

# FACTUAL REPORT OF TRIAL PIT & BOREHOLE INVESTIGATION 1

*My comments are in italics.*

Samples taken on 12th April 2017. *Despite there being only 6% of average rainfall during this month, moisture and water seepage were found. Hardly signs of desiccation when this would be expected if vegetation-related subsidence is being considered.*

Site plan - *no details of drains*

Trial Pit 1 - **very silty** clay

Live roots down to concrete foundations 1300mm

Borehole 1 - **very silty clay**; live roots to 2.3m [*this is unusual, so why??*] slight moisture at 3.3m [*but no drains report or evaluation of groundwater*] Pilcon Vane Tests and Mackintosh Probe Penetration Tests

Trial pit 2 - **very silty** clay; at 400mm 100mmØ Salt glazed (*prone to cracking*) drain; no roots below foundation (*drain above foundation level*)

Trial pit 3 – **silty to very silty** clay; at 900mm and below soil described as **moist**; 1200mm base of concrete

Borehole 2 - as trial pit 3 then **moist silty to very silty** clay; decomposing roots to 2 metres - *history of very deep roots here: why??* **Water seepage at 2.6m**

Details reported in trial pits and boreholes relate to **positions investigated only, as instructed by the client**, [*is this appropriate?; how would the client know how many and where trial pits should be placed for obtaining the best data*] on the date shown only. We therefore do not accept any responsibility for changes in soil conditions **not investigated any variations due to climate, seasons, vegetation and varying ground water levels (quite!!)**

Root samples mainly dead from plane or buddleia-like shrub.

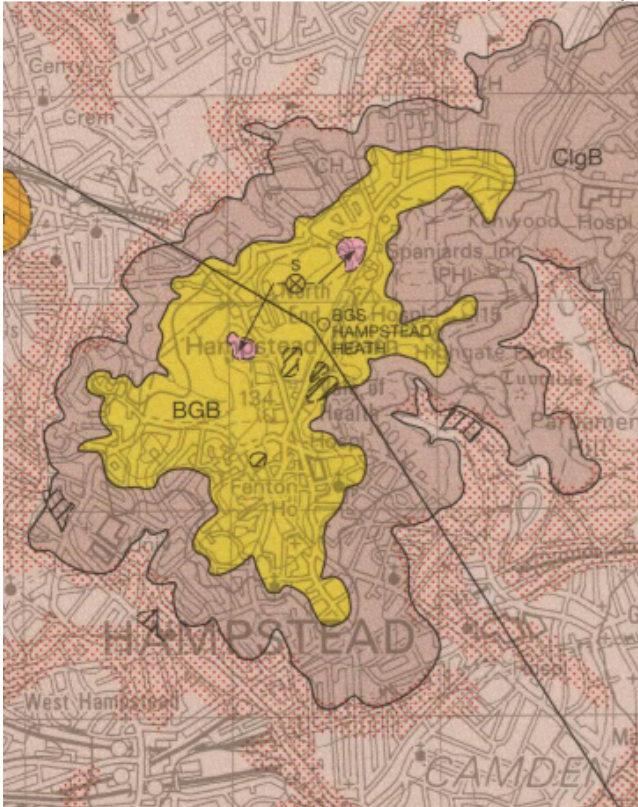
*Subsequent trial pits and boreholes produced similar evidence.*

*It is noted that the first 900cms or so of soil below the surface is described as 'Made Ground'. While of course this description is appropriate here in view of brick fragments and top soil it does not tell the full story. The slopes of Hampstead are overlain by Head. This is a solifluction of silt and sand from the higher Bagshot sands and Claygate Beds: it was caused to flow down the hill at the end of the last ice age. While deposited, it remains unstable, capable of transmitting groundwater and capable of losing a significant amount of its volume from silt erosion. This Head and the Claygate Beds, plus the presence of springs, groundwater and tributaries that are the origins of and go to form four of London's rivers are why Hampstead is ringed by an area of significant landslide potential on the British Geological Survey sheet. It is why it - along with Hampstead Garden Suburb - is considered the subsidence capital of the world with potholes, sink holes, fractured mains and drains and very slopey rooflines and windowsills of the older buildings. Historically it is known for its 'groves' i.e. tree lines, poplars, limes, willows and oaks and later the London planes too that the Victorians sensibly planted to help reduce the impact of all this water on buildings and gardens. Taking trees out certainly DOES NOT HELP.*



