



The Heath & Hampstead Society

The Society examines all Planning Applications and Notices of Intent for trees relating to Hampstead, and assesses them for their impact on conservation and on the local environment.

To London Borough of Camden, Development Control Team

Planning Ref: 2021/0509/T

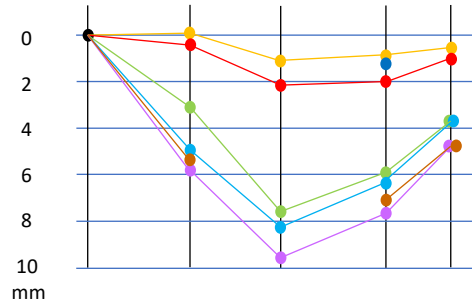
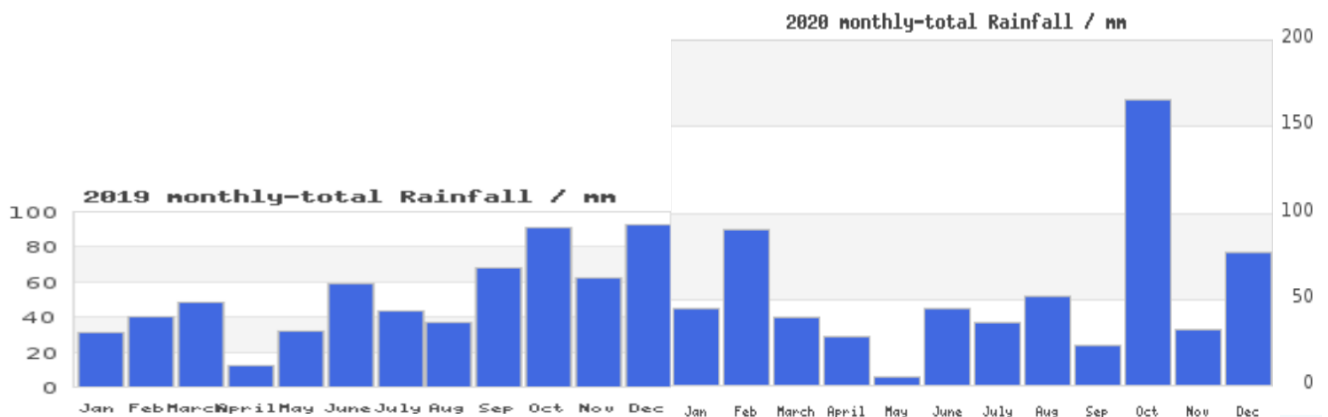
Address: 9 Willoughby Road

Case Officer: Tom Little

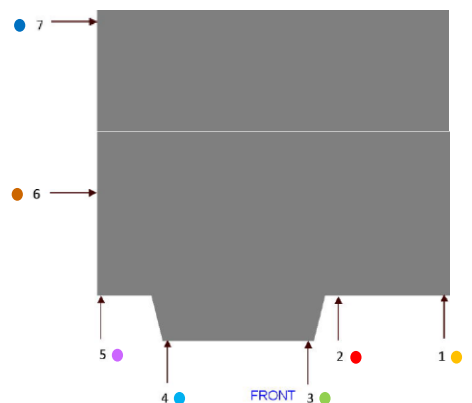
Date: 3rd March 2021

This new Notice of Intent that follows the refused 2020/1757/T to fell a TPOed ash tree for purported vegetation-related subsidence is this time accompanied by movement monitoring data and soil analysis from a borehole between the tree and the house. Unfortunately movement monitoring has only been done with 2-monthly visits rather than continuously, and crack monitoring has not been done at all, so this is of limited value with regards to determining causation.

Movement data with regards to rainfall (from nw3weather.co.uk) has been plotted, and is shown below:



	8 May m	9 July mm	2 Sept mm	4 Nov mm	15 Dec mm	Range mm
1	10.2980	+0.01	-0.11	-0.09	-0.05	0.12
2	10.1638	-0.06	-0.23	-0.20	-0.11	0.23
3	10.9454	-0.32	-0.73	-0.59	-0.36	0.73
4	10.9065	-0.50	-0.85	-0.66	-0.36	0.85
5	10.1782	-0.58	-0.96	-0.77	-0.48	0.96
6	10.1292	-0.54	not given	-0.71	-0.48	0.71
7	not given	10.7115 m	not given	-0.12 mm	not given	0.12



In comparing the timing of movement and rainfall it is clear that although the tree, being so close to the house, naturally has a small effect on movement, it is far from the main cause of movement.

