe structural damage. Damage is most severe where ventilation is poor and where timbers are in contact with damp masonry

Death watch beetles are not active fliers. A localised attack of death watch will not automatically spread to the whole house and infest every timber in the building. Lowering of moisture contents of the timber in conjunction with careful observation to determine the level and extent of activity should provide control of the insects. Some severe cases may merit the use of local insecticide treatments as a first aid measure. However, the chemical must be targeted properly or large quantities of toxic pesticides will be used to little effect

Woodworm and death watch beetle infestation will not flourish if the moisture content of timber is below about 14 to 15 per cent. The risk of infestation of insect attack is slight, in timbers with a moisture content at or below 14 per cent and the insect larvae will desiccate below about 12 per cent moisture content. The infestation will eventually die out if the timber moisture content is maintained below this. Healthy roof timbers should have a core moisture content of between 14 to 15 percent, while suspended floor timbers should be between about 11 and 14 per cent. Installation of a central heating system may reduce these moisture contents to about 9 per cent particularly in exposed timbers

It is absolutely necessary to recognise whether an insect infestation is 'active' or 'dead'. The presence of fresh frass (bore dust) in conjunction with damp timbers may be acceptable evidence of active infestation

Appendix B

SPECIALIST SEARCH TECHNIQUES AND THEIR LIMITATIONS

1 PRELIMINARY INSPECTION AND INVESTIGATION

The basis of any investigation is an understanding of building structures and defects and how these may interact to produce the ecological niches in which various decay organisms can thrive. With experience, an initial visual inspection can give a good idea of the areas that will need further study. A check-list for this preliminary investigation includes building defects, significant timber structures and concealed cavities

The condition of concealed timbers may be deduced from the general condition and moisture content of the adjacent structure. Only demolition or exposure work can enable the condition of timber to be determined with certainty and this destroys what it is intended to preserve. A non-destructive approach is therefore required and to help reduce uncertainty, specialist instrumentation and test equipment can be useful. However, it is important to remember that all tests and instruments are only aids to the surveyor, and must be interpreted with experience and care. A slavish reliance on any technique and failure to take into account its limitations is a recipe for disaster. No technique can be 100 per cent accurate or reliable

The techniques that may be used for preliminary investigation include resistance-based timber moisture meters, capacitance masonry moisture detectors, borescopes and Rothounds

2 DETAILED INVESTIGATION

The findings from the initial investigations are followed up by more detailed study. The aim is to determine as far as possible the distribution and extent of all significant decay and organisms in the building, the distribution of micro environments predisposed to timber decay and the building defects that cause them. The extent of significant timber decay should also be determined as far as possible. Active decay organisms may not yet have caused significant timber decay. Conversely, there may be significant decay even when the decay organisms that caused it have been dead for many years. This may seem obvious but many expensive 'treatments' are carried out on insect or fungus damaged timber that has not been infected for tens or even hundreds of years. Key factors that may be noted are species and viability of decay organisms, moisture content of materials, ambient relative humidity, and ventilation. Timber species and previous chemical treatments may also be significant

It is important that the results of the investigation are co-ordinated with the building structure bearing in mind the characteristics of particular periods and methods of building. They should also be carefully recorded and quantified where possible. This allows analysis of the results by other experts, reduces the 'grey' area in which disputes of opinion can arise and forms a basis on which future investigations can build. Photography can be especially valuable and may be used when necessary

3 ROTHOUNDS

Rothounds are specialist search dogs trained to help find dry rot (*Serpula lacrymans*) in buildings. Rothounds may indicate areas of active dry rot even before they are visible to the naked eye. This will occur if the dry rot is just developing, is inside the substance of the timber, between the timber and another surface or within porous masonry. Such indications may be confirmed by comparing them with measurements of the moisture content of the structure or by the use of a drilled sample. Rothounds will not indicate the remains of dead dry rot infestations

In areas indicated by Rothounds the significant timber structures should be checked for structural decay or high moisture levels. Even if these are not found steps should be taken to reduce moisture levels and increase ventilation. This may be all that is required to stop a developing problem and all that is then required is to check the area in 6 months. For this purpose Hutton + Rostron again favour the Rothounds

3.1 Capabilities

- a May detect living dry rot (*Serpula lacrymans*) by the scent of the metabolites produced by the fungus
- b May detect the scent of dry rot even when hidden behind panelling, under floors, behind plaster or in other concealed cavities
- c May detect the scent of dry rot at a distance of several metres depending on scenting conditions
- d May detect early dry rot growth before it is detectable by the unaided human eye
- e May discriminate between living or dead dry rot and between dry rot and other fungi instantly
- f Actively search for dry rot in buildings at high speed, covering 20 to 50 rooms in an hour g May indicate extent and spread of dry rot infestation
- g Will search small inaccessible areas and roof spaces i Will work in furnished and inhabited buildings
- h Totally non-destructive
- i Will work 2-4 hours per day

3.2 Limitations

- a Trained only to indicate living dry rot, not wet rot or dead dry rot. Will not indicate fruiting bodies on old dead outbreaks of dry rot
- b Indicate the scent of dry rot and the point of maximum scent. This may need interpretation as scent can occasionally be moved by air currents from the point of origin
- c Scent will not travel through impermeable surfaces such as neoprene. However, it may be detected at the edge of an impermeable barrier, e.g. around the edge of a room with a rubber-backed carpet covering an infected floor
- d Indicate dry rot infection, not decay. Therefore heavily decayed but inactive outbreaks may give a weaker indication than a recent highly active outbreak that has not yet caused significant decay

- e Maynot work if there is a corrosive or choking dust or vapour. However, Rothounds should not be put off by smells and may detect even small amounts of dry rot in the presence of other strong scents

3.3 Uses

- a Survey of properties prior to purchase, renovation, change of occupancy etc, to quickly check for hidden problems
- b Preliminary survey of properties with suspected decay problems to determine existence and extent of dry rot infestation
- c Survey of properties with known dry rot problems to determine activity and extent of infestation
- d Survey of properties undergoing remedial works to check for additional hidden areas of infestation
- e Survey of properties after remedial works to check for efficiency of treatment
- f Routine survey of properties with past problems thought to be at risk in order to detect recurrence of infestation at an early stage before significant decay can occur
- g Periodic survey of properties with known problems awaiting renovation, to detect 'hot spots' of dry rot activity

These can then be dealt with by 'reactive maintenance' allowing outbreaks to be controlled by minor exposure works and environmental controls. This avoids expensive building or remedial works. Further decay is prevented and infection controlled with significant savings on eventual renovation

4 FIBRE-OPTIC BORESCOPE EXAMINATION

A technique we have found routinely useful over the last 15 years is the use of fibre optics. We use long reach, fixed side view, rigid borescopes and high-power light sources. Although this is comparatively expensive it is essential for getting a clear view across a cavity such as a floor space. It also minimises the time spent and the number of holes drilled. Fibre optic inspection can reveal extensive decay and the consequences of water penetration. However, most wood-destroying fungi will not live on the face of timber which is exposed to air movement because this produces a drying effect. It is always a possibility that a fungus, especially dry rot, is travelling behind a wall plate, for example, and is not detectable from the cavity. Fibre optic inspection may not, therefore, find a minor attack which is developing, but it should indicate where these might be initiated so that faults can be identified and remedied. The siting of inspection holes depends on the points at risk within the room and will usually be located adjacent to balcony floors, flat roofs, cracks in rendering and other points where faults may have resulted in water penetration. Inspection may also be limited in areas of tiled and glued flooring materials and ornate or special wall coverings. Inspection holes are numbered and capped off for future use

5 THE MEASUREMENT AND SIGNIFICANCE OF MOISTURE CONTENT

The moisture contents in timber, mortar and plaster are measured by a variety of methods. Timber moisture content might be ascertained by the use of a standard resistance-type moisture probe which measures the moisture content at the surface of the wood.

