123 Knights Hill, West Norwood, London, SE27 OSP

Structural Engineer's Report

Prepared for: Lambeth Housing Management on the Instruction of Savills (UK) Ltd

July 2022

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Report Revision Sheet

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1.0 Introduction

- 1.1 London Borough of Lambeth's Strategic Asset Partner, Savills (UK) Ltd, instructed Sir Frederick Snow and Partners Ltd (SFSP) to undertake a structural engineer's inspection of 123 Knights Hill.
- 1.2 The Structural Investigation Request was received on 28th June 2022 and the survey was carried out by **an experimental on 14th** July 2022 and was limited to a visual inspection of the property. No opening up works were carried out during this inspection, although plaster had been stripped from a number of walls to expose underlying masonry prior to the inspection. No comments can be made on parts of the structure that remained covered or inaccessible. No comments can be made on the areas of the rear elevation that could not be viewed because of excavations and significant foliage in the rear garden.
- 1.3 The property was void at the time of inspection.
- 1.4 SFSP previously inspected the property in August 2018. Following this, a soil investigation was undertaken at the property and a final report produced, dated May 2019. These reports are included within SFSP's Second Final Report, which is included in section 8.0 of this report.
- 1.5 Further investigative works consisting of opening works were undertaken and a reinspection was undertaken in May 2021. Lambeth commissioned a CCTV drainage survey, and a report was issued to SFSP dated June 2021. SFSP produced a second final report based on the findings of re-inspection and CCTV survey dated July 2021. This Second Final Report, also dated July 2021, is included in section 8.0 of this report. Subsequently, a period of crack monitoring was commenced in February 2022 and is ongoing.
- 1.6 This report is for the use of Lambeth Housing Management only. It should not be copied or distributed except in full.

2.0 General Description

- 2.1 123 Knights Hill is a two-storey house on the east side of Knights Hill (see photograph 6.1). It is thought to be of traditional construction with masonry external walls, load bearing masonry internal walls, timber partition walls, suspended timber floors and ceilings and a timber multi pitched hidden valley roof. It is thought to have been constructed in early/mid 1800s.
- 2.2 The property has a rear garden (see photograph 6.2).
- 2.3 British Geological Survey data shows the site to be underlain by London Clay. The soil investigation undertaken at the property determined that foundations are founded on made ground.



3.0 Observations

- 3.1 Front Elevation
 - 3.1.1 A hairline crack was seen at the bottom right-hand corner of the first-floor right-hand window (see photograph 6.3).
 - 3.1.2 1-2mm wide cracks were noted at the top right and left-hand corners of the of the lefthand ground floor window (see photographs 6.4 and 6.5).
 - 3.1.3 A 1-2mm wide crack was observed at the top right-hand corner of the first-floor lefthand window (see photograph 6.6).

3.2 Rear Elevation

- 3.2.1 Numerous 1-3mm wide cracks were noted on the rear wall of the one storey section of the property (see photograph 6.7).
- 3.2.2 Significant cracks were observed at the top right and left-hand corners of the stair window (see photograph 6.8). It was noted that the wall above the window between these cracks appears to have moved outwards (see photograph 6.9).
- 3.2.3 A 5-15mm wide crack was observed on the left-hand side of the rear door on the side of the one storey section of the property (see photograph 6.10).
- 3.2.4 A 1-2mm wide crack was observed in the back of the parapet wall of the rear elevation of the one storey section (see photograph 6.11).
- 3.3 Ground Floor Hallway
 - 3.3.1 A 3-4mm wide crack was seen at the top right-hand corner of the front-most door to the large room (see photograph 6.12).
 - 3.3.2 2-10mm wide cracks were seen at the top right and left-hand corners of the rear-most door to the large room (see photographs 6.13 and 6.14).
 - 3.3.3 Significant areas of the internal masonry walls were observed to have deteriorated and masonry unit faces have broken away (see photographs 6.15 and 6.16).
 - 3.3.4 A 4-6mm wide crack was noted below the stair landing in the external wall (see photograph 6.17).
 - 3.3.5 A 10-15mm wide gap was seen down the right-hand side of the rear door (see photograph 6.18).
 - 3.3.6 A 5-8mm wide gap was observed down the left-hand side of the rear door.



