# Engineers Report

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| **Risk Address** | **Penbryn, Green Street**<br>**Eye**<br>**Hoxne**<br>**IP21 5AX** |

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| **360 Reference** | **LIV-SN-22-006110** |
| **Insurer Reference** | **800-08-001206** |
| **Policy Holder** | **Miss Jo Chimes** |

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| **Date Notified** | **15.11.2022** |
| **Date Instructed** | **15.11.2022** |
| **Report Date** | **30.01.2023** |

## Description of Premises

The Insured's property is a 3-bedroom, single storey detached property. The property was previously 5 Alms-houses that have now been converted into one single dwelling. The Alms-houses were originally constructed in 1844 and are of masonry solid walls, with cobble stone panels, under a pitched, newly tiled slate roof. The property is a Grade II listed building and sits within a Conservation Area.

The property is currently being refurbished by the Insured and works remain ongoing.

The property is located within a residential area, with no apparent adverse site features.

## Discovery of Damage

The Insured first noticed cracking to the property, in October 2022 and contacted the roofing contractor who replaced the roof in 2021 as she considered the cracking was related to this work. The roofing contractor visited the property and informed the Insured they believed the damage to the property was due to subsidence movement. Following this Insurers were subsequently notified, and a subsidence claim registered, in view of the policyholder's concerns.

## Focus of Damage and Report

This document addresses damage notified to Insurers in relation to internal and external cracking to the house, generally orientated towards the right-hand side of the property. All directions are stated when viewing the property from the front.


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Internal Damage

Left Hand Front Room
Vertical tapered cracking, up to approximately 3/4mm wide is evident to the left hand side of the front window which extends from ceiling level tapering downwards.

Kitchen
Stepped cracking, up to approximately 2/3mm wide is evident to the top right corner of the right hand WC division wall.

WC
Vertical tapered cracking was evident above and below the right elevation window, up to approximately 10mm wide

External Damage

Right Elevation
A tapered, vertical crack, varying in width up to approximately 20mm wide, is evident below the WC window where the original doorway was partially bricked up. There is a circa 15mm stepped crack to the arch lintel above the window and a circa 15mm tapered gap between the window frame and brickwork.

Rear Elevation
There are various stepped cracks along the rear elevation mainly at low level and to the plinth brickwork either side of the original Alms-houses entrance.

Left Elevation
A stepped diagonal crack, varying in width up to approximately 2/3mm wide, is evident radiating from the left-hand reveal of the front window up to roof level.

Front Elevation
There is a diagonal crack up to approximately 2/3mm wide radiating from above the right hand window up to eaves level. There is diagonal cracking up to approximately 2/3mm wide radiating from below the right hand window cill to ground level and the brickwork in this area is bowed outwards. There are also various stepped cracks along the front elevation mainly at low level and to the plinth brickwork either side of the original Alms-houses entrance.

Picture 1: Internal cracking to WC

Picture 2: Internal cracking to Left Hand room

Picture 3: External cracking to right elevation

Picture 4: External cracking to right elevation

## Non-Subsidence Related Damage

There are various cracks to the front and rear elevations around the door openings at low level and also minor internal cracking that may or may not be subsidence related. The proposed level monitoring will assist in confirming if these areas of the property are affected by subsidence of the site or are due to normal building movements and age related cracks.

The property is currently being refurbished and therefore already required redecoration prior to the subsidence movement and decorations will not be included in the repairs.

## Classification of Damage

It is common practice to categorise the damage in accordance with B.R.E. Digest 251 "Assessment of Damage in Low-Rise Buildings". In this case, the damage falls into Category 3 "Moderate" as there is cracking up to approximately 20mm wide.

| Category | Crack Width | Degree of Damage |
|---|---|---|
| 0 | Hairline cracks of less than 0.1 mm | Negligible |
| 1 | Typical crack widths are 0.1 to 1mm. | Very slight |
| 2 | Typical crack widths are 1 to 5mm. | Slight |
| **3** | **Typical crack widths are 5 to 15mm, or several of, say, 3 mm.** | **Moderate** |
| 4 | Typical crack widths are 15 to 25mm, but also depends on number of cracks. | Severe |
| 5 | Typical crack widths are greater than 25mm but depends on number of cracks. | Very Severe |

## Site Geology and Ground Conditions

The geological data indicates the ground to be a clay soil, which is susceptible to shrinkage in dry periods, particularly in the presence of vegetation.

### Indicative Site Geology and Soils Data for:

### Penbryn, Green Street, Hoxne, IP21 5AX

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| No of SI's within 4.8km from address on identical lithology. **(See comments)** | **6** |
| Closest - Furthest distance of a site investigation from the address (km). | **1 - 4.7** |
| Total number of boreholes. | **11** |
| Percentage of site investigations where root samples where taken. | **67%** |
| Percentage of site investigations where drainage was recorded. | **33%** |
| Number of samples tested at greater than 0.5m depth. | **36** |
| BRE Digest 240. "Volume change potential" from Av. Modified Plasticity Index (I'p) of 25%. | **Medium** |