However, this moisture content will be subject to considerable fluctuation, depending on current relative humidity and temperature. A rafter in a roof in summer may, for example, have a moisture content at the surface of 16 per cent which might rise to over 20 per cent in winter. This difference would not necessarily reflect increased water content resulting from a fault in the roof, but might simply be a redeposition of water resulting from a considerable drop in temperature

The condition in the core or subsurface of a timber will remain relatively stable which is why the centre of thick timbers may be preferentially decayed. It is this 'deep' moisture content which must be measured if results are to be meaningful. For this reason, a hammer probe with insulated electrodes or deep moisture probe is used to measure the moisture content within the timber. Healthy roof timbers should maintain a stable core moisture content of between about 12 per cent and 16 per cent, whilst suspended floor timbers (excluding ground floors) should be between about 11 per cent and 14 per cent. Central heating will usually reduce this figure to around 9 per cent

Similarly, surface moisture content readings in plaster and mortar are of limited value except for purposes of comparison. A surface capacitance meter may be used on plastered walls. For further investigation absolute measurements of moisture content may be made on site by means of a carbide-type gas pressure meter

Alternatively, samples are taken back to the laboratory in sealed vials, and the moisture contents are measured by the oven and balance method. For this, mortar samples are obtained by drilling holes in the wall and dust from the first inch of each hole is discarded. Dry mortar and plaster should have moisture contents below about 2 per cent. At levels much above this the moisture content of incorporated timbers will exceed 20 per cent and may easily reach levels at which fungal decay is likely

6 OTHER TECHNIQUES

Other techniques that may be used include microscopy, laboratory culture, hot wire anemometry and electronic RH measurement. We have also developed special instruments for measuring 'available' water in materials and for ultrasonic detection of timber-boring insects. More exotic techniques may sometimes be useful such as pheromone insect traps, infra-red thermography, shortwave radar, automatic weather stations and total building monitoring using specialist data loggers

Appendix C

REMEDIAL BUILDING WORKS AND ENVIRONMENTAL CONTROL

The most critical factors for the environmental control of decay organisms are available moisture and temperature. The former is dependent on such factors as moisture content, relative humidity, micro-ventilation, and salt content. In simplistic terms it is necessary to correct building defects leading to high moisture contents in timber and to increase ventilation around timber at risk

In practice there are two problems; first it is necessary to identify the significant building defects and then the best techniques must be chosen to control the environment at each point. This may be achieved by analysing the building in terms of moisture sources, moisture reservoirs and moisture sinks

It is not possible to prevent moisture entering a building entirely and often attempts to block the movement of moisture through a building structure using impermeable materials are ineffective. They may also be counter-productive as they can prevent moisture being dissipated, resulting in high moisture levels and decay in adjacent materials. The more effective and robust approach is that used in traditional buildings. Here, porous materials are preferred, and every moisture source is balanced by a moisture sink. Thus ground water may penetrate masonry but is evaporated off before it reaches timber structures. Similarly, water vapour is introduced by occupation, but is ventilated out via windows, chimneys and other passive and active forms of ventilation. Failure to balance a moisture source with an appropriate sink may result in moisture moving into vulnerable materials and eventually causing decay and other problems

Moisture reservoirs occur when a moisture 'source' has not been balanced by a 'sink' and water has accumulated in a porous material. Typical examples of this are to be found when thick masonry walls have been soaked by persistent leaks or when chimney breasts have been filled with rain water from uncapped chimneys. Such reservoirs may take years to dry out, even when the source has been dealt with. As a result, they can act as a source of moisture for recurrent timber decay over a long period. A special case of this phenomenon occurs when large quantities of water have been used in fighting a fire

In practice then, each area of decay is associated with a building defect, resulting in an increased moisture source, a blocked or inappropriate moisture sink or a moisture reservoir. The appropriate building measures should then be specified to correct that defect

A common example might be the bridging of a damp proof course by raised ground levels. This will act as a moisture source and may result in decay of timbers in an adjacent floor space. Reducing the ground level will cut off this source and will also provide a sink of moisture by allowing evaporation from the exposed wall. The sub-floor moisture level might also be controlled by increasing the other available moisture sinks. Cleaning pre-existing airbricks or inserting additional sub-floor ventilation would be a common measure. In general, it is important to increase evaporative surfaces and avoid obstructing them during refurbishment

Another common example would be a blocked and overflowing parapet gutter acting as a moisture source. This could wet up gutter soles, joist ends and wall plates as well as any other structure in an expanding cone extending from the leak down through the building. Preventing this moisture source may require a number of measures such as increasing the capacity of down pipes, re-lining the gutters and fitting thermostatically controlled trace heating tape to increase free flow of snow melt water

Any failure in a roof finish, gutter or coping will generally result in significant water penetration into the masonry wall beneath, which will then act as a moisture reservoir. Any timber in contact with this reservoir will be at risk of decay as it will tend to 'wick' moisture from the masonry. Steps must therefore be taken to isolate in-contact timber from the masonry using such measures as DPC membranes or joist hangers producing an air gap. It will also be necessary to ensure the timbers are adequately ventilated so that any moisture that is absorbed can be breathed off. Closed cavities or water-impermeable layers over timbers at risk must therefore be carefully searched out and rectified using knowledge of historic methods of construction. Bricked-in lintels and sealed up emulsion-painted sash windows are typical examples of structures at risk in this way

Having cut off the moisture source to a moisture reservoir and protected the 'at-risk' timbers it is next necessary to provide safe 'sinks' for the moisture. This will ensure that the reservoir is dried out in the long term. In some cases, the reservoir can be removed entirely, for example damp pugging can be dug out and replaced. In most cases it is a matter of promoting ventilation around a wicking surface on the reservoir and ensuring that the moisture-laden air can be vented to the outside. Dry lining systems can be useful for this purpose as can the good old-fashioned chimney. Raising the temperature will promote the process of wicking and evaporation. General house heating can help but care must be taken to ensure that water vapour is not being 'pulsed' into other parts of the building by a sequence of evaporation and condensation down a temperature gradient. Heating can be especially useful if it is possible to heat the reservoir material itself. We have devised special systems for heating large section timbers and masonry for this purpose but again the old-fashioned fire-place and chimney is very useful

In some cases, dehumidifiers can be used in the short to medium term, but care must be taken. They often require special 'tenting' and monitoring so that moisture is removed from the appropriate material and not from the world at large. They also require high air temperatures and high RH's to extract moisture efficiently

In all cases most of the remedial building works that may be required are quite within the capacity of the general contractor. Most are traditional repairs though some may take advantage of new materials or techniques such as dry lining, joist hangers and tanking. New and potentially useful products are coming into the building market all the time, for example, time controlled automatic fans, hollow ventilating plastic skirting boards, plastic masonry drains, roof space ventilating systems and moisture permeable paints. All such products and techniques can be used to help in making the environmental control of timber decay even more efficient and economical. All that is required is careful analysis of each situation and a little scientific understanding