Areas of significant  
Landslide potential

**From Figure 1 – GIS Map of Area of potential landslide vulnerability, Based on causative landslide factors; geology, slope angle, hydrology and know landslide activity: BGS Sheet Memoir 256 North London from the 1:50,000 Series Bedrock and Superficial Deposits for England and Wales**



BGB = Bagshot Beds (yellow); ClgB = Claygate Beds (grey)

**From 'BGS North London Bedrock & superficial geology map'**

This map shows the relationship between the local geology and the landslide potential of Hampstead. 62 Fitzjohns Avenue will be roughly below where the A of 'HAMPSTEAD' printed on the map is.

## Moisture Content and Index Property Determinations

*Comment: There is a huge range of Plasticity Index, none of it very high, indicating a range of silt composition including very high. There are insufficient samples to demonstrate that depth is the major factor. Water-carrying sand partings would be expected here but nothing was held back by the 0.425um sieve so it would seem there is silt (as well as the clay) at a slightly lower level of water-carrying ability to sand in the trial pit samples, but sand partings down to less than a foot wide but still capable of transmitting high levels of water - maybe even under pressure - are not ruled out on this site.*

*The visual appearance of the soil samples from the boreholes and trial pits gives the lie to this being solid clay - it is typical very silty clay found in the Claygate beds (as I have just dug out from under my hall floor) that has quite different physical characteristics from solid clay. Yes there is some clay there which the lab tests will pick up on, but this is not how it behaves in situ. Clay expansion and contraction will be smaller - something the building is used to from when it was built. What the engineers have to puzzle over is, why now?*

*The engineers also have to realise that the whole length of Fitzjohn's Avenue on this side suffers from subsidence. I understand the steps up to the buildings are continually moving and moving away from the buildings. This is due to the action of the many little tributaries formed from the groundwater that flow into the Shepherd stream which runs between Fitzjohns Avenue and Akenside Road. This is why the Victorians planted so many black poplars all along this rear garden boundary, though most of them have been removed due to fears of subsidence or age in the last few decades. The result has been much boggier wetter gardens and - it would seem - could have made a small contribution towards the acceleration of subsidence claims unrelated to dry summers since.*

**Level Monitoring**

**Our Ref: 468603**

**Date of Issue: 15/01/2018**

**Provider Details**

**CET Property Services - 0116 2605309**

**Monitoring Details**

<b>Instruction Date:</b>	<b>20/10/2017</b>		
<b>Number of visits</b>	<b>MUFN</b>	<b>Visit Frequency (Wks)</b>	<b>8</b>