The maximum range of monitored movement occurs at marker 6 nearest to the ash tree, *but this is still shy of 1cm*. No markers were placed on the party wall towards the rear of the building despite the worse cracks being associated with this area. Markers were all placed externally at ground level: a little above the unmarked 'manhole in the road... with an assumed value of 10.000m' that was deemed the reference datum.

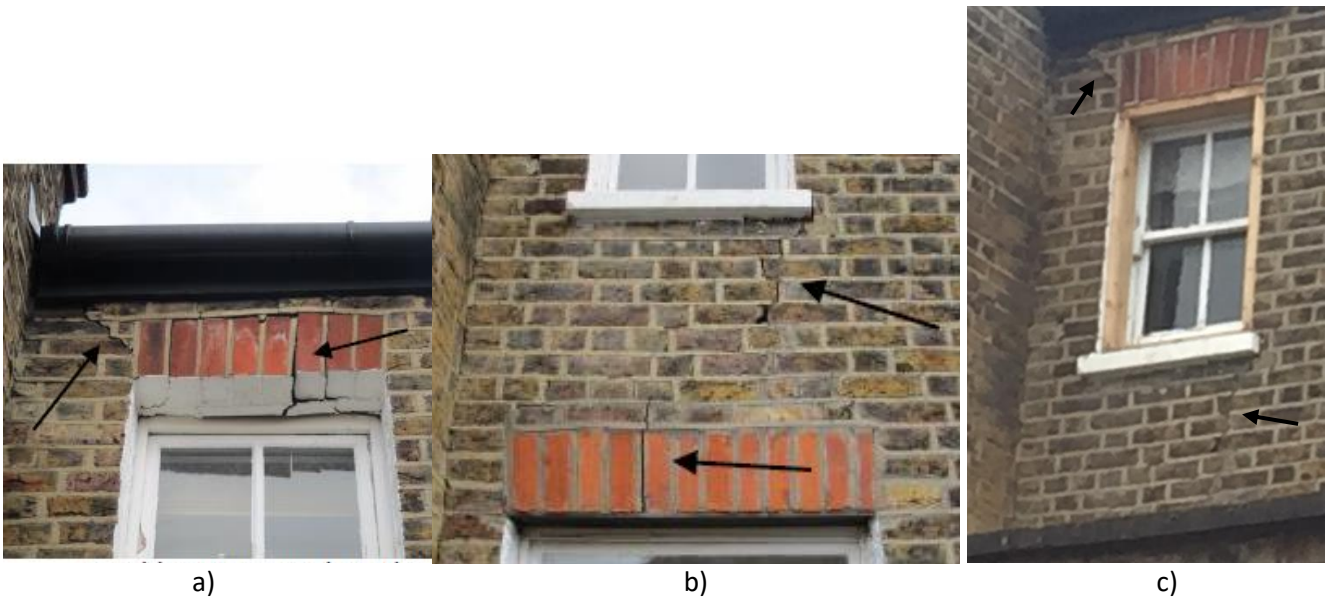
Marker 7 is the nearest marker to the party wall yet moves a maximum of 1.2mm. Even projected up to the third floor, any cracking produced by such movement would be little more than 'hair-line'. Since this is less than one might expect from mere clay expansion-contraction, one would presume this was fixed to some extent by its support from number 11 Willoughby Road. In view of the pattern of cracking in the external rear wall (away from its attachment to the party wall) and where the cracks are worst, this indicates the Party Wall itself has dropped at its rear part, but the stresses in the rear wall have fallen further along it. That the cracks internally along the ceiling joint with the party wall are tapered from back to front of this joint, including through the bathroom, until there are no cracks mentioned at this joint in the front bedroom, this would indicate to a geotechnical engineer with relevant experience where the problem lies and help determine why.



This is a strong indication that something is acting on the rear party wall, but since monitoring shows that tree-related movement is small, this tends to point towards an episode after re-decoration in 2017 but prior to movement monitoring that caused the subsidence of this wall, separate from the influence of the ash tree roots.