Appendix D

MAINTENANCE AND MONITORING

The investigation and building works described in the previous appendices should put a building back into a state of structural and environmental health. The environmental control approach will also mean that a building is less likely to develop problems in the future. This is because the effect of minor building failures should be 'buffered' by the robustness of the systems established. Fortunately, most traditional systems are robust in this way. This is why older buildings may tolerate a considerable amount of neglect and abuse before developing severe problems. However, the long-term health of the building will always depend on adequate maintenance. This is no less true of buildings treated with timber preservatives

A detailed investigation carried out as part of an environmental control policy provides an excellent basis on which to plan the most cost-effective maintenance program. Indeed, the building works required for environmental control are often best integrated into such a program. Short-term 'emergency' measures can be taken to simply halt further decay and measures to replace damaged structures or prevent future problems can be delayed to fit into a longer term plan of works. This flexibility in scheduling work as a result of the environmental approach allows further saving of costs and inconvenience

A maintenance program must also include provision for the routine inspection of all significant parts of the building at appropriate intervals. This should aim to detect and correct problems developing before they cause significant damage. Again the information gained in the investigation can be used to decide on the most cost effective inspection interval

In many cases remote monitoring systems can be very useful in increasing the efficiency and reducing the cost of maintenance programs. They can be especially useful for checking the moisture content of inaccessible timbers in roof spaces, behind decorative finishes and in walls. H+R have developed the Curator building monitoring systems for this proposal

Sensors can be placed at all critical points after the investigation or after the remedial building works. Areas can then be closed up and finishes re-applied, for example sensors may be placed in lintels, joist ends, valley gutter soles or in damp walls to monitor drying. It is important to use enough sensors and to place them with an understanding of the moisture distribution processes because conditions can vary even in a small area. It is these local variations in conditions that produce the environmental niches which decay organisms exploit

If more than 30 sensors are deployed, taking the readings can become onerous and this may result in human error or negligence. In these situations automatic monitoring systems become desirable. H+R have developed a number of specialised 'Curator' data logging systems to do this. With larger systems, the wiring of sensors can also become a problem. For systems requiring 100 or more sensors we can use a 'Curator A' unit working via a single 4-core main cable connecting up any number of nodes, each supporting 4 sensors. This system can be programmed with logging intervals and alarm limits for each sensor and can be read via the telephone system via its own modem. Data from the system can then be analysed using CAD and programs for statistical interpretation on a remote computer

Appendix E



Fig 1:

North-west elevation; showing a general view of the front elevation onto Richmond Street



Fig 2:

North-west elevation; showing a mastic joint at the abutment with the neighbouring flats. This joint and the lead flashing (at roof level) may be vulnerable to water penetration



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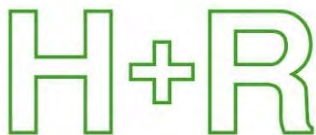
Fig 3:

North-west elevation; showing patress plates which correspond with tie-bars in the Second floor



Fig 4:

North-west elevation; showing location of step cracking which has extended through the brickwork and projecting stone sill



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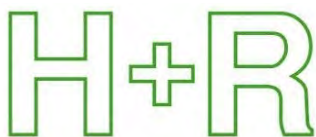
Fig 5:

North-west elevation; showing original lime mortar behind the 20th Century cementitious repointing. The cement was only applied as veneer and no raking-out appears to have been done to the lime mortar



Fig 6:

North-west elevation; showing the rainwater downpipe which discharged directly onto the footpath



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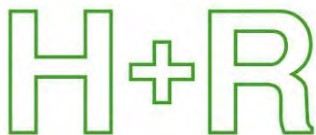
Fig 7:

South-west elevation; showing rebuilt section of gable. This is believed to be a response to WW2 bomb damage. There was widespread cracking through the cementitious render which was probably associated with initial shrinkage



Fig 8:

South-west elevation; showing fern growth corresponding with cracking in the cementitious render. Plant growth was indicative of damp conditions within this area of the masonry



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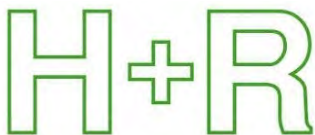
Fig 9:

South-west elevation; showing gate which provided access into the shared alleyway



Fig 10:

Alleyway; showing a large plastic container filled with water blocking access through the gate. The alleyway was also filled with stored items and general waste



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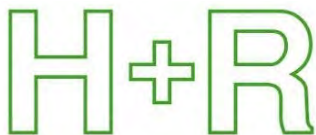
Fig 11:

South-east elevation; showing eaves gutter overflowing towards the centre of the rear elevation. This was providing the conditions for damp and timber decay in the internal timber structures



Fig 12:

South-east elevation; showing a low point in the east corner of the eaves gutter that was allowing rainwater to discharge against the building



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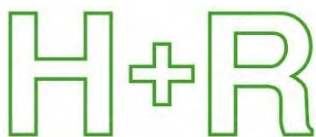
Fig 13:

South-east elevation; showing a blockage in the neighbouring eaves gutter providing an additional source of moisture to the east corner of the building



Fig 14:

South-east elevation; showing cracks through the fire exit stair treads



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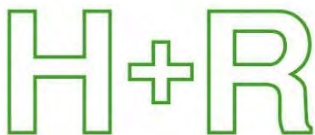
Fig 15:

Second floor; showing a view of the central roof truss which included tie rods. An earlier lath and plaster ceiling had been removed from the ceiling joists



Fig 16:

Second floor; showing the bearing end of the lower purlin which was tested by decay detection drilling and deep moisture probing. No decay was detected but the purlin was damp



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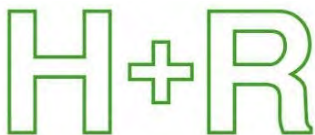
Fig 17:

Second floor; showing cracking through the brickwork directly over the location of the patrix plate and tie bar passing through the floor



Fig 18:

Second floor; showing the north-west bearing end of the truss. No decay was detected and the bearing end of the principal rafter was dry



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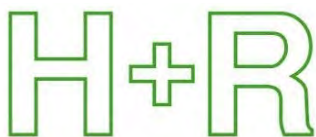
Fig 19:

Second floor; showing cracking through the brick pier between the windows. Brickwork and a timber block were loose



Fig 20:

Second floor; showing cracking through the brickwork directly over the location of the pattress plate and tie bar passing through the floor



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Fig 21:

Second floor; showing rebuilding of the upper portion of the chimneystack. This appears to date from WW2 bomb damage



Fig 22:

Second floor; showing step cracking through the gable brickwork caused by corrosion of metal beneath the purlin brick corbel



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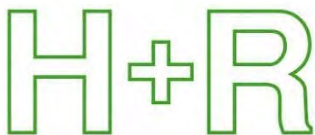
Fig 23:

Second floor; showing step cracking through the gable brickwork caused by corrosion of metal beneath the purlin brick corbel



Fig 24:

Second floor; showing a cement board applied over the fireplace opening.
This may be an asbestos containing material (ACM)



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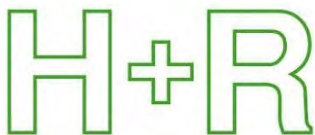
Fig 25:

Second floor; showing non-original rafters which appear to have been used to roof over earlier skylight openings



Fig 26:

Second floor; showing cracking through the brickwork directly over the location of the patten plate and tie bar passing through the floor