**Visit Dates (future dates are estimated)**

<b>Setup</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>

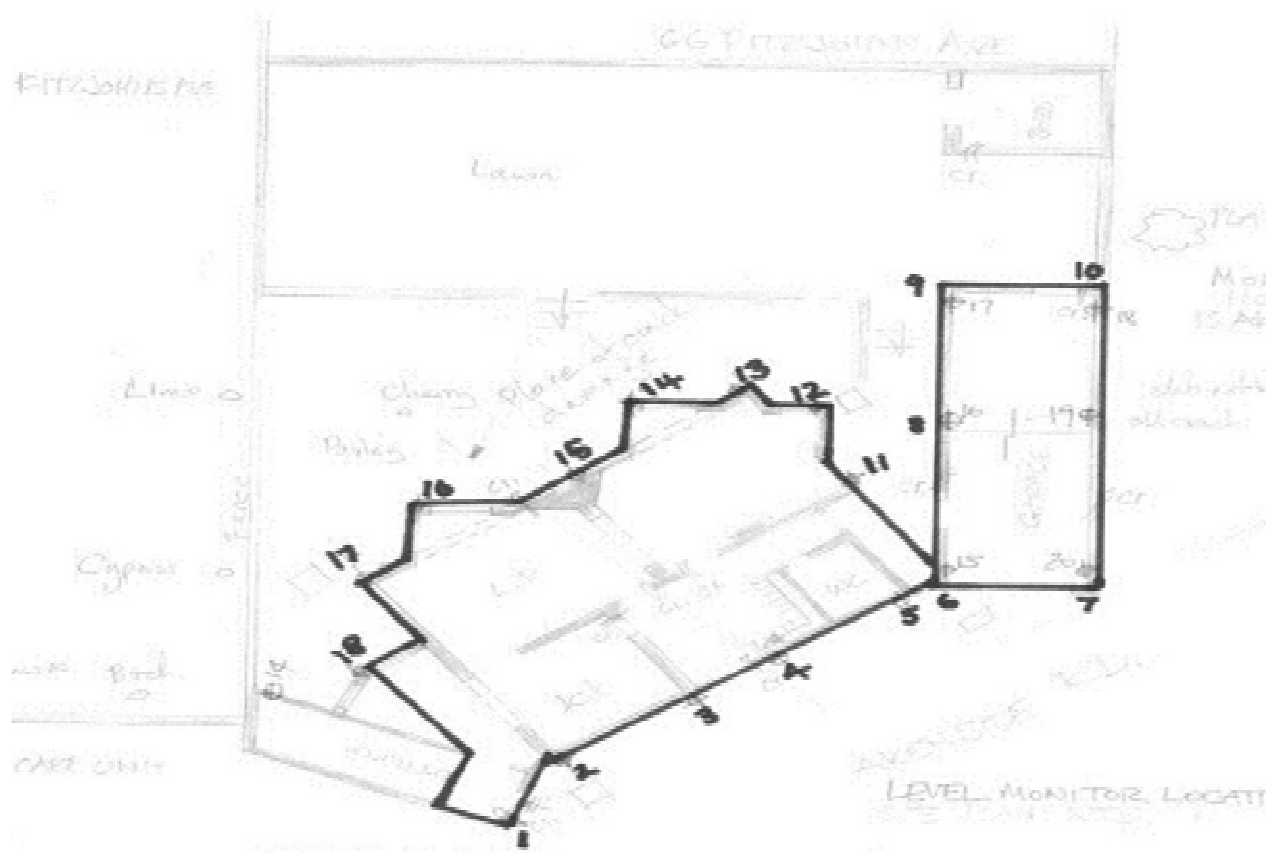
**Client Details**

Insurance Co.:	
Client Ref:	
Client Name:	<b>Richard Gill &amp; Associates</b>
Technical Mgr:	
Customer support	
Tel:	
Email:	

**Risk Address**

Occupier:	
Address:	<b>12 Akenside Road</b>
Address:	
Town:	<b>London</b>
County:	
Post Code:	<b>NW3 5BT</b>
Contact Name	<b>Kristian Muthutz</b>

**Level Monitoring - Site Sketch**



2016

Rainfall for Hampstead during the period of movement monitoring - taken from <http://nw3weather.co.uk/wxdataday.php>