3.4 Ground Floor Front Left-Hand Room

- 3.4.1 A hairline to 1mm wide crack was seen in the chimney breast (see photograph 6.19). It was noted that, where an area of plaster has been removed, a metal plate is embedded in chimney approximately level with the crack. The plate was observed to be rusted.
- 3.4.2 A 2-3mm wide crack was observed in the internal wall with the ground floor back lefthand room (see photograph 6.20).
- 3.4.3 1-2mm wide cracks were seen at the top right and left-hand corners of the door (see photograph 6.21).
- 3.4.4 Efflorescent staining was noted on the underside of the first-floor floorboards (see photograph 6.22).
- 3.4.5 A 1-2mm wide crack was observed in the internal wall with the downstairs hallway (see photograph 6.23).
- 3.5 Ground Floor Back Left Hand Room
 - 3.5.1 Two 1-2mm wide cracks were seen at the top right-hand corner of the door (see photograph 6.24).
 - 3.5.2 A 1-2mm wide crack was noted in the internal wall with the hallway (see photograph 6.25).
 - 3.5.3 A 2-3mm wide crack was seen in the top reveal of the left-hand window (see photograph 6.26).
 - 3.5.4 A hairline to 1mm wide crack was observed in the right-hand window reveal (see photograph 6.27).
- 3.6 Ground Floor Bathroom
 - 3.6.1 It was noted that a brick appears to be missing from high level of the wall, in the corner (see photograph 6.28).
- 3.7 Ground Floor Right Hand Room
 - 3.7.1 It was noted that the rear door opening is a void with no door or doorframe present (see photograph 6.29).
 - 3.7.2 Efflorescent staining was observed on the underside of the first-floor floorboards (see photograph 6.30).



- 3.7.3 A 3-5mm wide crack was seen at the top left-hand corner of the front-most door to the hallway (see photograph 6.31).
- 3.7.4 A 10-15mm wide crack was noted at the top left-hand corner of the rear-most door to the hallway (see photograph 6.32).
- 3.7.5 A 10-20mm wide gap was observed in the corner between the rear elevation wall and the internal wall with the stairs (see photograph 6.33).
- 3.7.6 It was noted that the rear elevation wall is slightly distorted above the rear door opening (see photographs 6.34 and 6.28).
- 3.7.7 A 15-25mm wide crack was seen in the corner between the rear elevation and party wall (see photograph 6.35).
- 3.7.8 It was noted that areas of masonry at low level on the right and left-hand sides of the rear door opening are missing (see photographs 6.36 and 6.37).
- 3.7.9 4-5mm wide cracks were seen at the top left and right-hand corners of the rear door opening (see photographs 6.38 and 6.39).
- 3.8 Stairs
 - 3.8.1 A 10-15mm wide gap was noted around the window reveal (see photograph 6.40).
 - 3.8.2 A 10-20mm wide gap was seen in the corner between the rear elevation wall and internal wall with the large ground floor room (see photograph 6.41).
 - 3.8.3 A 4-5mm wide crack was observed at high level in the internal wall with the back left room (see photograph 6.42).
 - 3.8.4 A 10-15mm wide crack was seen in the external wall forming the return on the rear elevation. The crack is approximately at the connection between the rear elevation and the return (see photograph 6.43).
 - 3.8.5 It was noted that light was visible through the corner in the external wall and a 2-4mm wide crack is present (see photograph 6.44).
 - 3.8.6 It was observed that areas of the masonry have deteriorated (see photograph 6.45).
- 3.9 First Floor Landing
 - 3.9.1 It was seen that areas of masonry walls have deteriorated (see photograph 6.46). Some areas of newer masonry were observed (see photographs 6.47 and 6.48).