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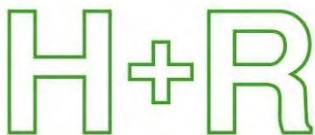
Fig 27:

Second floor; showing timber partition which housed a sink and toilet which were both of historic interest



Fig 28:

Second floor; showing the cast metal sink with copper tap and lead pipework



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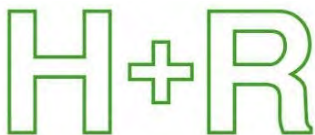
Fig 29:

Second floor; showing the china clay pan with lead pipework



Fig 30:

Second floor; showing the lead-lined timber cistern supported on timber brackets



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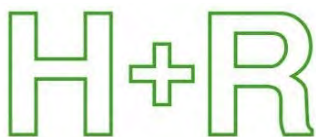
Fig 31:

Second floor; showing exposure of one of the three lateral restraint tie bars. Note that the upper section of the joists had been notched to accommodate the tie bar



Fig 32:

Second floor; showing the central hexagonal coupling nut used for tensioning the tie bar



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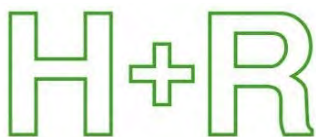
Fig 33:

Second floor; showing a view through the suspended timber floor. There was some dust and cobwebs but the ceiling void was relatively clean



Fig 34:

Second floor; showing mild steel herringbone strutting 'X' bridging and later timber blocking used for floor stiffening



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Fig 35:

First floor; showing the central floor beam which supports the Second floor joists. The office was formed of modern plasterboard on studwork



Fig 36:

First floor; showing a view of the office which included a modern suspended ceiling. This concealed the earlier lath and plaster ceiling



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Fig 37:

First floor; showing vertical cracking within the south-west gable wall. This appeared to correlate with the location of a former doorway. Note that the brickwork was spanned by a redundant timber lintel



Fig 38:

First floor; showing the north-west bearing end of the central floor beam. The bearing was inaccessible for testing due to stored goods. However, there was no visual evidence of damp or decay



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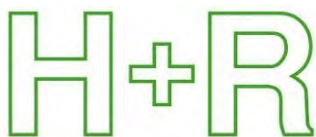
Fig 39:

First floor; showing heavy use of the softwood floorboards which had partially exposed the metal tongues within



Fig 40:

First floor; showing an exposed metal tongue



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Fig 41:

First floor; showing water penetration where rainwater from the leaking gutter was splashing off the emergency exit door threshold. Floorboards were damp and vulnerable to decay but no significant decay had yet occurred



Fig 42:

First floor; showing staining at ceiling level caused by the gutter leak. No decay was detected in the south-east bearing end of the central floor beam and the timbers above were dry



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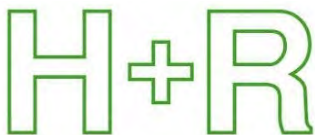
Fig 43:

First floor; showing spalling of the brickwork pier caused by inappropriate repointing of damp brickwork using a cement mortar. The brickwork was now dry and this is a historical intervention



Fig 44:

First floor; showing a cast-iron oven within the fireplace. This was of historic interest. The chimney flue was unventilated



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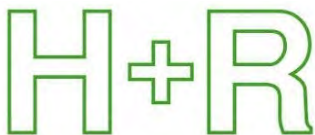
Fig 45:

First floor; showing modern plasterboard on stud partition walls forming the kitchen and WC



Fig 46:

First floor; showing cracking in the south-west gable wall



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Fig 47:

Ground floor; showing the central floor beam which supports the First floor



Fig 48:

Ground floor; showing the loading doors to the front elevation that were spanned by a metal lintel internally



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Fig 49:

Ground floor; showing windows spanned by softwood timber lintels. No damp or decay was detected in these lintels where accessible



Fig 50:

Ground floor; showing the bricked-up fireplace which was unventilated



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Fig 51:

Ground floor; showing staining associated with water penetration from the neighbours defective gutter (see Fig 12-13). Timbers were vulnerable to damp and decay in this location

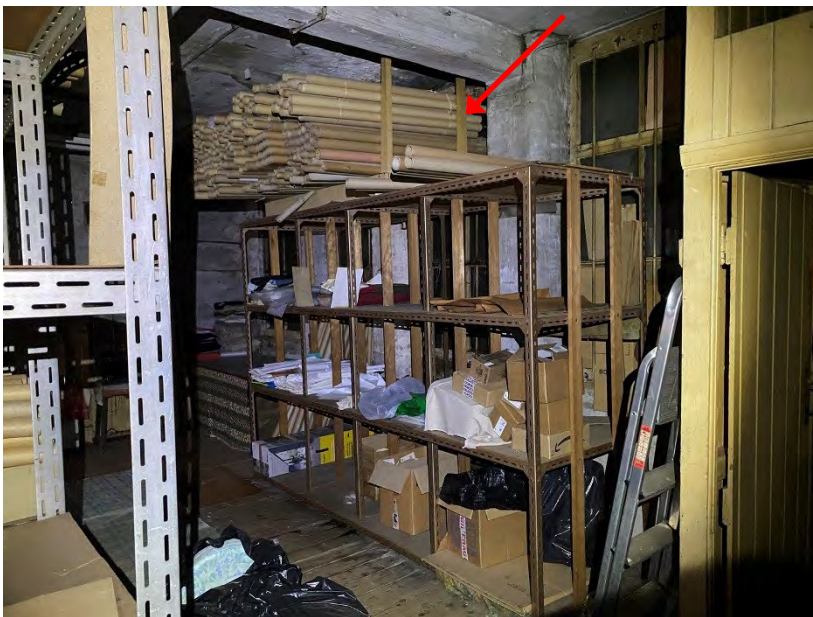
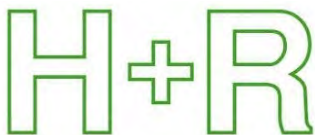


Fig 52:

Ground floor; showing shelving and stored goods which inhibited close inspection of the lintel directly beneath the damp floorboards (Fig 41)



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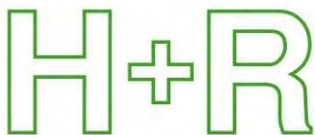
Fig 53:

Ground floor; showing the timber lintel which was probably damp. However, there was no visual evidence of fungal decay. The south-east bearing end of the central floor beam was damp but no significant decay had yet occurred



Fig 54:

Ground floor; showing the transition from original metal tongued softwood floorboards to tongue and groove floorboards. Inspection at basement level revealed repairs were in response to historical fire damage



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Fig 55:

Lower ground floor; showing softwood plank and post propping/strengthening beneath the repaired area of floor. No significant decay was detected in the base of the posts. As they were in contact with the damp ground they were presumably pre-treated