2017

2018

Oct	Nov	Dec
10.2	0.0	0.0
0.0	0.0	0.4
0.0	0.2	0.0
0.0	7.2	0.0
0.0	0.0	0.0
0.0	2.2	0.0
0.0	0.0	0.0
0.0	1.1	0.0
1.8	20.8	0.0
0.2	0.0	6.6
0.2	0.0	0.0
1.1	10.5	0.8
5.3	0.0	0.3
0.0	0.9	0.0
7.6	0.5	0.0
10.6	0.9	0.0
1.3	0.7	0.2
0.0	0.0	0.0
0.0	2.2	0.0
0.0	19.2	0.0
0.0	15.0	0.2
0.0	0.8	0.0
0.0	0.0	0.9
0.0	0.0	0.0
0.4	0.0	0.0
0.0	0.0	1.1
0.0	0.2	0.0
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0
Oct	Nov	Dec
10.6	20.8	6.6
38.7 (60%)	82.4 (147%)	10.5 (19%)
10	15	8
476.7 (93%)	559.1 (99%)	569.6 (91%)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.4	1.7	4.0	0.0	4.9	0.0	0.0	0.0	0.0	0.2	0.0	0.1
2	0.0	0.5	0.0	0.0	0.0	5.3	0.0	8.6	0.0	0.0	0.0	0.0
3	0.0	2.0	1.8	0.0	2.5	0.3	0.0	0.0	0.3	0.0	0.0	0.8
4	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	4.4	0.0
5	0.0	0.7	10.0	0.0	0.0	2.8	0.0	2.8	1.0	0.6	0.0	0.0
6	2.9	6.1	0.0	0.0	0.0	17.5	0.0	0.0	0.0	0.0	0.0	0.0
7	2.1	1.5	0.0	0.0	0.0	1.3	0.0	0.3	0.0	0.6	4.2	2.6
8	0.9	0.0	0.0	0.0	0.0	1.0	0.0	0.0	5.2	0.0	0.4	0.0
9	5.0	0.1	0.0	0.0	0.0	0.8	0.0	39.1	0.4	0.0	0.0	0.0
10	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.8	18.6
11	0.0	1.7	0.0	0.0	1.0	0.0	29.7	0.0	7.0	1.0	11.2	14.6
12	15.9	0.4	2.0	0.0	1.4	0.0	9.9	0.0	2.2	0.0	2.6	1.2
13	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	9.2
14	0.5	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.6	0.0	0.0	0.0
15	8.2	1.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2
16	4.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
17	0.0	0.0	0.0	0.4	35.6	0.0	0.0	5.3	0.0	0.0	0.0	3.0
18	0.0	0.0	0.0	0.0	15.0	0.0	1.0	13.2	1.8	4.0	1.8	0.0
19	0.0	0.2	0.0	0.0	1.0	0.0	4.8	0.0	1.4	6.4	0.0	0.0
20	0.0	0.0	2.8	0.0	1.5	0.0	0.5	3.3	0.0	1.2	2.4	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	3.5	4.3	0.8	3.0	0.0	0.0
22	0.0	0.5	7.0	0.0	0.0	0.0	9.2	0.3	0.0	0.0	0.0	0.0
23	0.0	3.0	2.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	3.8	0.0
24	0.0	0.0	0.0	0.4	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0
25	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	4.0
26	0.0	2.5	0.0	1.0	0.0	0.0	0.6	0.0	0.0	0.6	0.0	9.6
27	0.0	9.1	0.0	1.1	0.0	18.5	2.2	0.0	12.6	0.0	3.2	4.0
28	0.0	1.0	0.4	0.0	4.1	4.6	0.0	0.0	7.4	0.0	0.0	0.0
29	14.0		0.3	0.0	16.0	0.0	7.4	0.0	5.6	0.0	0.0	8.6
30	0.4		0.0	0.0	0.0	0.0	17.8	9.1	0.8	0.0	0.0	4.0
31	6.3		0.0		0.0		0.0	0.1		0.0		5.8
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High	15.9	9.1	10.0	1.1	35.6	18.5	29.7	39.1	12.6	6.4	11.2	18.6
Total	68.7 (125%)	33.9 (85%)	30.4 (69%)	2.9 (6%)	85.9 (168%)	52.1 (95%)	89.0 (212%)	86.4 (163%)	58.3 (102%)	17.6 (27%)	34.8 (62%)	88.3 (158%)
Count	14	20	9	4	12	9	13	11	18	9	10	16
Cumulative	68.7 (125%)	102.6 (108%)	133.0 (96%)	135.9 (72%)	221.8 (93%)	273.9 (93%)	362.9 (108%)	449.3 (116%)	507.6 (114%)	525.2 (103%)	560.0 (99%)	648.3 (104%)

Day	Jan	Feb
1	7.4	1.7
2	0.0	0.5
3	0.0	2.0
4	0.1	0.7
5	0.0	0.7
6	2.9	6.1
7	2.1	1.5
8	0.9	0.0
9	5.0	0.1
10	0.0	0.2
11	0.0	1.7
12	15.9	0.4
13	0.5	0.0
14	0.5	0.0
15	8.2	1.1
16	4.5	0.6
17	0.0	0.0
18	0.0	0.0
19	0.0	0.2
20	0.0	0.0
21	0.0	0.0
22	0.0	0.5
23	0.0	3.0
24	0.0	0.0
25	0.0	0.3
26	0.0	2.5
27	0.0	9.1
28	0.0	1.0
29	14.0	
30	0.4	
31	6.3	
	Jan	Feb
High	15.9	9.1
Total	68.7 (125%)	33.9 (85%)
Count	14	20
Cumulative	68.7 (125%)	102.6 (108%)