3.10 First Floor Front Left-Hand Room

- 3.10.1 A 1-3mm wide crack was noted at the top left-hand corner of the door (see photograph 6.49).
- 3.10.2 Masonry units were noted to be missing from high level of an internal wall, within the roof void (see photograph 6.50).
- 3.10.3 A 10-15mm wide gap was observed in the corner between the front elevation and internal wall (see photograph 6.51).
- 3.10.4 A 1-2mm wide crack was seen in the corner between the party wall and internal wall (see photograph 6.52).
- 3.10.5 A 1-2mm wide crack was noted in the internal wall with the back right room (see photograph 6.53).
- 3.11 First Floor Back Left-Hand Room
 - 3.11.1 A 2-3mm wide crack was noted in the corner between the rear elevation and the internal wall (see photograph 6.54).
 - 3.11.2 A 1-2mm wide crack was seen at high level of the party wall (see photograph 6.55).
 - 3.11.3 A hairline crack was observed at the top right-hand corner of the door (see photograph 6.56).
 - 3.11.4 A hairline crack was noted at the top right-hand corner of the window (see photograph 6.57).
- 3.12 First Floor Bathroom
 - 3.12.1 A 1-2mm wide crack was seen in the corner between the front elevation and the internal wall with the front right room (see photograph 6.58).
- 3.13 First Floor Front Right-Hand Room
 - 3.13.1 Evidence of significant water damage and what appeared to be fungal growth was noted on the double ceiling joist (see photograph 6.59).
 - 3.13.2 1-2mm wide cracks were observed at the bottom right and left-hand corners of the window (see photographs 6.60 and 6.61).
 - 3.13.3 Wallpaper at high level of the front elevation wall appeared to have been subject to moisture penetration (see photograph 6.62).



- 3.13.4 Two 1-2mm wide cracks were seen at the top right-hand corner of the door (see photograph 6.63).
- 3.14 First Floor Back Right-Hand Room
 - 3.14.1 A 10-15mm wide crack was observed at the top left-hand corner of the door (see photograph 6.64).
 - 3.14.2 A 1-3mm wide crack was noted in the corner between the internal wall with the stairs and the rear elevation wall (see photograph 6.65).
 - 3.14.3 An area of deteriorated/missing masonry was seen below the window (see photograph 6.66).
 - 3.14.4 A 1-2mm wide crack was observed between the rear elevation and the party wall (see photograph 6.67).
 - 3.14.5 The window/window frame was seen to be distorted (see photograph 6.68).
 - 3.14.6 A 2-4mm wide crack was noted at the top left-hand corner of the window (see photograph 6.69).
 - 3.14.7 A 4-10mm wide crack was seen at the top right-hand corner of the window (see photograph 6.69).
 - 3.14.8 A 3-5mm wide crack was observed at the bottom right-hand corner of the window (see photograph 6.70).
 - 3.14.9 A 1-2mm wide crack was noted in the corner to the right of the door (see photograph 6.71).
 - 3.14.10 Vertical timber props were noted along the roof edge next to the party wall (see photograph 6.72).



4.0 Comments and Conclusions

- 4.1 Areas in the ground floor front left-hand room that had been identified as visibly wet/damp in the second final report dated July 2021 appear to have dried, leaving efflorescent staining on floorboards and joists. The roof boards in the first-floor front left-hand room also appeared to have dried. It is not thought that joists or rafters in these areas have deteriorated due to water exposure.
- 4.2 The double roof joist in the first-floor front right room appeared to have deteriorated further since July 2021. It does not appear to have dried out and is covered in what was thought to be fungal growth. It is therefore thought that water is still penetrating into the property.
- 4.3 Cracking is widespread and although many cracks are minor and characteristic of cracking that would be expected in a property of this type and age, some are more severe and are characteristic of significant structural movements, and are probably associated with differential ground movements. With the removal of significant areas of internal finishes, it was revealed that the underlying fabric of the property is significantly cracked in some areas. It appears that the rear elevation has moved away from internal walls leaving gaps at the butt joints, and distortion of openings on the rear elevation indicates that part of the rear elevation wall has moved downwards.
- 4.4 The crack monitoring readings to date cannot be commented on with reliability as not enough readings have been taken to determine if a seasonal pattern is apparent or if movements are progressive.
- 4.5 Two mature trees which have previously been determined by NHBC (Chapter 4.2 Building Near Trees) guidance to be too close to the property, especially with the shallow nature of the foundation at the property, remain in place.
- 4.6 The dense foliage in the rear garden has grown to such an extent that large foundation exposure excavations are concealed and present a danger to anyone attending the site.