Absence of crack recovery: The external cracks can also be seen to still exist despite plenty of opportunity to close up in a winter of very heavy rainfall. Hampstead had 180% of its 30-year average of rainfall for January, following 244% of average rainfall for October, and while admittedly a dry November, 140% for December 2020. This has given plenty of opportunity for any persistent moisture deficit in the clay in the ground below to be reversed and for cracks to close up. These cracks have undergone little visible change since the photographs taken by Crawford's on 4th November 2019: evidence the trees are not playing much of a part at all.

The top window had some serious cracking to its lintel above and there were cracks below the window too going from the right side of the window sill diagonally down and left to the window below. This window had cracks between the 4th and 5th from the left vertical red bricks in the lintel above it.

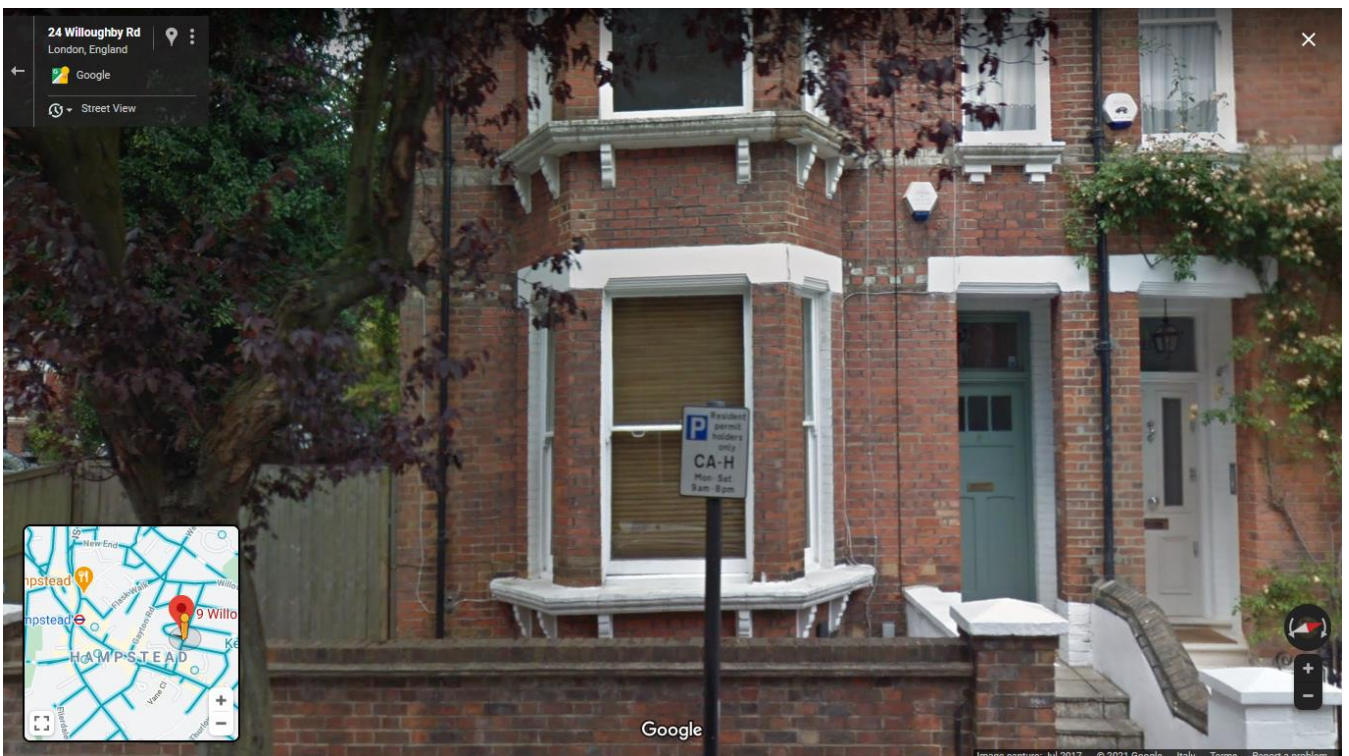


a) and b) photographs for Tech Report November 2019; c) photograph taken from Rudall Crescent March 2021.

