ADDENDUM TECHNICAL REPORT

Crawford Reference: SU1404491

4B Hampstead Hill Gardens
Hampstead
London
NW3 2PL

prepared for

RSA
3rd Floor
Bowling Mill
Dean Clough
Halifax
HX3 5WA

SUBSIDENCE CLAIM

Crawford and Company
Cartwright House,
Tottle Road,
Riverside Business Park,
Nottingham, NG2 1RT
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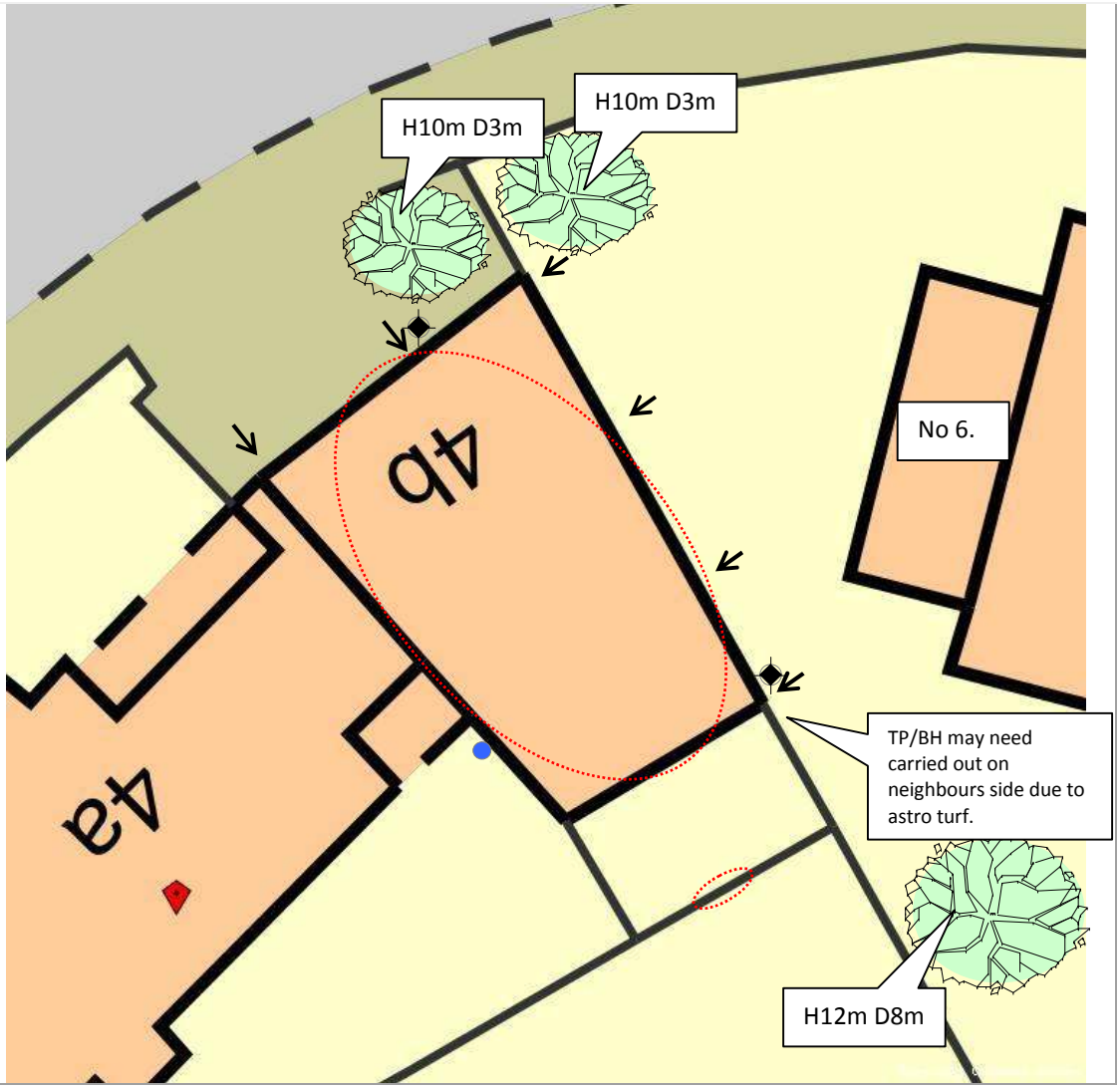
Site Plan	This plan is Not to Scale

This plan is diagrammatic only and has been prepared to illustrate the general position of the property and its relationship to nearby trees etc. The boundaries are not accurate, and do not infer or confer any rights of ownership or right of way. Position of utilities is only indicative and contractors must satisfy themselves regarding actual location before commencing works.



Key:

	Tree: Deciduous		Tree: Conifer		Shrub
	Hedge		Area of Damage		Bore Hole
	Trial Hole		Trial & Bore Hole		Level Monitoring
	Rain Water Manhole		Rain Water Gulley		Rain Water Pipe
	Waste Water Manhole		Waste Water Gulley		Toilet Pipe
	Rain Water Drain		Waste Water Drain		Electricity Cable
	Water Supply Pipe		Gas Supply Pipe		Incoming Gas Pipe
	Incoming Water		Incoming Electrics		

INTRODUCTION

We have been instructed by insurers to investigate a claim for subsidence at the above property. The area of damage, timescale and circumstances are outlined in our initial Technical Report. This report should be read in conjunction with that report.