| **Previous Soils Data** nr = Non recorded | ***Depth m.*** | ***M.C. (%)*** | ***L.L. (%)*** | ***P.I. (%)*** | ***P.L. (%)*** | ***425um (%)*** | ***Suction kPa*** | ***Oed Strain*** |
|---|---|---|---|---|---|---|---|---|
| **Sample population** | 36 | 36 | 13 | 13 | 13 | 13 | 17 | 10 |
| **~ Minimum** (Av - 1 StdDev) | 0.6 | 15 | 40 | 23 | 15 | 83 | 4 | 0.0090 |
| **~ Maximum** (Av + 1 StdDev) | 3.8 | 24 | 50 | 31 | 21 | 98 | 1184 | 0.0140 |
| **Average** | 2.0 | 20 | 45 | 27 | 18 | 90 | 343 | 0.0090 |
| **General soils description** | Firm brown/grey sandy CLAY with some fine-medium gravel / chalk | | | | | | | |
| **BGS 1:50 000 maps as a: Superficial Deposit** | **1:50 000 scale bedrock geology description:** Norwich Crag Formation - Sand. Sedimentary Bedrock formed in the Quaternary period. Local environment previously dominated by shallow seas. **Setting**: Shallow seas and swamps, estuaries and deltas. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse- to fine-grained (locally with some carbonate content) forming interbedded sequences. | | | | | | | |
| **BGS 1km Hex. Superficial Deposit Depth Data** Mean Depth = 35m Max Depth = 43m Coverage = 99% The BGS only record superficial deposits greater than 1m in depth. | **1:50 000 scale superficial geology description:** Lowestoft Formation - Diamicton. Superficial Deposits formed in the Quaternary period. Local environment previously dominated by ice age conditions (U). **Setting**: Ice age conditions (U) with glacial tills deposited by ice. These sedimentary deposits are glacigenic in origin. They are detrital, created by the action of ice and meltwater, they can form a wide range of deposits and geomorphologies associated with glacial and inter-glacial periods during the Quaternary. | | | | | | | |
| **BGS 1:50,000 Artificial Ground** | Non recorded | | | | | | | |

| **BGS "GeoSure" 5km Hexagonal Hazard Ratings** | |
|---|---|
| **Shrink/Swell** | Moderate |
| **Collapsible Deposits** | Low |
| **Compressible Ground** | Low with areas of localised significant rating. |
| **Landslides** | Low |
| **Running Sand** | Low |
| **Soluble Rocks** | Low |
| **Mining (not coal) 1km hx grid** | Localised small scale mining may have occurred in the area. |

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| **Government Coal Authority Data** (<25m = found within 25m) | No data recorded for this location. |

**Comments:** The location is in a very low SI density area. The six SIs reported above are on exactly the same Superficial deposit.

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## Evidence of External Influences

Trees

The property is surrounded by a significant amount of large deciduous trees, including Yews, owned by third parties and these trees are likely to be influencing ground conditions beneath the property. The trees sit within a conservation area and may also have Tree Preservation Orders.

Drains

The property is served by domestic drainage that runs around the property. We will need to check the drains in close vicinity of the damage at the right-hand and left-hand side, to see if they are leaking and having any influence on ground conditions.

## Summary and Conclusions

The pattern and nature of the cracks at the right-hand and left-hand side is indicative of an episode of subsidence. The cause of movement appears to be clay shrinkage. A valid claim is therefore accepted for the damage to the property, subject to the subsidence policy excess of £1,000.

The timing of the event, the presence of shrinkable clay beneath the foundations and the proximity of vegetation where there is damage indicates the shrinkage to be root induced.

Fortunately, the cause of the problem (dehydration) is reversible. Clay soils will re-hydrate in the winter months, causing the clays to swell and the cracks to close. Provided the cause of movement is dealt with (in this case, vegetation) there should not be a recurrence of movement.

Although the cause of the movement needs to be dealt with, we note the involvement of a Third Party trees that may have Tree Preservation Orders. Unfortunately, they will require certain investigations to be carried out to demonstrate the influence of their vegetation.

Typically, these investigations would involve trial pit(s) to determine the depth and type of footings, boreholes to determine the nature of the subsoil/influence of any roots, CCTV survey of the drains and monitoring to establish the rate and pattern of movement. It will also be necessary to obtain a specialist Arboricultural Report.

Following completion of the mitigation works described above, and a period to allow the ground to rehydrate, crack repairs and redecoration to the affected areas of the property can proceed. A repair schedule will be drawn up and agreed in due course.

**Next Steps**

A valid claim arises under the terms of the insurance policy, subject to the applicable excess of £1000, for the localised subsidence damage to the property.

The key steps required to progress the claim are as follows:

- Contact the Insured and arrange for site investigations to be undertaken at a suitable date. These will include trial hole excavations at the right-hand and left-hand sides of the house and a drainage survey of the drains in proximity to the damage.
- Instruct an Arborist to survey and identify the extent of tree works required to mitigate further damage.
- Liaise with the relevant owners of any implicated vegetation to arrange any recommended tree removal to be undertaken as soon as possible.
- Arrange repairs to leaking drains where required, under the terms of the insurance policy.
- Following completion of the above mitigation, allow the ground to rehydrate, before proceeding with repairs to the property.

Provided vegetation removal can be achieved, it is anticipated that the ground will recover, with only crack repairs and redecoration works therefore being required to the affected areas. A repair schedule has been drawn up, although this will be finalised following completion of any mitigation measures, as applicable.

Ian McKenna BSc (Hons) MRICS MCIOB Dip CII
360Globalnet Subsidence Team