JAPAN CENTRE GROUP LIMITED

Preliminary investigation of timber ceiling structure and plaster at 35 Great Queen Street

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CONTENTS

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1 INTRODUCTION

1.1 AUTHORITY AND REFERENCE

Hutton+Rostron Environmental Investigations Limited carried out a preliminary investigation of timber ceiling structure at 35 Great Queen Street on 3 November 2015 in accordance with instructions received from Michael Kewer by email dated 27 October 2015 at 18:24 on behalf of Japan Centre Group Limited. Reference was made to drawings supplied by Blenheim Design, reference BD 1578 for the identification of structures. For the purpose of orientation in this report, the front of the property, facing onto Great Queen Street was taken as south

1.2 AIM

The aim of this investigation was to inspect accessible structural ceiling timbers for signs of active or historic decay, following historic water penetration from the property above and to comment on the suitability of the ceiling coverings and covings for retention on refurbishment

1.3 LIMITATIONS

This survey was confined to the accessible structures. Only demolition or exposure works, to provide full access, can enable the condition of enclosed timbers 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. No formal investigation of masonry moisture distribution was made

2 EXECUTIVE SUMMARY

2.1 OBSERVATIONS

2.1.1 Ceiling plaster

Hair reinforced ceiling plaster, applied to timber laths, was in generally poor condition, friable and subject to progressive failure. A significant area had become detached and had fallen away beneath sanitary facilities on the floor above and isolated physical damage had occurred elsewhere. It was very likely that further failures of attachment would occur after refurbishment

2.1.2 Coving

The timber coving at the wall/ceiling junction was extensively damaged and had been partially removed on previous refurbishment. Retained sections of coving appeared to be detached in some places, increasing the risk of further detachment and failure after refurbishment

2.1.3 Ceiling structure

Damage to the timber beams spanning the centre of the ground floor had significantly reduced their load bearing capacity. Where accessible, representative joist centres and bearing ends were subjected to decay detection drilling and probing for deep moisture content. No evidence of timber decay was found and the moisture content of timber was uniformly below 10 per cent, which is too dry to support timber decay or the action of wood boring insects.

2.1.4 Anthrax

The project team had raised some concerns about the possible presence anthrax (*bacillus anthracis)* residues or spores in animal hair used to reinforce the ceiling plaster on original construction. A representative sample of detached ceiling plaster was removed for laboratory testing

2.1.5 Mould and other contaminants

Laths exposed by failure of plaster below sanitary facilities in the first floor property were affected by surface mould growth. It was very likely that irritant dust and other debris contained in ceiling voids was contaminated by mould spores, which may represent a health risk to sensitive or vulnerable individuals on future occupancy

2.2 RECOMMENDATIONS

2.2.1 Ceiling plaster

Allowance should be made for recording the retained ceiling plaster in detail and for removal of detached plaster. Retained plaster should be stabilised, possibly by screw fixing new ceiling boards into the ceiling joists prior to installing the proposed suspended false ceiling below. Consideration should be given to complete removal of the plaster and timber laths, to allow for detailed structural inspection and thorough cleaning of the ceiling voids

2.2.2 Coving

Allowance should be made for careful recording of the retained coving, followed by stabilisation and reinforcement as required, to prevent progressive failure ad damage on occupancy. Consideration should be given to complete removal of the coving, to allow for detailed structural inspection and cleaning of the ceiling voids

2.2.3 Ceiling structure

H+R understand that steel portal frames are proposed to partner the defective beams at the centre of the ground floor. Subject to further inspection following exposure works, no urgent remedial works are required

2.2.4 Anthrax

Text to follow on completion of laboratory tests. Standard site hygiene procedures should be followed throughout the demolition and construction phases. See Guidance notes from English Heritage (now Historic England) and the Health and Safety Executive (HSE) at Appendix C

2.2.5 Mould and other contaminants

Provisional allowance should be made for thorough decontamination and cleaning of all retained building fabric and enclosed ceiling voids, subject to permitted works to remove ceiling finishes and covings. Alternatively, retained ceiling structures should be fully encapsulated by new ceiling boards or membranes, to prevent contaminants from entering the occupied spaces of the ground floor