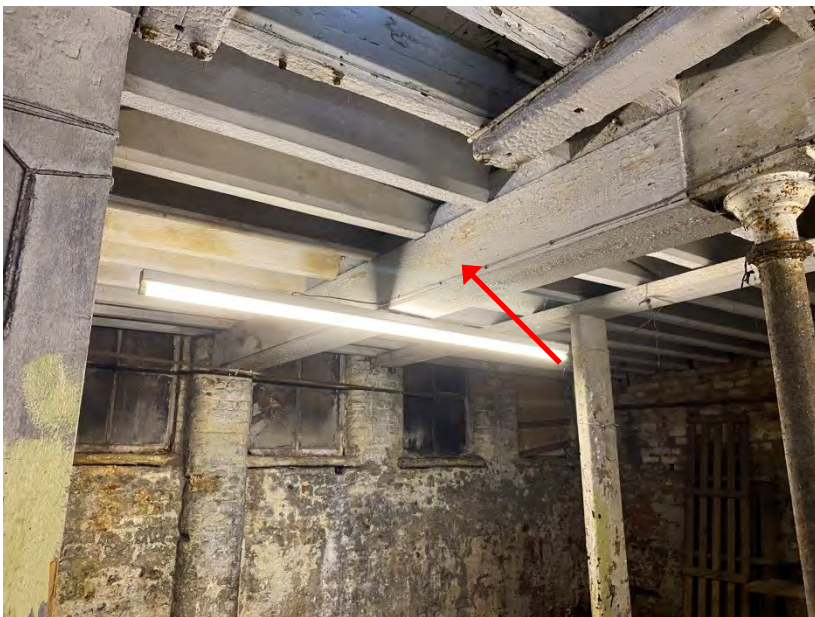
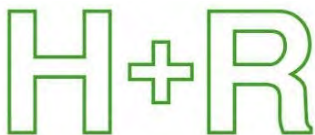


Fig 56:

Lower ground floor; showing timber boxing around the south-east half of the central floor beam. This has been applied to conceal charring from fire damage. Note the transition in the floor joists from original to new



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Fig 57:

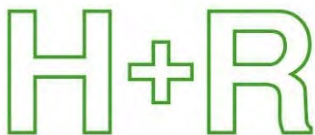
Lower ground floor; showing exposure of the central beam revealing charring of the timber



Fig 58:

Lower ground floor; showing the bearing end of the 2 no. planks supporting the floor structure. The timbers were damp where touching the wall

Note how the floor height intersects the window. This restricted inspection and testing of the timber lintels above



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Fig 59:

Lower ground floor; showing charring to the inner timber lintel caused by fire damage



Fig 60:

Lower ground floor; showing the bearing end of the new floor joists in the east corner. The timbers were damp but no significant timber decay was detected



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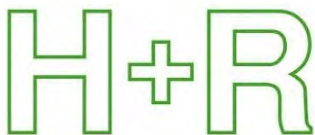
Fig 61:

Lower ground floor; showing leakage of the downpipe and soil vent pipe in the south corner. Water gradually drained towards a drain in the centre of the basement floor



Fig 62:

Lower ground floor; showing leakage from the lead pipe. This may be foul water



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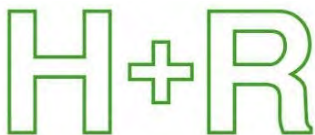
Fig 63:

Lower ground floor; showing the water draining towards a central floor drain. The floor was probably contaminated with foul water. There were rat droppings throughout the floor



Fig 64:

Lower ground floor; showing a rat entry location at the base of a decayed window frame



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Fig 65:

Lower ground floor; showing the base of the staircases where they were supported in the masonry. The timber joists were damp and partially decayed by wood-boring weevil



Fig 66:

Lower ground floor; showing decay in the bearing end of a staircase joist. The timbers were below ground level so therefore susceptible to damp and decay



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Photographs
12 September 2022



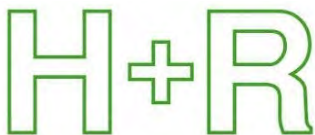
Fig 67:

Lower ground floor; showing deep moisture probing of the north-west bearing end of the central floor beam. The beam was damp but no significant decay was detected



Fig 68:

Lower ground floor; showing repointing of the brickwork using a cementitious mortar. This had encouraged spalling in a number of the softer bricks below ground level



51-53 Richmond Street, Manchester
Photographs
12 September 2022



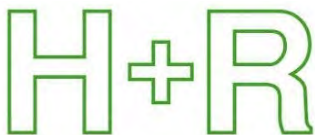
Fig 69:

Lower ground floor; showing investigation through the cement screed and concrete slab



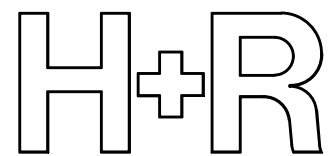
Fig 70:

Lower ground floor; showing what appears to be an earlier/original brick floor beneath



51-53 Richmond Street, Manchester
Photographs
12 September 2022

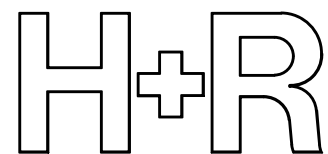
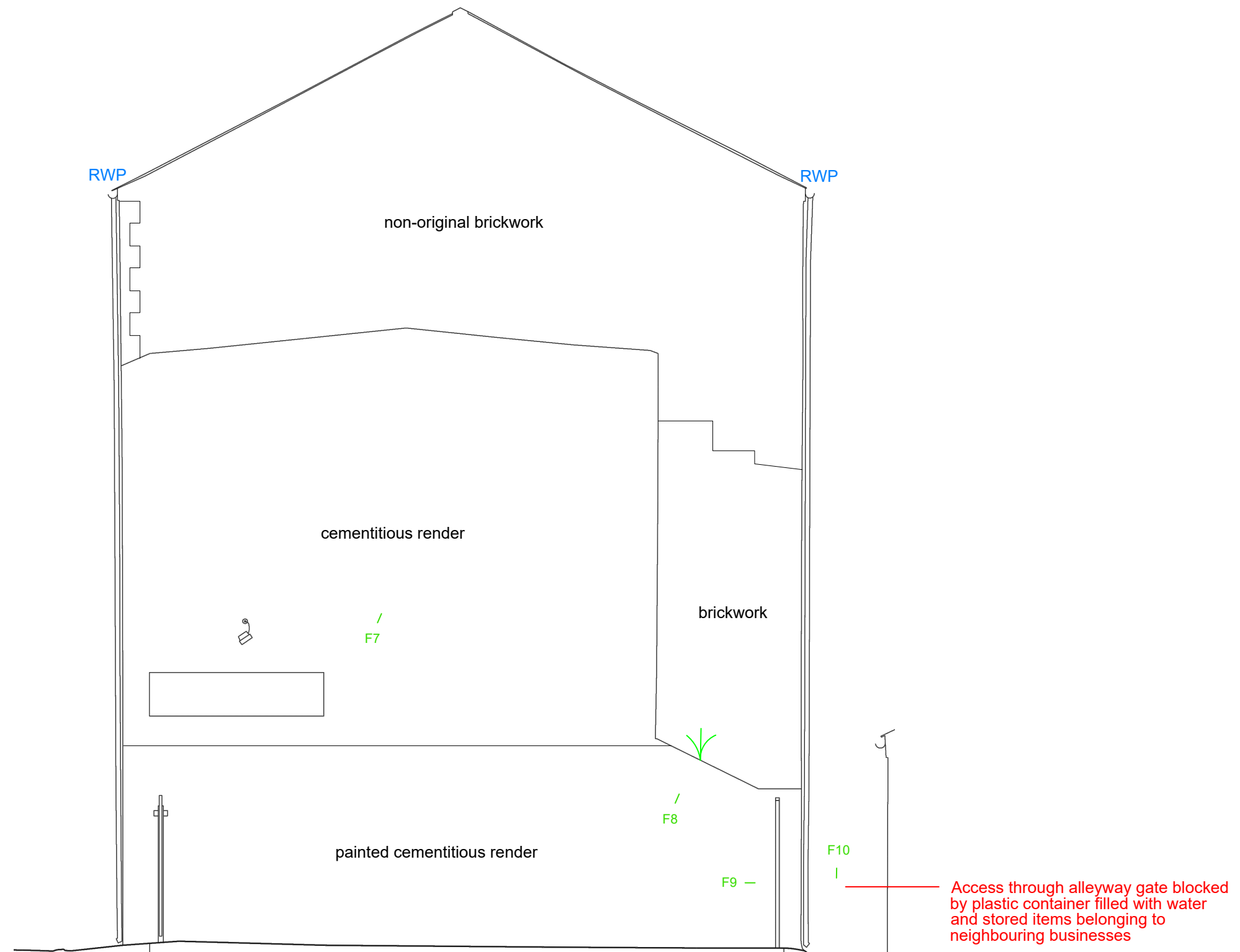
Appendix F