**Level Monitoring - Movement (in millimetres)**

**Our Ref:**

**468603**

**Date of Issue**

**15/01/18**

**Movement data colour-coded and placed against rainfall data to demonstrate inadequate of relationship with the seasons for trees or for actual rainfall.**

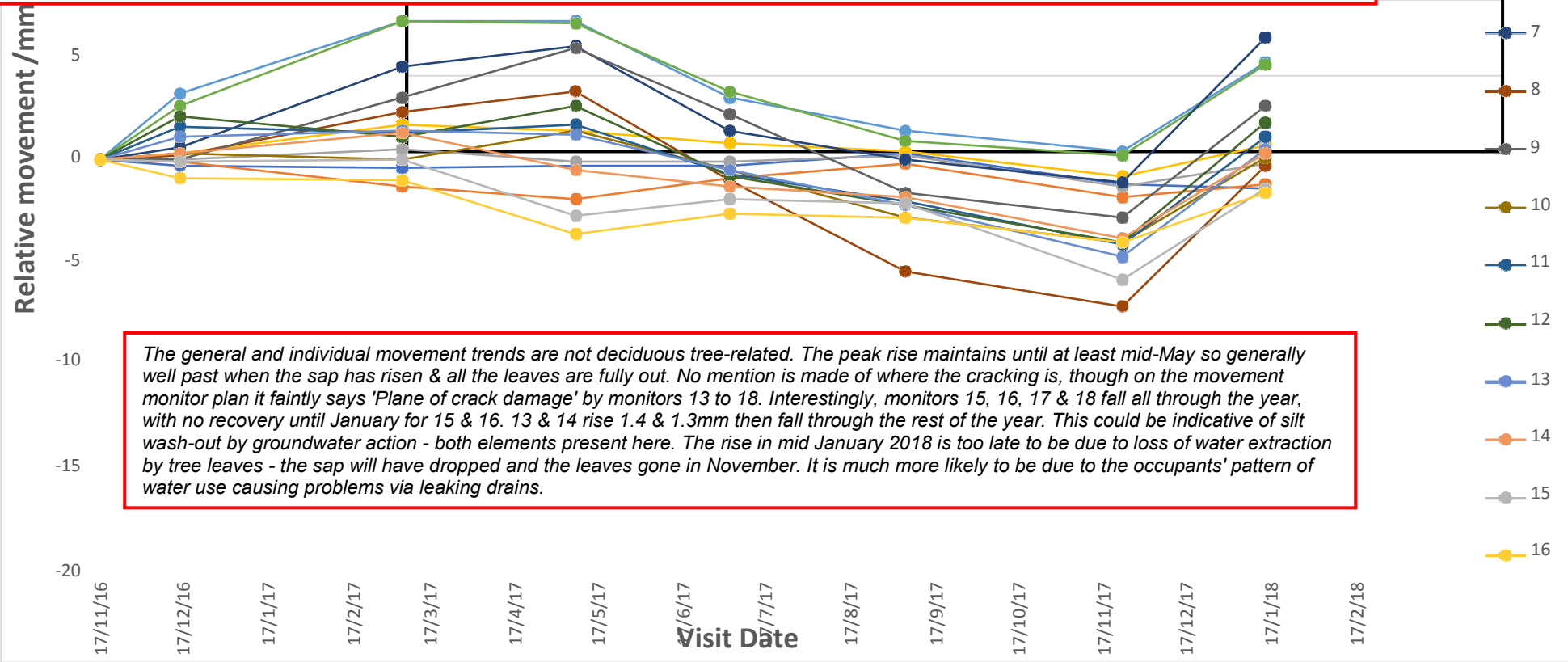
Reading Date	17/11/16	16/12/16	7/3/17	9/5/17	4/7/17	6/9/17	24/11/17	15/1/18		RANGE		
Point / Reading	1	2	3	4	5	6	7	8	9	10	11	12
1	0.0	-0.3	-0.4	-0.3	-0.3	0.3	-1.2	-1.4		-1.4		
2	0.0	-0.1	-1.3	-1.9	-0.9	-0.2	-1.8	-1.2		-1.9		
3	0.0	0.0	0.5	-0.1	-0.1	0.2	-1.3	-0.2		-1.3 to +0.5		Lowest
4	0.0	0.3	1.7	1.4	0.8	0.4	-0.8	0.7		-0.8 to +1.7		
5	0.0	3.2	6.7	6.7	3.0	1.4	0.4	4.7		+6.7		
6	0.0	2.6	6.7	6.6	3.3	0.9	0.2	4.6		+6.7		Highest
7	0.0	0.6	4.5	5.5	1.4	0.0	-1.1	5.9		-1.1 to 5.9		
8	0.0	0.2	2.3	3.3	-1.0	-5.4	-7.1	-0.3		-7.1 to 3.3		
9	0.0	0.0	3.0	5.4	2.2	-1.6	-2.8	2.6		-2.8 to +5.4		
10	0.0	0.3	0.0	1.4	-0.5	-2.8	-4.0	0.1		-4 to 1.4		
11	0.0	1.6	1.3	1.7	-0.7	-2.0	-4.1	1.1		-4.1 to 1.7		
12	0.0	2.1	1.1	2.6	-0.8	-2.2	-4.0	1.8		-4 to 2.6		
13	0.0	1.1	1.4	1.2	-0.5	-2.2	-4.7	0.5		-4.7 to +1.4		
14	0.0	0.3	1.3	-0.5	-1.3	-1.8	-3.8	0.3		-3.8 to +1.3		
15	0.0	-0.1	0.0	-2.7	-1.9	-2.1	-5.8	-1.4		-5.8		
16	0.0	-0.9	-1.0	-3.6	-2.6	-2.8	-4.0	-1.6		-4		
17	0.0	-1.6	-1.8	-4.5	-3.6	-3.7	-4.3	-2.9		-4.5		
18	0.0	-1.0	-2.3	-4.6	-4.7	-4.3	-5.1	-3.6		-5.1		

