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THE MORTON PARTNERSHIP LTD.

CONSULTING CIVIL & STRUCTURAL ENGINEERS,  
HISTORIC BUILDING SPECIALISTS

Old Timber Yard House, 55 The Timber Yard  
Drysdale Street, London N1 6ND

Tel: 020 7324 7270 Fax: 020 7729 1196

email: [london@themortonpartnership.co.uk](mailto:london@themortonpartnership.co.uk)

[www.themortonpartnership.co.uk](http://www.themortonpartnership.co.uk)

**STRUCTURAL SURVEY  
TO  
16 – 19 SOUTHAMPTON PLACE  
LONDON WC1**

**Project Manager:** Hanover Cube

**Architect:** Canaway Fleming Architects  
The Dutch House  
307 – 308 High Holborn  
London  
WC1V 7LL

**Prepared by:** The Morton Partnership Ltd  
Old Timber Yard House  
55 The Timber Yard  
Drysdale Street  
London N1 6ND

**Date:** September 2011

**Ref:** PC\13006~srep Rev B

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## **1.0 Introduction and Client's Brief**

- 1.1 We have been requested by Chris Richards of Hanover Cube to carry out a brief structural survey and appraisal of the properties comprising 16, 17, 18 and 19 Southampton Place.
- 1.2 The survey is to set out any significant structural defects found to the properties.
- 1.3 The survey was visual only with very limited opening up and did not include inspection of services, drains etc. comments being limited to the structural aspects of the building.
- 1.4 The surveys to the buildings were carried out on 12 October 2010, 10 December 2010 and 11 January 2011 and 22 February 2011. Further visits were made on 30 June, 14 July and 8 September 2011.

## **2.0 Brief Description**

- 2.1 The properties are 4 terraced properties on Southampton Place in Holborn.
- 2.2 The properties are currently five and six storey townhouses comprising basement, ground, first, second, third and there is a fourth floor in number 18. These are traditional Georgian buildings however it is believed extensive reconstruction works were carried out following possible bomb damage during WW2 and also significant structural works during phases of previous refurbishment. The front of number 19 extends over the side passage at first, second and third floors.
- 2.3 The properties were most recently used as offices and appear to have had regular decoration cycles and maintenance.
- 2.4 The buildings are currently linked in a number of locations at different floor levels. It is proposed to maintain these number of penetrations through party walls to ease circulation between the buildings.
- 2.5 Access was not possible to a number of areas, in particular the roof voids.
- 2.6 A number of alterations are proposed including removing a number of walls at different floor levels. The proposed occupation of the buildings are as classrooms which has a slightly higher theoretical loading than office use. We discuss this later in the report.

## **3.0 Structural Survey Detail**

### **3.1 16 Southampton Place**

- 3.1.1 The roof structure is double pitched front to back with a central valley. There did not appear to be any evidence of significant water ingress noted to the central spine wall however opening up did expose surface decay to the valley plate (Photograph 1). There was a crack noted in the ceiling finish adjacent to the stair wall at third floor level.
- 3.1.2 The roof to the rear within the mansard at third floor has settled. A section of ceiling finish was removed in this area to expose the structure and it was noted that an additional timber purlin was added some time in the past we presume to arrest the settlement in this area. As there was no cracking in the plaster finish we assume that this structural enhancement has been successful.
- 3.1.3 The majority of floor structures appear to span between party walls and intermediate walls below or floor beams that span front to back.
- 3.1.4 There were a number of loose floor boards at third floor level of number 16 and generally through out the building.

- 3.1.5 There was no significant cracking or structural defects visible within this building. There were no excessive cracks noted to the external elevations.
- 3.1.6 The staircase in number 16 will need minor enhancements such as tread replacements and handrail stiffening but the general condition of the stairs was found to be acceptable.