This photograph is at an angle which reduces the view of the stepped nature and width of the cracks and cannot show the window below. However it shows that although there has been temporary support for the window and patching of the severe top lintel cracking, the diagonal crack to the left of the lintel is as before, as is the diagonal crack from the right windowsill to the window below. There has been no recovery which it is essential to demonstrate for vegetation-related subsidence.

What is really causing the subsidence and cracking?

Looking at the house from Willoughby Road with Street View, it is clear that subsidence without recovery has been occurring for many decades, being already present in 2008:



Street View of 9 Willoughby Road in July 2019 (latest available)



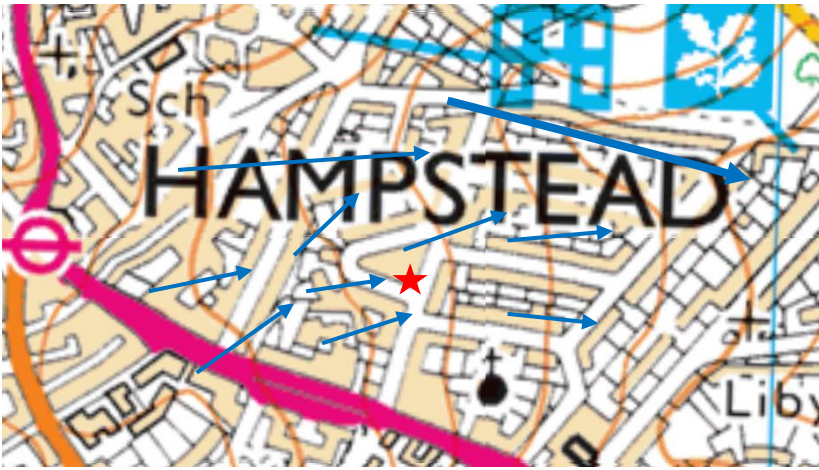
Most comparable Street View of 9 Willoughby Road in June 2008 with the -



- tell-tale gap under the left side of the sash window when fully closed

There are many cases of subsidence along Willoughby Road and Rudall Crescent, and I believe silt erosion is a significant part of the problem. Just what is washing it out in relation to the timing of crack appearances is harder to establish, and impossible with merely 2-monthly measurement.

The long-term nature of subsidence in many parts, though not all, of the Hampstead area is indicative of silt erosion from the superficial deposits – the quaternary Head solifluction – and from the Claygate Beds below, by the action of groundwater. Leaking drains and mains, of which there are plenty noted though generally ignored by Loss Adjusters in subsidence cases, are also a likely cause, the drains' and mains' foundations having themselves subsided due to silt washout beneath them causing opening of drain joints and cracking. There is also evidence that a sewer is breached somewhere: this was picked up when testing the groundwater in boreholes at 31 Willoughby Road. Rising head permeability testing was also able to demonstrate that discharge from leaky services and soakaways was active in the more permeable horizons of Head and Made Ground, separate from groundwater whose actions are more short-lived and often missed with infrequent monitoring.



Direction of groundwater flow within the Claygate Beds and overlying Head

★ 9 Willoughby Road

Groundwater generally flows in the direction of the prevailing slopes – at right angles to contour lines. In case there is any doubt that the ground here might be productive, the 1866 OS map shows the area around Willoughby Road to have many public wells and public pumps marked on the map, as well as wells associated with private houses and known wells at the Brewery. These tapped into this very groundwater with sufficient flow that enabled the water to be collected at quite a rate.



1866 OS map: Public Wells and Pumps (P or Pump) indicated by red line below



1912 OS map indicating position of Willoughby Road – in 1866 much of the road was fields

Hampstead is after all – due to the unique geology of this area - the source of four of London’s rivers. Here, the groundwater seeps, flows or gushes into the river Fleet, a good deal of this within the top superficial deposit ‘Head’ – frequently mistaken for ‘Made Ground’. The borehole dug at 9 Willoughby Road indicates this is about 1.2 metres thick. A number of buildings in the area require pumps in their cellars/basements for groundwater removal. 21 Willoughby Rd abandoned a basement dig-out due to the rate of groundwater inflow into the site.