51-53 Richmond Street, Manchester - Front (North-west) elevation
PRELIMINARY INVESTIGATION OF DAMP AND TIMBER CONDITION
12 September 2022

Hutton + Rostron Environmental Investigations Ltd
 Netley House, Gomshall, Surrey, GU5 9QA Tel: 01483 203221
 213.41 Report -Not to scale- © Copyright Hutton+Rostron 2022

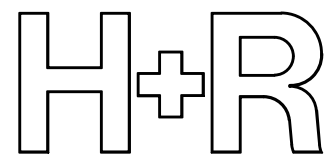
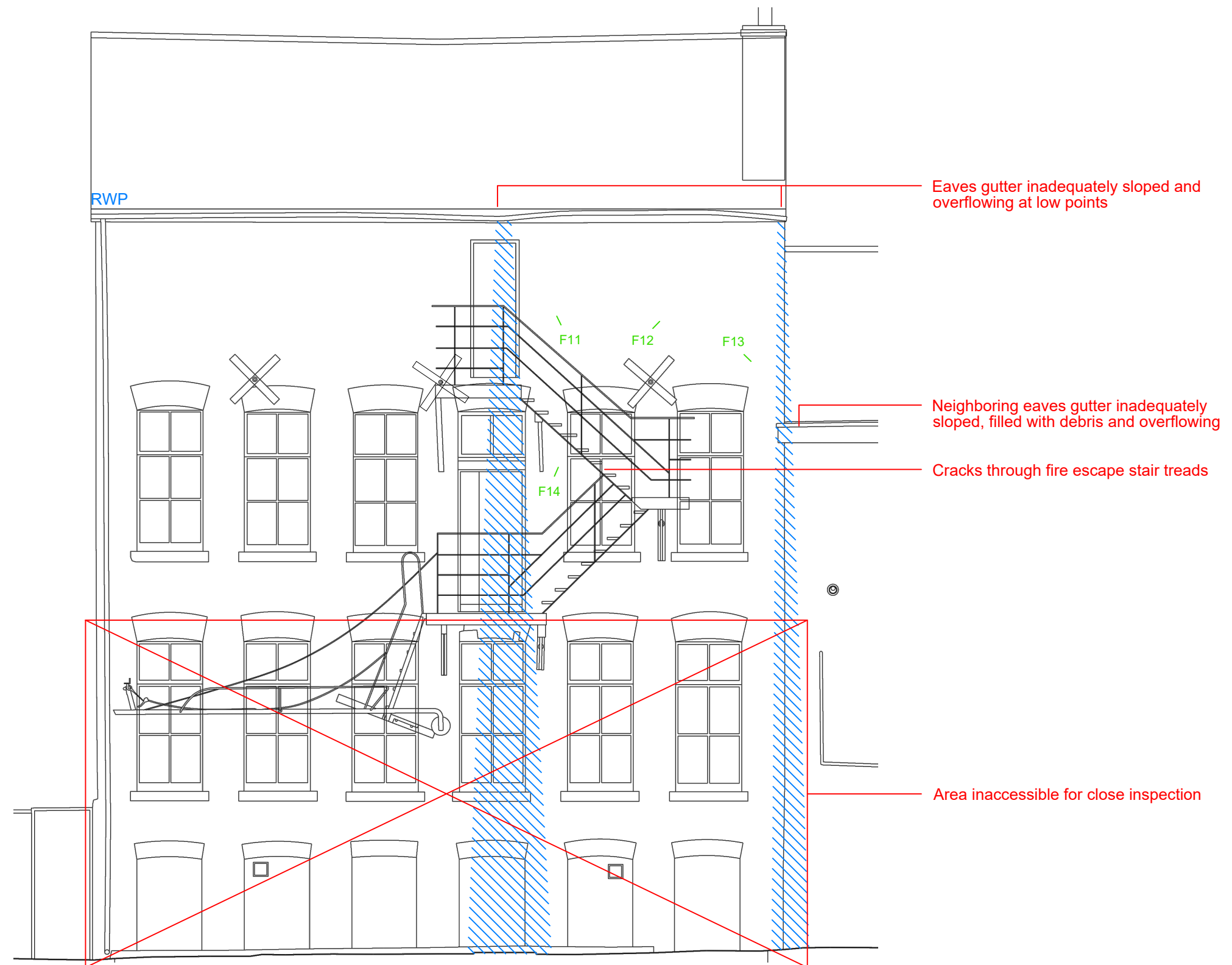
Key: RWP ○ Rainwater downpipe
 — F1-6 Photograph location
 ~~~~~ Cracking



**51-53 Richmond Street, Manchester - Side (South-west) elevation**  
**PRELIMINARY INVESTIGATION OF DAMP AND TIMBER CONDITION**  
**12 September 2022**

**Hutton + Rostron** Environmental Investigations Ltd  
 Netley House, Gomshall, Surrey, GU5 9QA Tel: 01483 203221  
 213.41 Report -Not to scale- © Copyright Hutton+Rostron 2022

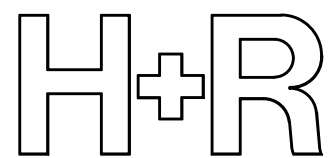
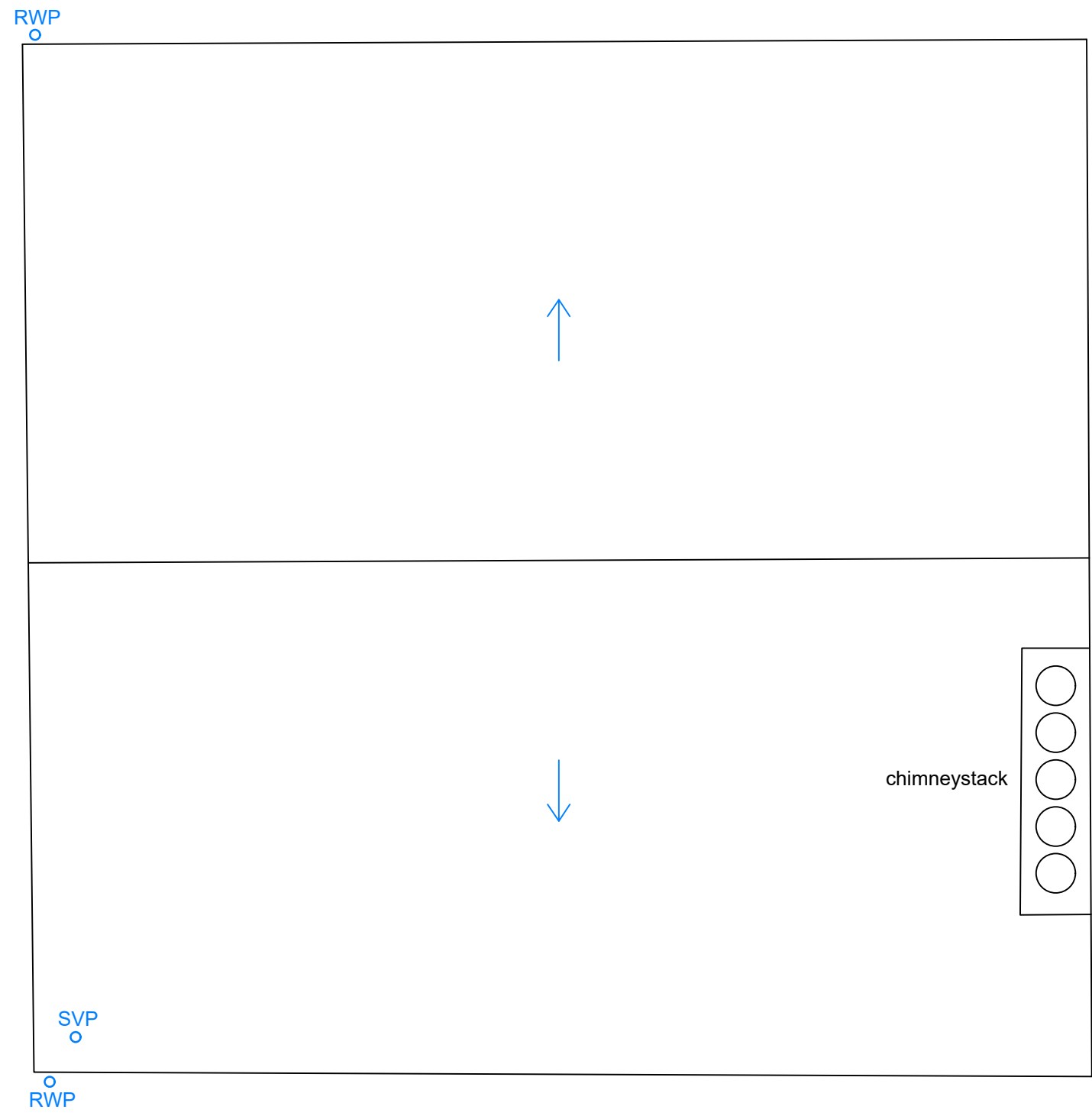
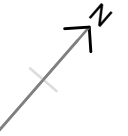
**Key:** RWP ○ Rainwater downpipe  
 — F7-10 Photograph location  
 ↗ Plant growth



**51-53 Richmond Street, Manchester - Rear (South-east) elevation**  
**PRELIMINARY INVESTIGATION OF DAMP AND TIMBER CONDITION**  
 12 September 2022

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 Netley House, Gomshall, Surrey, GU5 9QA Tel: 01483 203221  
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**Key:** RWP ○ Rainwater downpipe  
 — F11-14 Photograph location  
 /// Area subject to water penetration

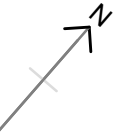


**51-53 Richmond Street, Manchester - Roof coverings**  
**PRELIMINARY INVESTIGATION OF DAMP AND TIMBER CONDITION**  
**12 September 2022**

**Hutton + Rostron** Environmental Investigations Ltd  
Netley House, Gomshall, Surrey, GU5 9QA Tel: 01483 203221  