Month	2016 Nov	Dec	2017 Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	2018 Jan
Total rainfall %	147%	19%	125%	85%	69%	6%	168%	95%	212%	163%	102%	27%	62%	158%	125%



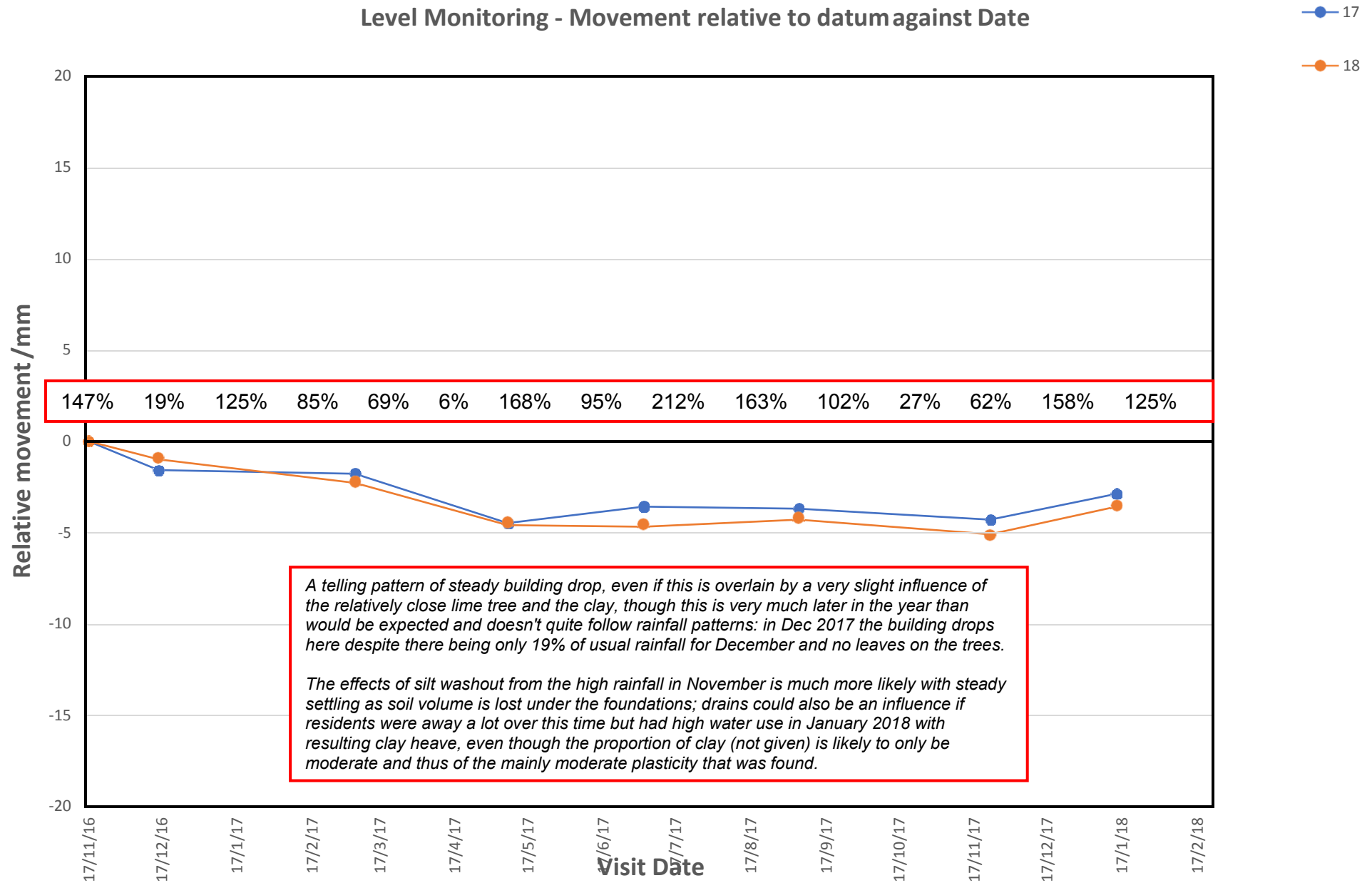
Level Monitoring - Movement relative to datum against Date

Total %Av	147%	19%	125%	85%	69%	6%	168%	95%	212%	163%	102%	27%	62%	158%	125%
Cum total	99%	91%	125%	108%	96%	72%	93%	93%	108%	116%	114%	103%	99%	104%	125%



*The general and individual movement trends are not deciduous tree-related. The peak rise maintains until at least mid-May so generally well past when the sap has risen & all the leaves are fully out. No mention is made of where the cracking is, though on the movement monitor plan it faintly says 'Plane of crack damage' by monitors 13 to 18. Interestingly, monitors 15, 16, 17 & 18 fall all through the year, with no recovery until January for 15 & 16. 13 & 14 rise 1.4 & 1.3mm then fall through the rest of the year. This could be indicative of silt wash-out by groundwater action - both elements present here. The rise in mid January 2018 is too late to be due to loss of water extraction by tree leaves - the sap will have dropped and the leaves gone in November. It is much more likely to be due to the occupants' pattern of water use causing problems via leaking drains.*