To establish the cause of damage, further investigations have been undertaken and these are described below.

INVESTIGATIONS

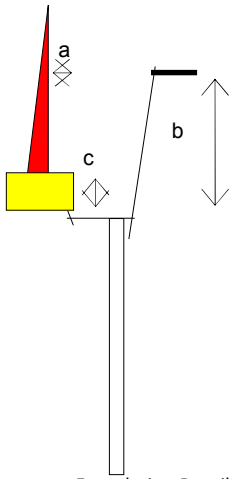
The following investigations were undertaken to identify the cause of movement.

TRIAL HOLES

A trial hole was excavated to expose the foundations - see site plan for location and the diagram below for details.

Trial Hole 1 revealed a concrete footing founded at a depth of 0.35m below ground level which bears onto MADE GROUND: Medium compact, dark brown/orange, silty clay with occasional clinker and brick fragments. Roots of live appearance to 3mm and 20mm diameter.

Trial Hole 2 revealed a concrete footing founded at a depth of 0.98m below ground level which bears onto firm, moist, brown/orange, grey veined, silty CLAY with partings of orange silt and fine sand. Roots of live and dead appearance to 1mm diameter.



Foundation Details

No.	Borehole Depth	Footing (a)	Underside (b)	Thickness (c)
TH1	2.30 m.	120 mm.	350 mm.	300 mm.
TH2	3.00 m.	250 mm.	980 mm.	290 mm.

AUGERED BOREHOLES

A 50mm diameter hand auger was sunk - see site plan for location(s). Borehole 1 confirmed the continuation of the subsoil encountered within the trial pit to 0.8m where we encountered firm, mid borwn/orange, grey veined, silty CLAY with partings of orange silt and fine sand, with roots to a depth of 2m below ground level. The borehole remained dry and open upon completion.

Borehole 2 confirmed the continuation of the clay subsoil encountered within the trial pit, with roots to a depth of 2.6m below ground level. The borehole remained dry and open upon completion.

In-situ shear vane testing confirmed the clay subsoil to be stiff in nature.

SOIL SAMPLES

Soil samples were retrieved from the bore, wrapped in clingfilm before being bagged and deposited with a testing laboratory the same day. The laboratory have instructions to test the samples to determine if there is evidence of root induced desiccation.

The following laboratory tests were carried out on soil samples retrieved from the boreholes :-

Moisture Content
Values ranged from 23% to 28% over the depth of Borehole 1
Values ranged from 27% to 35% over the depth of Borehole 2

Atterberg Limits
Results indicate that the clay subsoil can be classified as a very high plasticity clay in accordance with the Casagrande chart.

Suction Tests
Suction tests on disturbed samples is a recognised method of assessing clay desiccation. The results in Borehole 1 indicate evidence of very severe desiccation between a depth of 1m and 2m. The results in Borehole 2 indicate evidence of severe desiccation between a depth of 1m and 3m.

ROOTS

Roots were retrieved from the trial hole and have been submitted to a botanist for identification.

Roots in Borehole 1 were identified as the Species Carpinus which are hornbeams.

Roots in Borehole 2 were identified as the Species Carpinus which are hornbeams and Leguminosae which include laburnum, robinia (false acacia or locust), broom, the pagoda tree and the climber wisteria. .

Starch was present which indicates that the roots were alive at the time of retrieval.

DRAINS

A CCTV survey of drainage in the vicinity of damage was carried out at the time of initial sit investigations. This revealed no defects.

DISCUSSION

The results of the site investigations confirm that the cause of subsidence is root-induced clay shrinkage. The clay is plastic and thus will shrink and swell with changes in moisture content. Roots have extracted moisture below the depth of the footings, thus causing differential foundation movement to occur. This is supported by the following investigation results :-

- The foundations are at a depth of 0.35 and 0.98m which is below the level that normal seasonal movement would occur.
- The moisture content profile indicates a reduction in moisture content between a depth of 1m and 2m which is indicative of desiccation at this level. This is also co-incident with the depth of root activity.
- Atterberg limit testing indicates that the soil has a very high plasticity and hence will shrink and swell with changes in moisture content.
- Suction tests indicate severe to very severe desiccation between a depth of 1m and 3m coincident with the depth of root activity.
- Roots were found to a depth of 2.6m.
- Shear vane readings indicate an increase in shear strength of the clay between a depth of 1m and 2.5m indicating desiccation at this depth.

RECOMMENDATION

The cause of the movement needs to be dealt with first. From the results of the site investigation, we are satisfied that the Hornbeam's can be removed. Based on our analysis, we are satisfied there is no adverse heave risk to the property.

Our Mitigation Unit will liaise with the Local Authority to arrange a TPO application to be submitted and advise of the outcome when it is received. A decision is normally taken by the Local Authority after 8 weeks of submission.

If the decision is favourable, our Mitigation Unit will arrange for the tree works to be undertaken, subject to authority from the tree owner(s). If the application is refused, there are possible grounds to Appeal or submit a further Application if there is new evidence. This will be reviewed in detail at the time.

Following completion of the tree management works, we will undertake a suitable period of monitoring to confirm stability has been achieved before undertaking repairs to the property.

Yours faithfully,

Gordon McEwan BSc (Hons) Building Surveying Cert CILA
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19 March 2015