### **3.2 17 Southampton Place**

- 3.2.1 The roof of number 17 has been replaced with a steel frame at some time in the past (Photograph 2). This would have been relatively recent as the steel beams had a zinc rich primer applied. The floors were generally found to span parallel with the front wall onto front to back spanning beams.
- 3.2.2 Some minor movement and cracking was noted to the top of the party wall between 17 and 18 above the roof level. We would recommend that these cracks should be stitch repaired using stainless steel helical bars grouted into the horizontal bed joints.
- 3.2.3 A crack was noted in the ceiling to the rear room at third floor level.
- 3.2.4 Cracking was found in the second floor ceilings to the front and rear rooms. Both of these cracks were perpendicular to the front wall. The floor to the front room at second floor level was found to sag. This can be corrected by furring pieces fixed to the tops of the joists.
- 3.2.5 The first floor to the rear of number 17 was found to undulate across its length. Cracking was noted in the ceiling to the front room at this level. Some water staining was seen in a number of locations at this level but this was thought to be more associated with failed radiators rather than issues with the building fabric.
- 3.2.6 There was some movement in the coving found to the rear room at ground floor. This occurs in the junction of the rear bay and also in the area of the flank wall.
- 3.2.7 A section of damp wall was noted at high level in the stair lobby in the party wall with 18 Southampton Place.
- 3.2.8 The basement floors were found to be solid construction with no obvious signs of distortion or being out of level.
- 3.2.9 A number of cracks were noted in this building to the rear elevation in the fair faced brickwork. This was particularly evident to the heads of the first floor where the cracks measured in the order of 2-3mm (Photograph 3). We would recommend that these cracks are stitched using stainless steel helical bar reinforcement grouted into the horizontal bed joints.
- 3.2.10 The gauged brick arch over the first floor rear window has a cracked brick. It would be wise to replace this brick now that access is available.
- 3.2.11 During works to remove the landing store at first and second floor the chimney structure was exposed. This revealed the riser has been cut into the chimney structure leaving only ½ brick cover to the flues. This facing brick skin has been dislodged in a number of areas. We would recommend that all loose and missing bricks are found, these are to be replaced ensuring adequate bonding in. To prevent further deterioration of this wall we would recommend that stainless steel expanded metal lathe is screwed to the wall and a suitable render is applied to protect the brickwork and prevent air seepage from the flues.
- 3.2.12 There is a set of external steps to the rear of number 17 leading from the basement courtyard to a raised ground floor level courtyard. These steps were found to be in a particularly poor condition. The treads have been repaired in the past and these repairs are now spalling away. This is more of a fabric repair but in our opinion the treads and risers to the full stair should be replaced.

**3.3 18 Southampton Place**

- 3.3.1 This is the only one of the properties that we are involved in that has a fourth floor. This area is within the roof space to the middle section of the property. There is a large water tank stored in the corner of this storey which is adjacent to the left overrun.
- 3.3.2 A section of sagging plaster was noted in the ceiling of the stair lobby at third floor level. This was opened up and it is likely that a former water leak caused the damage. The plaster that has been damaged is plaster board and not lathe and plaster and the water leak has dried without causing decay to the structural joists (Photograph 4). It will be necessary to replace the plasterboard ceiling.
- 3.3.3 The third floor structure comprises timber joists spanning parallel with the front elevation between steel beams. This floor appeared generally free from excessive distortion.
- 3.3.4 The second floor structure was also found to comprise timber joists supported on steel beams in a similar arrangement. There was no original floor structure found at this level.
- 3.3.5 The first floor was found to be the original timber structure comprising timber joists spanning between party walls and intermediate timber beams. The floor condition was found to be reasonable where no excessive sagging was noted.
- 3.3.6 The ceiling in the ground floor front room was found to have a number of cracks running through from the chimney structure. Further investigations should be carried out on this ceiling to confirm that it is satisfactorily secured to the backing structure. The remainder of the ground floor was found to be in reasonable condition.
- 3.3.7 The basement area floor is solid construction with no areas of significant settlement, cracking or distortion noted.
- 3.3.8 Some minor cracks were noted to the rear elevation of this property, particularly around the first floor windows. Some of these were considered to be hairline in which case we would be happy to leave but we would recommend that the larger cracks are stitched.
- 3.3.9 The gauged brick arch over the second floor rear window has delaminated and the majority of the faces of bricks have come away (Photograph 5). It would be a worthwhile exercise to replace these eroded bricks when access is available.
- 3.3.10 On the front elevation it was noted that a rendered column appeared to be coming away from the brickwork. On closer inspection it can be seen that a metal downpipe is enclosed behind the render which is corroding. This corrosion is causing the downpipe to be jacked away from the wall causing the opening up. When struck, this area appeared to be sound with no signs of live material and therefore is more of a building fabric issue than a structural one.

