

**INSURANCE CLAIM: ENGINEERING APPRAISAL REPORT**

Name of Insured: London Borough of Camden



Address of Insured: 6 Dartmouth Park Avenue, LONDON, NW5 1JN

Situation of Damage: 6 Dartmouth Park Avenue, LONDON, NW5 1JN



This report is prepared on behalf of London Borough of Camden for the purpose of investigating an insurance claim. It is not intended to cover any other aspect of structural inadequacy or building defect that may otherwise have been in existence at the time of inspection.

Date: 23/08/2021



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## **INTRODUCTION**

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The technical aspects of this claim are being overseen by our Building Consultant Gavin Catheline MCIOB, in accordance with our project managed service.

The claim is primarily concerned with damage to the front bay windows and the rear single storey extension. All references to the property are as observed facing the front of the building.

## **DESCRIPTION OF BUILDING**

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The subject property is a detached house constructed c.1890, in a mature residential area and on a plot that is gently sloping down from back to front. To the rear of the property is a single storey kitchen extension.

The claim concerns damage to the front bay windows and the rear single storey kitchen extension.

## **CIRCUMSTANCES OF DISCOVERY OF DAMAGE**

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The residents at the property first discovered the damage in approximately 2000.

There has been a gradual discovery of cracking to the front bay windows over the last 20 years, but the damage has been seen to get worse in recent years. Previous monitoring investigations were carried out to the main cracks about 8 years ago, but no repairs were undertaken.

## **NATURE AND EXTENT OF DAMAGE**

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### **Description and Mechanism**

The principal damage takes the form of vertical and diagonal tapered cracking.

The indicated mechanism of movement is downward towards the front of the front bay windows and downward towards the rear of the rear single storey extension.

### **Significance**

The level of damage is moderate, and is classified as category 3 in accordance with BRE Digest 251 - Assessment of damage in low-rise buildings.

### **Onset and Progression**

London Borough of Camden has advised that damage first commenced in approximately 2000.

We consider that both the crack damage and distortions are historic.

It is likely that movement will be of a cyclical nature with cracks opening in the summer and closing in the winter.



#### SITE INVESTIGATIONS

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Site investigations were carried out by CET Property Assurance Ltd on 19<sup>th</sup> July 2021 and for details of the trial pit and borehole locations, together with test results, please refer to the attached CET factual report.

##### Trial Pit 01/Borehole 01

This was located adjacent to the front left corner of the front left bay window, within the area of damage and this revealed a 2-step brick corbel and clinker foundation with an overall founding depth of 500mm below ground level. The founding subsoil is described as stiff, mid brown, orange, silty CLAY with gravel. Numerous roots up to 2mm in diameter were observed beneath the foundations. The stiff clay subsoil extended throughout the borehole to a depth of 5.0m below ground level with further roots being observed within the subsoil samples to a depth of 1.4m. A datum was installed at the base of the borehole at 5.0m as a reference point for level monitoring.

##### Trial Pit 02/Borehole 02

This was located adjacent to the front and centre of the front right bay window, within the area of damage and this revealed a concrete underpinned foundation with an overall founding depth of 1400mm below ground level. The founding subsoil is described as stiff, mid brown, orange, silty CLAY. Numerous roots up to 1mm in diameter were observed beneath the foundations. The stiff clay subsoil extended throughout the borehole to a depth of 5.0m below ground level with further roots being observed within the subsoil samples to a depth of 2.1m.

##### Trial Pit 03/Borehole 03

This was located adjacent to the right-hand side elevation of the rear single storey extension, towards the rear right corner, within the area of damage and this revealed a concrete strip foundation with an overall founding depth of 400mm below ground level. The founding subsoil is described as stiff, mid brown, orange, silty CLAY. Numerous roots up to 1mm in diameter were observed beneath the foundations. The stiff clay subsoil extended throughout the borehole to a depth of 5.0m below ground level.