Level Monitoring - Movement relative to datum against Date



## Gani, Ajim

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**From:** Little, Tom  
**Sent:** 15 May 2018 10:07  
**To:** Planning  
**Cc:** Bell, Nick  
**Subject:** FW: 2018/1984/T 62 Fitzjohn's Avenue, NW3 5LT REAR GARDEN (near boundary with 12 Akenside Road): 1 x Lime (T4) - Fell and treat stump. Agent: OCA  
**Attachments:** 62 Fitzjohns Ave Comment on Factual Report.pdf.docx; 62 Fitzjohns Ave Monitoring Levels with comments.pdf.docx

An objection to be logged please

Tom Little  
Tree and Landscape Officer

Telephone: 02079746266



**From:** Vicki Harding [mailto:vickiruthharding@gmail.com]  
**Sent:** 14 May 2018 18:09  
**To:** Bell, Nick <Nick.Bell@camden.gov.uk>; Little, Tom <Tom.Little@camden.gov.uk>  
**Subject:** 2018/1984/T 62 Fitzjohn's Avenue, NW3 5LT REAR GARDEN (near boundary with 12 Akenside Road): 1 x Lime (T4) - Fell and treat stump. Agent: OCA

Dear Nick Bell and Tom Little,

Please excuse me writing to both of you, but I am unsure who is dealing with this case.