5.0 Recommendations

- 5.1 We recommend that work records are checked to determine if works were carried out to drainage defects identified by CCTV survey as per SFSP Second Final Report recommendation 6.2.
- 5.2 We recommend that, as per SFSP's Final Report recommendation 7.2, the two mature trees along the southern boundary of the garden are removed and dense foliage is removed. The garden should be maintained so that it is not overgrown, in order to reduce the influence of vegetation on soil moisture contents and to expose excavations in order to reduce fall risk.
- 5.3 We recommend that as per recommendation 6.1 of SFSP's Second Final Report that a specialist roofer be instructed undertaken an inspection of the roof and make good any leaks or defects that are identified as per the roofers' recommendations.
- 5.4 We recommend that a timber preservation specialist is contracted to undertake an assessment of the rotten timber roof joist. The opportunity should be taken for an assessment of all timber that has been subject to long term moisture exposure. Any recommendations for making good of timber elements of the structure, whether this is treatment of timber or removal and replacement, should be undertaken.
- 5.5 We recommend that defective masonry internally around rear door in the ground floor right hand room is carefully removed. Once defective masonry has been removed, new masonry should be constructed to match existing where wall has lost thickness, to reinstate the stability of this section of the property. It is noted that these repairs are likely to crack as movements continue.
- 5.6 We recommend that in the internal wall where it is apparent that significant portions of masonry units have been lost, remaining sections of masonry units are carefully cut out and removed and replaced to match existing.
- 5.7 We recommend that ongoing crack monitoring is continued and once it has been determined that significant progressive movements have ceased (and only then), that repairs are undertaken. Depending upon crack widths and the extent of cracking at that time, these are likely to include the following:
 - 5.7.1 The section of masonry above the rear door should be carefully removed/deconstructed, a new lintel be provided and the masonry above reinstated to match existing. Bed joint reinforcement, such as Helifix Helibar, should also be installed in this new section of masonry, in accordance with manufacturer's instructions and Helifix repair detail CS05, with bars projecting 1 metre into the existing masonry on each side of the re-built area.
 - 5.7.2 Bed joint reinforcement, such as Helifix Helibar, should be installed horizontally across the large cracks at the corners of the rear windows in accordance with manufacturer's



instructions and Helifix repair detail LR08, then the cracks be injected with Crackbond TE3 or similar, in accordance with the manufacturer's instructions.

- 5.7.3 The narrower cracks in the rear elevation should be injected with Fosroc Nitofill LV to maintain weather tightness of the property.
- 5.7.4 Helifix Helibar/CemTies reinforcement should be installed around joints between internal/party walls and the rear elevation wall, in accordance with manufacturer's instructions and Helifix repair details RW03 and RW04, then the cracks should be made good using an appropriate Helifix bonding agent depending on the width of the crack, in accordance with the manufacturer's instructions.
- 5.7.5 Internally, the property is in need of a complete overhaul of the finishes. Finishes should be removed around large cracks and where the underlying wall is masonry each crack should be injected with an epoxy resin such as Fosroc Nitofill and that the finishes be reinstated to match the existing. If the underlying material isn't masonry, any gaps between dissimilar materials should be taped over and then the finishes be reinstated over the crack, incorporating metal mesh within the plaster to help to control future cracking.
- 5.7.6 Smaller internal cracks should be filled using a proprietary, internal grade, paintable, flexible crack filler such as Sika Decorators Caulk.