**3.4 19 Southampton Place**

- 3.4.1 The third floor of 19 Southampton Place is also within the roofspace as with the other properties. There are higher level roof voids to the front and rear above the ceiling levels above the central valley that is located over the stairwell. Cracking was noted to the rear room ceiling at third floor level. This area was opened up during the investigation works and was found to be particularly live. The principal structure was found to be in a reasonable condition but we would recommend the roof finishes are replaced as ponding occurs in the flat section of this roof.
- 3.4.2 There were a number of floor boxes within the third floor area. We would recommend that some area of flooring are opened up as part of the works to ensure that the floor joists were not excessively cut or notched to install these services.

- 3.4.3 Water staining was noted in the ceiling of the third floor stairwell (Photograph 6). Opening up revealed that this is due to a leak in the valley section of the roof over and although water ingress has occurred, decay to the roof members has not yet taken place. We would of course recommend that the leak is made good.
- 3.4.4 The second floor of 19 Southampton Place was found to be in a reasonable condition. opening up to the rear room at this level exposed a large section timber beam spanning front to back between the two rear windows which supports common floor joists.
- 3.4.5 There were a number of cracks in the ceiling finishes to both the front and rear rooms at first floor level. It was not possible to identify if these cracks were the cause of thermal movement or whether the plaster is de-bonding from the backing structure.
- 3.4.6 Cracking was noted in the ceiling in the front room of the ground floor. This was in the area of the chimney structure.
- 3.4.7 No visible defects were noted in the basement areas of this building.
- 3.4.8 The staircase to number 19 was found to be structurally acceptable, however a number of treads will need to be replaced as these were found to be worn and deflecting when walked on.
- 3.4.9 The rear and side elevation to number 19 is painted render. There were a number of cracks noted in this render where the majority of these were found to be hairline. There were a number of these cracks that were more significant and we have recommended that the render is removed in these locations to expose the backing structure. We want to establish if the cracking is simply caused by shrinkage or thermal movement in the render. If the cracking is found to be of reasonable thickness in the backing structure we would recommend that these cracks are stitched.

#### 4.0 Comments on Proposed Alterations

- 4.1 One of the most significant proposed alterations between the former building and the proposed is the change of use from offices to educational use. The theoretical imposed loading that has been applied to the floor during its use as offices was  $2.5\text{kN/m}^2$ . The new proposed use will be classrooms where, according to BS6399: 1 the imposed floor load for a classroom is  $3.0\text{kN/m}^2$ . This is therefore an increase in design imposed loading of  $0.5\text{kN/m}^2$ . In many of the classrooms we will be removing the existing non loadbearing partitions to form larger classrooms and therefore the dead weight applied to the floors will reduce accordingly.
- 4.2 We have carried out assessments also of the proposed imposed floor loads based on the architectural layouts as these are more catered for centres for adult education rather than general classrooms. The most densely populated room is classroom S22 which is designed to accommodate 13 people. If we assume that each person weighs 120kg and their desk weighs 50kg, the total load distributed over this floor area equates to be  $1.3\text{kN/m}^2$  which is far less than the theoretical imposed design load of  $3.0\text{kN/m}^2$  for classrooms generally. Even if we were to allow for an additional 10 students each weighing 120kg standing, the imposed loading in this room acting on the floor structure is  $1.9\text{kN/m}^2$ . This loading is even less than what would be allowed for office loading which is  $2.5\text{kN/m}^2$  which we know these floors can support. We are therefore confident that the existing floor structures are adequate to support the proposed loadings.
- 4.3 It is proposed to remove a number of non loadbearing walls within the buildings. These have been identified by opening up various areas and these can be removed without adding any further structural elements.