3 OBSERVATIONS

3.1 GROUND FLOOR, CEILING ON SOUTH SIDE

3.1.1 Ceiling coverings

1 Condition: The ceiling was closed-in with lath and plaster, which may date back to the original construction in the late 18th century, or have been replaced on previous refurbishment. The plaster was extremely friable and evidently approaching the end of its serviceable life. A section of plaster that had become detached was taken down and examined and found to be reinforced with animal hair. The keys on the reverse of the plaster section had failed, allowing it to fall away over an area of approximately 1m^2 towards the south-west corner. The ceiling had been subject to isolated areas of physical damage and refurbishment on a number of previous occasions, resulting in patterns of redundant fixing holes into the floor joists above the ceiling and further areas of physical damage to plaster coverings, notably adjacent to the original cornice on the east side, where a chimneybreast had been removed on previous refurbishment and in isolated areas towards the centre of the ground floor

2 Sources of water and moisture: The previous use of the ground floor as a restaurant would have generated signficinat quantities of warm moisture laden air on occupancy, increasing the risk of interstitial condensation, leading to corrosion of lath fixings and providing the conditions for mould growth. Where the ceiling had fallen away the surfaces of lathes were affected by mould growth and staining, consistent with intermittent localised decay in the laths, following escape of water from building services in the premises above. H+R understand that the occupied area on the first floor, above the most damaged area of ceiling included a bath or shower room. Damage to exposed wall coverings on the west side was consistent with water having drained downwards through the structure prior to refurbishment

3.1.2 Ceiling structure

The ceiling was supported on floor joists to the property above, spanning east to west, typically 180mm deep and varying in width between 50 and 90mm in the areas that were exposed for inspection. Joists appeared to be supported on loadbearing brick party walls to the east and west, but access was restricted for detailed inspection by retained ceiling finishes. The exposed joists towards the south-west were tested by decay resistance drilling and deep probing, and found to be free of defects associated with timber decay and to have deep moisture contents below 9%, significantly below the H+R defined decay threshold of 17%. The ceiling voids between the joists were extensively obstructed by debris

3.1.3 Primary beams

2 No. softwood timber beams spanned the opening separating the north and south ground floor areas, approximately 4m from the south elevation. The beams spanned the full width of the property, approximately 5m between the loadbearing masonry party walls. The lower beam was approximately 200mm deep and 70mm wide and the upper beam approximately 150mm x 150mm. The upper beam showed signs of fissuring, which may have prompted the installation of the lower beam on previous refurbishment. The lower beam also showed deflection at its centre, where a vertical hole had been drilled through the beam, weakening it

and causing it to crack, and ‘shakes’ towards the west end that would have significantly reduced the loadbearing capacity of the beam. Temporary support had been provided as part of current refurbishment works and H+R understand that one or more steel ‘goalpost’ frames are proposed to partner the damaged beams on refurbishment

3.1.4 Covings

Timber covings, which may date back to original construction, had been partially retained at the perimeter of the ground floor ceilings. Coving was extensively damaged at the north end of the west wall, adjacent to the beam spanning the ground floor at its centre, and on the east and west sides, where some patch repairs had been undertaken on previous refurbishment. The coving had been completely removed on the south side and towards the south ends of the east and west walls. Plasterboard had been installed in areas where the coving was missing, presumably to close-off the ceiling void, on previous refurbishment

3.1.5 Mould growth and other contaminants

Exposed ceiling laths below the sanitary facilities in the property above, towards the south-west corner of the ceiling, were affected by surface growth of black moulds. Mould spores may represent a health risk or irritant to occupants following refurbishment. Significant quantities of debris within the ceiling voids would tend to harbour mould spores on occupancy. Ceiling voids are also likely to contain irritant silicate dusts from friable ceiling plaster and general airborne contaminants associated with the age and location of the structure, such as soot and diesel particulates