This is a Notice of Intent to fell a lime tree following on from the felling of a cherry tree in 12 Akenside Road, purportedly because trees are causing subsidence of 12 Akenside Road.

I am writing to you to demonstrate that the assumptions of OCA are incorrect and that the data presented shows otherwise.

Hence, I am requesting that any Notices of Intent to fell any more trees as a result of this case should be refused until they provide

- a) actual hard evidence that the trees *are* responsible and not preventing a worse situation, and
- b) that the causes of subsidence that I believe are demonstrated with their data have themselves been disproved.

I enclose copies/sections of the 'Factual Report' and the 'Level Monitoring' documents with my comments on them so that you can see how OCA and the engineer have neither evaluated the data correctly, nor understood the local conditions that are responsible for movement.

I believe the data shows that:

- Movement is not vegetation-related; the timing of movement does not follow sap flow and the patterns of late autumn leaf loss and spring re-growth of deciduous trees.

- While some movement would be expected for any building on soil with clay within it, even when there are no trees anywhere near, the movement here is not sufficiently frequently recorded to demonstrate that its pattern follows rainfall levels, indeed it seems to indicate that other factors must be present even if the wetting and drying out of clay through rainfall is a minor overlying feature. If movement data is presented for *this and other Hampstead addresses with complex hydrogeology* it should be continuous.
- The movement data does demonstrate continuing loss of volume below part of the building - where 'plane of crack damage' is written on the plan(?) - indicating that this house is no different from others in Fitzjohn's Avenue and much of Hampstead: it is suffering from erosion of the high proportion of silt from within the Claygate Beds by the action of groundwater.
- This may be compounded by a certain level of ground slippage that is all too possible here. There are many other causes of subsidence related to the building that have not been investigated.

I also consider that a proper drains survey should be done, including pressure testing to establish if there is any leaking occurring. While I consider it likely that silt erosion is the more major cause, I don't need to remind you of the consequences of leaking drains - a now well-accepted causative mechanism for subsidence - which could be having additional impact here. Leaking drains should be fixed before any tree felling or remedial work is done otherwise both are futile and a lot of money is wasted.

Since Hampstead is the source of four rivers of London - here the Shepherd Stream that runs into the river Tyburn - the presence of continually flowing groundwater with surges during heavy rain needs to be studied before any expensive remedial work is undertaken so that money is spent on the real cause rather than the misnomer of vegetation-related causes. Groundwater has a similar effect to leaking drains except that the movement pattern follows rainfall not household water use, and of course cannot be fixed in the way that leaking drains can be. Over time of course on-going subsidence will occur unless this problem is resolved

OCA state that the history and timing of damage indicates tree root induced movement. They have given no history that could indicate the mechanism. They have not indicated why so many dead roots were found deep below the house; they have not indicated why tree roots should want to go below a house that elsewhere would normally be dry below it; they have not indicated why this 19th century house with trees all around it should suddenly start moving recently, or (more likely) the movement noticed by newcomers who do not understand Hampstead's geology - Fitzjohn's Avenue in particular where cracking is expected.

I am concerned that having removed trees in 12 Akenside Road's garden and presumably found no change contrary to their predictions, OCA are now requesting further felling in neighbouring gardens. This is also most unlikely to help, making it likely they will then be after even more trees, including the fabulous - and also innocent - London plane street trees in the vicinity.

With best wishes

Vicki Harding

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***Dr Vicki Harding***  
***Tree Officer Heath & Hampstead Society***  
***0207 794 7279***  
***0776 295 4552***

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