6.0 Photographs



6.1 General view of the front elevation of 123 Knights Hill





6.2 General view of the rear garden of 123 Knights Hill. Note extensive foliage







- 6.3 Hairline crack in the front elevation at the bottom right-hand corner of the first-floor righthand window (left)
- 6.4 1-2mm wide crack in the front elevation at the top right-hand corner of the left-hand ground floor window (right)







- 6.5 1-2mm wide crack in the front elevation at the top right-hand corner of the left-hand ground floor window (left)
- 6.6 1-2mm wide crack in the front elevation at the top right-hand corner of the first-floor lefthand window (right)







- 6.7 Numerous 1-3mm wide cracks in the rear elevation of the one storey section of the property (left)
- 6.8 Significant cracks in the rear elevation at the top right and left-hand corners of the stair window. Note that the wall above the window appears to have moved outwards (right)



6.9 Section of wall above the stair window that appears to have moved outwards







- 6.10 5-15mm wide crack on the left-hand side of the rear door on the side of the one storey section of the property (left)
- 6.11 1-2mm wide crack was observed in the back of the parapet wall of the rear elevation of the one storey section (right)



6.12 3-4mm wide crack in the ground floor hallway at the top right-hand corner of the frontmost door to the large room







- 6.13 2-10mm wide crack in the ground floor hallway at the top right-hand corner of the rearmost door to the large room (left)
- 6.14 2-10mm wide crack in the ground floor hallway at the top left-hand corner of the rearmost door to the large room (right)







- 6.15 Area of the ground floor hallway internal masonry wall that has deteriorated. Note masonry unit faces have broken away (left)
- 6.16 Area of the ground floor hallway internal masonry wall that has deteriorated. Note masonry unit faces have broken away (right)







- 6.17 4-6mm wide crack in the ground floor hallway below the stair landing in the external wall (left)
- 6.18 10-15mm wide gap in the ground floor hallway down the right-hand side of the rear door (right)



6.19 Hairline to 1mm wide crack in the ground floor front left-hand room in the chimney breast, note exposed rusted metal plate





6.20 2-3mm wide crack in the ground floor front left-hand room in the internal wall with the ground floor back left-hand room



6.21 1-2mm wide cracks in the ground floor front left-hand room at the top left and right-hand corners of the door







- 6.22 Efflorescent staining in the ground floor front left-hand room on the underside of the first-floor floorboards (left)
- 6.23 1-2mm wide crack in the ground floor front left-hand room in the internal wall with the hallway (right)



6.24 Two 1-2mm wide cracks in the ground floor back left-hand room at the top right-hand corner of the door





6.25 1-2mm wide crack in the ground floor back left-hand room in the internal wall with the hallway



6.26 2-3mm wide crack in the ground floor back left-hand room in the top reveal of the lefthand window







- 6.27 Hairline to 1mm wide crack in the ground floor back left-hand room in the right-hand window reveal (left)
- 6.28 Missing brick at high level of the wall in the corner of the ground floor bathroom (right)



6.29 General view of rear door opening in the ground floor right-hand room. Note masonry above the door is distorted





6.30 Efflorescent staining in the ground floor right-hand room on the underside of the first-floor floorboards



6.31 3-5mm wide crack in the ground floor right-hand room at the top left-hand corner of the front-most door to the hallway







- 6.32 10-15mm wide crack in the ground floor right hand room at the top left-hand corner of the rear-most door to the hallway (left)
- 6.33 10-20mm wide gap in the ground floor right-hand room in the corner between the rear elevation wall and internal wall with the stairs (right)



6.34 Rear elevation wall above the rear door opening in the ground floor right-hand room that is distorted







- 6.35 15-25mm wide crack in the ground floor right-hand room in the corner between the rear elevation and party wall (left)
- 6.36 Area of masonry in the ground floor right hand room at low level on the right-hand side of the rear door opening that is missing (right)



6.37 Area of masonry in the ground floor right hand room at low level on the left-hand side of the rear door opening that is missing







- 6.38 4-5mm wide cracks in the ground floor right hand room at the top left-hand corner of the rear door opening (left)
- 6.39 4-5mm wide cracks in the ground floor right hand room at the top right-hand corner of the rear door opening (right)







- 6.40 10-15mm wide gap around the stair window reveal (left)
- 6.41 10-20mm wide gap in the corner of the stair landing between the rear elevation wall and internal wall with the large ground floor room (right)