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- Key:**
- RWP ○ Rainwater downpipe
  - SVP ○ Soil vent pipe
  - ← Roof pitch





Access inhibited by stored goods. Bearing end of floor beam inaccessible for testing. No evidence of significant damp or timber decay

Modern stud partitions and plasterboard ceiling. Lath and plaster ceiling above

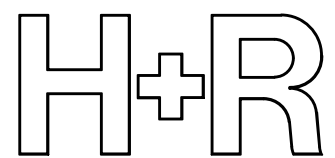
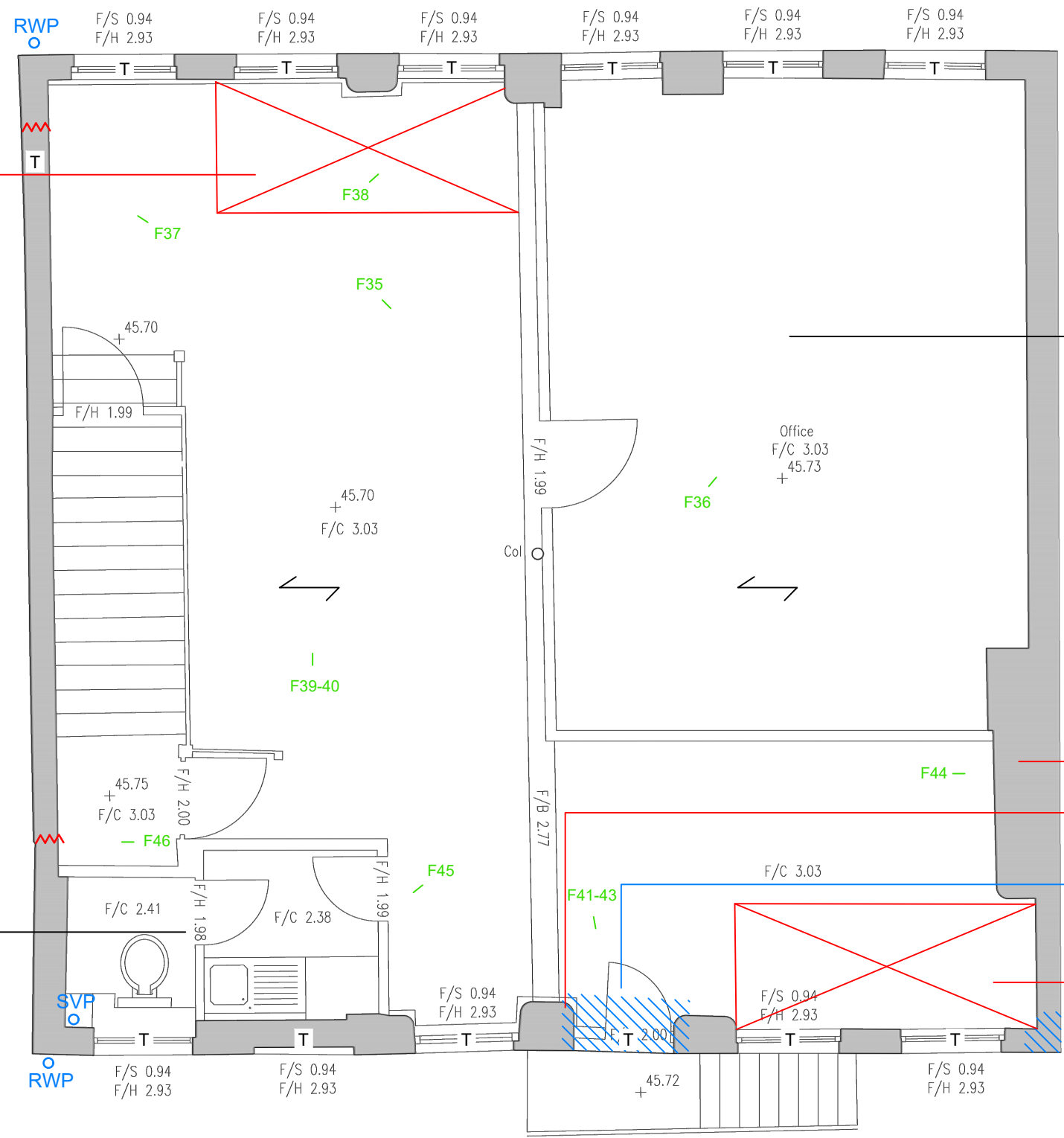
Fireplace oven unventilated

Brickwork pier spalled where repointed and plastered with cement mortar

Softwood floorboards and joists damp and at risk of decay. 30%DMC

Access inhibited by stored goods. Floorboards and joists at risk of decay at corner of building

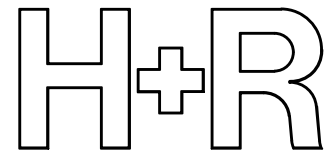
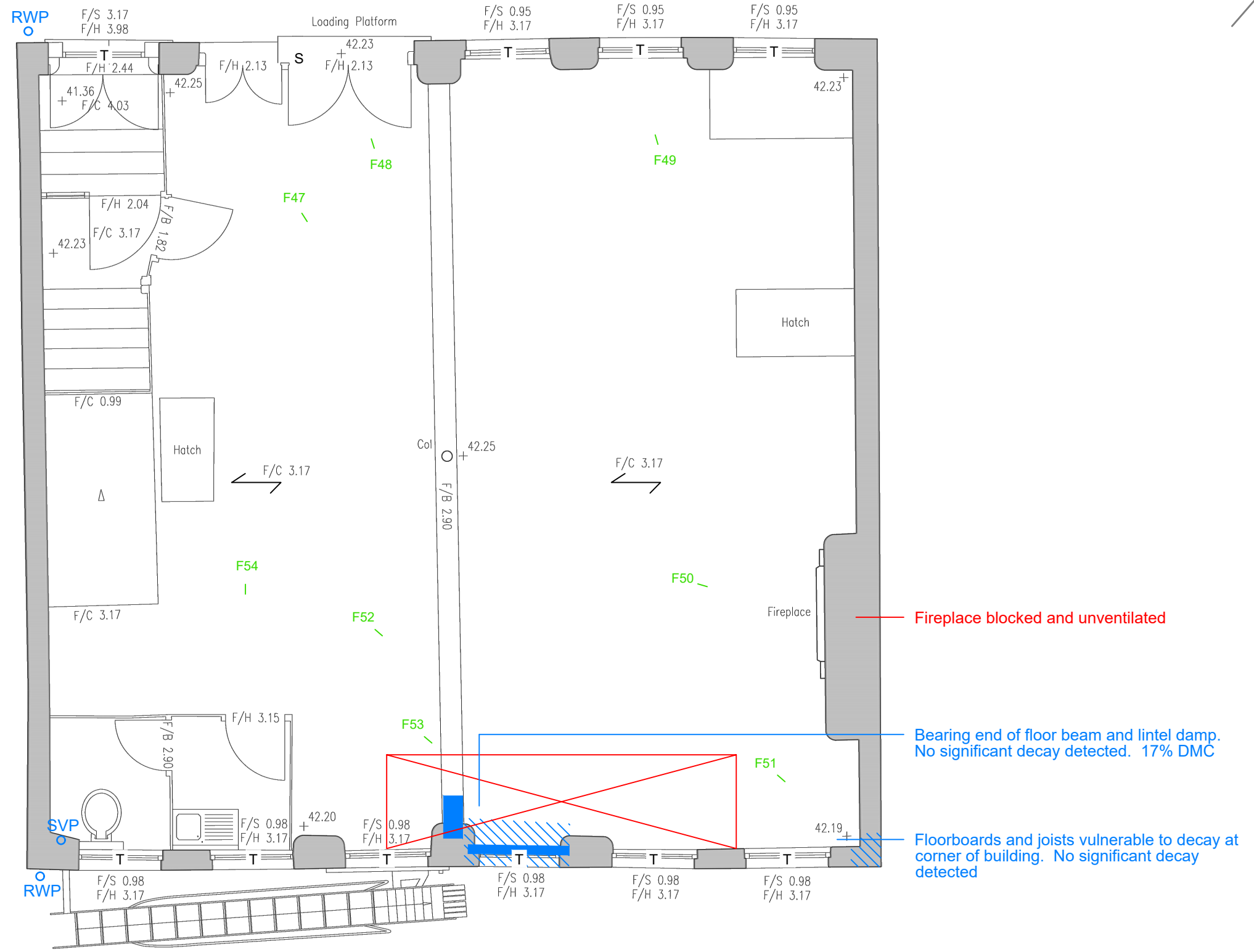
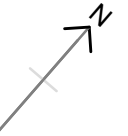
Modern stud partitions and plasterboard ceiling. Lath and plaster ceiling above



**51-53 Richmond Street, Manchester - First Floor**  
**PRELIMINARY INVESTIGATION OF DAMP AND TIMBER CONDITION**  
**12 September 2022**

**Hutton + Rostron** Environmental Investigations Ltd  
Netley House, Gomshall, Surrey, GU5 9QA Tel: 01483 203221  
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- Key:**
- RWP ○ Rainwater downpipe
  - SVP ○ Soil vent pipe
  - Area subject to water penetration
  - F35-46 Photograph location
  - Cracking/ loose brickwork
  - T Timber lintel
  - ← Floor joist direction



**51-53 Richmond Street, Manchester - Upper Ground Floor**  
**PRELIMINARY INVESTIGATION OF DAMP AND TIMBER CONDITION**  
**12 September 2022**

**Hutton + Rostron** Environmental Investigations Ltd  
Netley House, Gomshall, Surrey, GU5 9QA Tel: 01483 203221  