The subsoil samples retrieved from all 3 boreholes were sent to a laboratory for analysis. This has revealed that the clay subsoil is of very high plasticity index, meaning that the material is very susceptible to movement due to shrinkage and swelling with variations in moisture content. This is to say that if moisture is withdrawn from the subsoil, for example due the action of roots, then shrinkage i.e. a volumetric reduction will occur.

Analysis of the subsoil moisture content profiles and soil suction values indicates that the subsoil in borehole 01, within the area of damage to the front left bay window has a moisture deficit to a depth of approximately 1.5m to 2.0m below ground level. The moisture content profiles in borehole 03 also indicate a moisture deficit at foundation level and to a depth of approximately 1.0m. This indicates that the subsoil in borehole 01 at the front left and borehole 02 at the rear has been affected by shrinkage due to the action of the roots found beneath the foundations.

The roots have been analysed in the laboratory and in borehole 01 and borehole 03 they have been identified as *Pomoideae* – which include apple, cotoneaster, hawthorn, pear, pyracantha, quince, rowan, snowy mespil and whitebeam. Further roots in borehole 01 were identified as *Lonicera* – which are honeysuckles, both climbing and shrub forms; related species include *Symphoricarpos* spp. (snowberry). The roots in borehole 02 were from a broadleaved species but too decayed for positive identification.



A CCTV survey of the drains serving the property was also carried out as part of the site investigations. This has revealed multiple defects to the clay pipes including displaced joints, cracking to the pipework and root intrusion / blockages. The condition of the subsoil at all trial pit / borehole locations does not indicate that the subsoil has been adversely affected by leakage from the drains. However, the drains should be repaired to prevent the damage from getting worse as recommended in the drainage survey report from CET Property Assurance Ltd.

#### **MONITORING**

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Crack width and level monitoring has been instructed.

Monitoring will be used to determine any ongoing significant movement trends consistent with a root exacerbated clay shrinkage subsidence mechanism. We expect the programme of monitoring to demonstrate downward movement during the summer and recovery during the wetter winter months until such time that the implicated vegetation has been removed.

#### **CAUSE OF DAMAGE**

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Based on the information detailed above, we are of the opinion that damage has occurred due to clay shrinkage subsidence. This has been caused by moisture extraction by roots altering the moisture content of the clay subsoil, resulting in volume changes, which in turn have affected the foundations.

#### **RECOMMENDATIONS**

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Our recommendation is that mitigation measures are undertaken to address the cause of damage and restore stability to the subsoil and building foundations. Consideration can then be given to the required building repairs.

#### **MITIGATION**

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We consider the damage will not progress if appropriate measures are taken to remove the cause. In this instance it is likely that vegetation for which the policyholder, other private owners and the Local Authority are responsible is contributing toward the cause of damage.

We have identified the following items of vegetation as being within influencing distance to the property and which are likely to be implicated in the current damage:

G1 – Group of dense mixed shrubs and trees – up to 4m high, 1m distance from front – In risk address front gardens.

T1 – Red leaf deciduous tree – 8m high, 8m distance from front left corner – In front garden at No.8 Dartmouth Park Avenue, London, NW5 1 JN

T2 – Deciduous tree – 7m high, 7m distance from front right corner – In public footpath to front right of property owned by Local Authority.

T3 – Pear tree – 17m high, 3m distance from rear left corner – In risk address rear gardens.

We recommend that an Arboricultural Report is obtained to identify the trees and vegetation around the property and to provide us with detailed recommendations for tree removal works required to restore stability to the front bay windows and the rear single storey extension.

We would also recommend that the drains are repaired as identified in the attached CCTV survey report and estimate for repairs from CET Property Assurance Ltd to eliminate leakage from the drains as a contributing factor and to prevent future problems.

#### **REPAIR**

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We have not yet decided on the final type of repair required, but have produced an outline of the most likely requirements. This involves undertaking superstructure repairs and redecoration. This decision has been taken based on our knowledge and experience of dealing with similar claims. In addition the results of the Site Investigation, laboratory testing and monitoring have been taken into account.

#### **PROJECT TEAM DETAILS**

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Gavin Catheline MCIQB - *Building Consultant Specialist Subsidence Team*

Emma Weatherley

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