3.1.6 Hair reinforced plaster – Anthrax *(bacillus anthracis*) infection risk

Plaster applied to ceilings was reinforced with natural hair, as was common practice at the time of original construction. Hair from abattoirs was generally used, representing a potential pathway for infection should hair have been taken from anthrax infected carcases. A review of guidance from the Health and Safety Executive and English Heritage (now Historic England) indicates that the risk of infection is very low. There have been no reported cases of infection in workers engaged in construction activity in the UK since 1977. H+R removed a sample of ceiling plaster for laboratory analysis, to test for the spores of the anthrax bacterium (*b.anthracis).* Commentary on results to follow

4 RECOMMENDATIONS

The following recommendations are made subject to consultation and agreement with the Local Authority Conservation Officer

4.1 GROUND FLOOR, CEILING ON SOUTH SIDE

4.1 CEILING COVERINGS

4.1.1 Plaster

Ceiling finishes should be inspected in detail and any detached or damaged plaster carefully removed, bagged and discarded, as directed by national Legislation and Local Authority Bye Laws and waste licensing requirements. Allowance should be made for stabilising the sound areas of lath and plaster by underdrawing with a suitable ceiling board or for the recording and complete removal of the ceiling coverings, to allow thorough cleaning of the ceiling voids and reinstatement in new materials to match the existing on future refurbishment.

4.1.2 Laths

Detached or damaged laths should be removed where plaster has been removed or has fallen away. Consideration should be given to the complete removal of laths, along with plaster finishes, to allow de-contamination of the enclosed ceiling voids (see 4.5 below)

4.2 CEILING STRUCTURE (JOISTS)

No urgent remedial works are required. Should removal of ceiling finishes and covings be undertaken (see 4.1 and 4.4) allowance should be made for comprehensive inspection and decay detection drilling and probing as required, to assess the extent and severity of any structurally significant timber decay that may be present. Allowance should also be made for inspection of exposed joists and any associated wall plates by the Structural engineer

4.3 PRIMARY BEAMS

H+R understand that the Structural Engineer has specified ‘goalpost’ supports to be installed alongside the existing beams to carry the floor loads above and make the damaged timber beams structurally redundant, allowing them to be enclosed above the proposed false ceiling structure

4.4 COVINGS

Allowance should be given to detailed inspection of the cornice and to securing any unstable elements for retention above the proposed false ceiling. This may include the installation of mesh or perforated strapping to retain cornice components in position. Alternatively the covings should be carefully recorded and removed, to allow detailed inspection of the ceiling structure and effective cleaning and decontamination of enclosed ceiling voids

4.5 MOULD GROWTH AND OTHER CONTAMINANTS

Allowance should be made for thorough cleaning of mould affected surfaces following removal of detached plaster and laths, initially with an industrial vacuum cleaner fitted with medical grade ‘HEPA’ or HEPA Type, air filters. Any mould affected plaster to be retained on

refurbishment should be thoroughly cleaned using a 10% solution of household bleach or sodium hypochlorite in cold water, followed by thorough rising and drying, before encapsulation above the proposed false ceiling or behind wall linings. Personnel undertaking mould removal works should be provided with appropriate PPE, including 'FFP3' grade face masks, gloves, disposal overalls and eye protection. Consideration should be given to complete removal of existing ceiling finishes, following careful photographic recorded, to allow cleaning and decontamination of the ceiling void

4.6 ANIMAL HAIR REINFORCED PLASTER

Notwithstanding the extremely low probability of anthrax (*b.anthracis*) spores being present in the ceiling plaster a Risk Assessment should be conducted, generally to comply with the COSHH (Control of Substances Hazardous to Health) Regulations 2002. HSE guidance does not make recommendations for specific control measures for workers in Construction related trades but advises general site hygiene measures, including as follows (see Appendix C, HSE HGE174 p. 12)

- use good basic hygiene practices including regular hand-washing and avoid hand to mouth/eye contact
- take rest breaks, including meals and drinks, in separate accommodation away from the workplace
- cover all cuts, abrasions and other breaks in the skin with waterproof dressings and/or gloves
- ensure first-aid equipment is available and regularly maintained
- avoid personal contamination by the use of suitable protective clothing and use separate storage for keeping protective clothing apart from personal clothing which is not worn during working hours;

These precautions may be considered good practice for any building site and will provide additional protection against irritant dusts and contaminants, alongside the routine use of FFP 3 Grade dust masks and lightweight disposable gloves