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- Key:**
- RWP ○ Rainwater downpipe
  - SVP ○ Soil vent pipe
  - Area subject to water penetration
  - F47-54 Photograph location
  - T Timber lintel
  - ↔ Floor joist direction
  - Damp timber at risk of decay

Staircase landing joists partially decayed at bearing end by wood-boring weevil  
30% DMC

Bearing end of floor beam damp. No significant decay detected. 22% DMC

Underside of timber staircases concealed by tongue and groove boards. Timbers vulnerable to decay where embedded or in direct contact with the masonry

Floor beam fire damaged and encased in new timber boards

Softwood post and plank propping provided to non-original floor structure. No significant decay in base of posts as timbers have been pre-treated

Floor beam encased in timber boards due to historical fire damage. Requires exposure to assess significance

Historical fire damage to lintels. Significance unknown as inaccessible for tactile assessment

Bearing end of floor joists damp. No significant decay detected. 15% DMC

Bearing end of floor joists damp. No significant decay detected. 25% DMC

Rainwater/soil vent pipe leaking onto floor

Bearing end of floor beam and planks damp. No significant decay detected. 20-25% DMC

Rats entering through hole in decayed window frame

RWP

PI

+39.17

F/C 1.96

F/B 2.74

F/C 2.15

F/C 2.74

F/C 2.98

F/S 0.86

F/H 2.93

F/S 0.86

F/H 2.93

F/S 0.86

F/H 2.93

F/H 1.92

+41.03

F/H 1.92

+39.16

F/C 3.05

GU Col

+39.09

F/B 2.82

F/C 3.05

F/B 2.82

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F/S 0.86

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