Silt erosion shows overall lowering of levels as silt volume is lost. With the non-continuous movement monitoring, it is hard to distinguish this from i) the effect of leaking drains which cause both saturated clay expansion and silt erosion, ii) rainfall-related clay expansion/contraction and iii) any effect that the tree might be having. Groundwater storm surges can be extremely erosive and are a distinct causal possibility here (see table below of Hampstead rainfall surges) along with burst mains, explaining why cracking suddenly worsens when the tree has been present here for near to as long as the building. 2017 was a particularly bad year for severe storm surges with many cases of groundwater flooding and subsidence from more intense silt erosion.

All, along with the groundwater, are both steadily and more suddenly eroding silt and causing movement over decades+++ hence the repairs to walls & mortar and the wonkiness of sash windows and their sills.

Surges	No.	>15mm/day	> 20mm/day	> 25mm/day	> 30mm/day
2020	7	16 Feb; 18 Jun; 2/3/4/21 Oct; 3 Dec	18 Jun; 2/3/4 Oct	2/3 Oct	2/3 Oct
2019	3	10 Jun; 24 Sep; 1 Oct	24 Sep	24 Sep	24 Sep
2018	0				
2017	10	12 Jan; 17/18/29 May; 6/27 Jun; 11/30 Jul; 9 Aug; 10 Dec	17 May; 11 Jul; 9 Aug	17 May; 11 Jul; 9 Aug	17 May; 9 Aug
2016	9	11 Jan; 15 Apr; 11 May; 20/23 Jun; 16 Sep; 9/20/21 Nov;	15 Apr; 23 Jun; 16Sep; 9 Nov	23 Jun	23 Jun
2015	5	3/8 Jan; 24 Jul; 31 Aug; 16 Sep	24 Jul; 16 Sep	24 Jul; 16 Sep	24 Jul
2014	7	6 Jan; 10/25 Aug; 20 Sep; 13 Oct; 8/23 Nov	10/25 Aug; 20 Sep; 13 Oct; 23 Nov	10/25 Aug; 20 Sep; 13 Oct; 23 Nov	25 Aug; 13 Oct
2013	4	24 Aug; 13 Sep; 23/24 Dec	13 Sep	13 Sep	13 Sep
2012	11	29 Apr; 1 May; 3/11 Jun; 8 Jul; 5 Aug; 23 Sep; 5 Oct; 4 Nov; 20/22 Dec	11 Jun; 23 Sep; 20 Dec	11 Jun	
2011a	2	17 Jan; 6 Sep	6 Sep		
2010	6	16 Feb; 1&2 May; 23/25 Aug; 2 Oct	16 Feb; 1&2 May; 23 Aug; 2 Oct	16 Feb; 1 May; 2 Oct	1 May
2009	8	9 Feb; 4 Mar; 7/27 Jun; 6 Aug; 15 Sep; 29/30 Nov	9 Feb; 27 Jun; 6 Aug; 15 Sep	27 Jun; 6 Aug; 15 Sep	27 Jun; 6 Aug

There seems to have been a mains water leak picked up in July 2017 on Street View where water can be seen to be emerging from between seams in the roadway tarmac:



The insurance company may put in a request to fell the tree in order to have space to underpin the house. Other more effective and cheaper methods are available, such as Geobear's Ground Injection techniques. The access required for their machinery (width 700mm) means the ash tree would not prevent the process.

In summary I am asking Camden to refuse this Notice of Intent since

- i) An inadequate frequency of movement monitoring has been done at this particularly complex site, with no movement monitoring at all of the worst area of cracking.
- ii) There is no crack monitoring at all – but visual inspection would seem to indicate there has been no crack recovery during one of Hampstead's wettest winters, vindicating the tree.
- iii) The amount of possibly seasonal movement that could be attributed to the tree is far too small to have caused the more significant degree of recent cracking.
- iv) There is clear evidence of long-term subsidence on the corner of the house, in an area with a long history of silt erosion.
- v) 2017 was a year with a particularly high frequency and volume of rainstorms. This can cause groundwater surging and more severe silt erosion capable of producing more acute subsidence and cracking of the type and pattern seen here.
- vi) Water isolated as coming from leaking drains, mainly flowing in the superficial deposits, has been measured as significant at another site in Willoughby Road.
- vii) Mains water bursts and sewer breaching have also occurred and require further investigation.
- viii) Professional evaluation from a geotechnical engineer with experience of the particular local geology is more likely to determine the causes of subsidence and cracking here and their remediation.

Dr Vicki Harding

Society Tree Officer, Heath & Hampstead Society