- 4.4 At third floor level it is proposed to remove the dividing wall in the front rooms in properties 16 and 17. These may be partially loadbearing as the roof structures span front to back bearing on purlins at the change in slope of the roof and the purlins may be propped on these walls. There is no wall in the same location in the floor below but it is likely that there is a support within this wall in the location of the purlin. The majority of these walls can be removed but careful opening up will be required in the purlin support location to confirm if there is a post within the wall.
- 4.5 The internal walls at second floor level in numbers 16,17 and 18 that run front to back in the front rooms are both to be removed. These are non loadbearing and can be carefully removed.
- 4.6 There is a cupboard structure in number 17 at second and first floor level within the stairwell. This can also be carefully removed as it is non load-bearing.
- 4.7 To the rear of number 16 at ground floor level it is proposed to remove the walls enclosing the external courtyard and roof over this area to increase the area of room G40. The existing flat roof structure over the linking corridor is supported on doubled up steel beams that bear onto the brick pier that is to be removed. We would recommend that a new steel beam of a suitable size is installed under these beams to span the full width of the property so that the existing brick support can be removed. This new steel beam will also support the existing roof beams to the rear of the property.
- 4.8 The new cavity enclosing wall to form the enclosure to room G40 will be built off the existing basement wall. This wall was found to be a 9" solid wall with a new facing skin. We would therefore recommend that a new reinforced concrete spreader beam is cast on this existing wall to provide a suitable base for the new cavity wall.
- 4.9 It is proposed to remove the partition walls to the rear of the 18 Southampton Place at ground floor level. This is not a problem as these are non-loadbearing.
- 4.10 It is proposed to form a new opening in the basement of number 18 in the main spine wall. We have asked for further opening up in this area to determine if the wall is loadbearing at this level. This wall was revealed to be non loadbearing where the loadbearing wall to the floors over is supported on steel beams at high level basement level.
- 4.11 There are a number of existing doors to the basement areas that are to be widened or relocated. It will be necessary to replace the existing lintels with suitable lintels to span the greater opening.
- 4.12 It is proposed to form a new door into the ground floor of No. 19 from Barter Street. This can be formed using proprietary precast concrete lintels with a stainless steel angle to support an external brick flat arch. There are a number of other new openings proposed for this level which can be formed in the same manner.
- 4.13 It is proposed to form a new access ramp to number 17. This is to be a lightweight steel structure formed over the lightwell to the front of the property. This structure can be formed of steel primary structures fixed to the existing lightwell retaining walls and front walls via steel brackets resin anchored.
- 4.14 It is proposed to install 2No AC condenser units on the roof of number 17. These are too heavy to simply place on the existing roof and will need to be supported on new steel beams above the roof finish. It will be necessary to span the new steel beams between the lift shaft wall and a new steel channel spreader face fixed to the chimney between 16 and 17 Southampton Place.

## 5.0 Conclusions and Recommendations

- 5.1 Generally the properties are in reasonable structural condition. There were very little defects found in the structures where access was available. The majority of cracking appeared to be in the plaster finish and can be made good with re-decorations.
- 5.2 We are satisfied that the floor structures are suitable for use as classrooms. The increase in design imposed load and the removal of partition walls results in a comparable net load being applied to the floors which these floor structures have supported for many years. The classroom classification loading is rather high in this instance as the use is in fact adult education with fixed desk and chair arrangement with limited numbers of people in each class.
- 5.3 There are a number of structural works required to accommodate the structural proposals. We have essentially highlighted these in the section above but it will be necessary for us to prepare structural drawings and justifying calculations for building control approval. The drawings can then inform the contractor what structural works are to be implemented.
- 5.4 There were a number of cracks noted in the rear elevation and we would recommend that these are repaired using a stainless steel helical bar reinforcement system.
- 5.5 The stairs in the properties were generally found to be in a reasonable condition where the landings and flights had not significantly settled or dropped in the past. There were a number of flights where the treads had worn and appear to be not fully supported and we would recommend that these are exposed and made good by replacing treads and ensuring that adequate brackets are in place between the carriages and treads. Some areas have been exposed and in these areas the treads have significantly worn which will involve reasonable replacement.

## 6.0 Limitations

- 6.1 It should be stated that we have not inspected woodwork or other parts of the structure unless specifically detailed in the report, which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.
- 6.2 This report has been carried out to the Client's requirements and no liability is intended or will be accepted from any third party whatsoever.
- 6.3 The limits of liability are restricted to the contents of this report. No opening up or investigation of foundations etc was carried out, the inspection being visual only.
- 6.4 No checks on load bearing capabilities have been carried out.



## APPENDIX A

### Photographs



**Photograph 1:** Surface decay to valley of 16 Southampton Place



**Photograph 2:** Exposed steel roof beam in number 17



**Photograph 3:** Cracking to the rear of 17 Southampton Place



**Photograph 4:** Water ingress to the ceiling of 18 Southampton





**Photograph 5:** Delaminating to the brick arch over the rear window of 18 Southampton Place.



**Photograph 6:** Water ingress at third floor of 19 Southampton Place.