- 6.42 4-5mm wide crack in the stair area at high level on the internal wall with the back left room (left)
- 6.43 10-15mm wide crack in the stair area in the external wall forming the return on the rear of the property (right)







- 6.44 Visible light through the corner of the stair landing in the external wall. Note 2-4mm wide crack (left)
- 6.45 Area of masonry wall within the stair area that has deteriorated (right)



6.46 Example of area of masonry wall on the first-floor landing that has deteriorated.



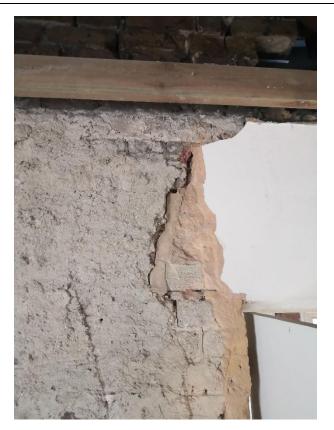


6.47 Area of newer masonry on the first-floor landing



6.48 Another area of newer masonry on the first-floor landing



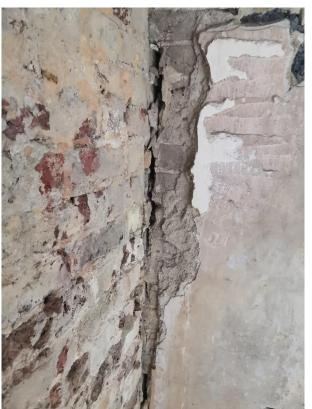


6.49 1-3mm wide crack in the first-floor front left-hand room at the top left-hand corner of the door



6.50 Missing masonry units in the first-floor front left-hand room at high level of internal wall within the roof void







- 6.51 10-15mm wide gap in the first-floor front left-hand room in the corner between the front elevation and internal wall (left)
- 6.52 1-2mm wide crack in the first-floor front left-hand room in the corner between the party wall and internal wall (right)



6.53 1-2mm wide crack in the first-floor front left-hand room in the internal wall with the back right room





- 6.54 2-3mm wide crack in the first floor back left-hand room in the corner between the rear elevation and the internal wall (left)
- 6.55 1-2mm wide crack in the first floor back left-hand room at high level of the party wall (right)







- 6.56 Hairline crack in the first floor back left-hand room at the top right-hand corner of the door (left)
- 6.57 Hairline crack in the first floor back left-hand room at the top right-hand corner of the window (right)







- 6.58 1-2mm wide crack in the first-floor bathroom in the corner between the front elevation and internal wall with the front right room (left)
- 6.59 Evidence of significant water damage and fungal growth in the first-floor front right-hand room on the double ceiling joist (right)







- 6.60 1-2mm wide crack in the first-floor front right-hand room at the bottom right-hand corner of the window (left)
- 6.61 1-2mm wide crack in the first-floor front right-hand room at the bottom left-hand corner of the window (right)



6.62 Evidence of water penetration on the wallpaper in the first-floor front right-hand room at high level of the front elevation wall







- 6.63 Two 1-2mm wide cracks in the first-floor front right hand room at the top right-hand corner of the door (left)
- 6.64 10-15mm wide crack in the first-floor back right-hand room at the top left-hand corner of the door (right)





6.65 1-3mm wide crack in the first floor back right-hand room in the corner between internal wall with the stairs and the rear elevation wall



6.66 Area of deteriorated/missing masonry in the first floor back right-hand room below the window





6.67 1-2mm wide crack in the first floor back right-hand room between the rear elevation and the party wall



6.68 Window/window frame in the first floor back right-hand room that is distorted





6.69 2-4mm wide crack in the first floor back right-hand room at the top left-hand corner of the window and 4-10mm wide crack at the top right-hand corner of the window



6.70 3-5mm wide crack in the first floor back right-hand room at the bottom right-hand corner of the window





6.71 1-2mm wide crack in the first floor back right-hand room in the corner to the right of the door



6.72 Vertical timber prop in the first floor back right-hand room along the roof edge with the party wall



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8.0 Copy of SFSP Second Final Report Dated July 2021