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23 Downside Crescent, NW3

Basement Impact Assessment

Ref: 140381/KH

Date: 25 November 2014

Rev No: Planning

1.0 INTRODUCTION

1.1 It is proposed to construct a new single storey basement to the footprint of the existing semi-detached property and to the rear extension of this Victorian three storey property.

1.2 This report is in response to The Camden Development Policy DP27, with reference to paragraph 27.3., the proposed extension is a single storey at level with neighbouring properties.

1.3 Following the format guidance in The Camden Policy Guidance PG4, the stages for a Basement Impact Assessment are:

- Stage 1 - Screening; •
- Stage 2 - Scoping; •
- Stage 3 - Site investigation and study; •
- Stage 4 - Impact assessment;•
- Stage 5 - Review and decision making.

This report follows the Flow Charts and uses the Figurative information given in the Camden Geological, Hydro-geological and Hydrological Study to submit data with relevance to the small scale of this project to address stages 1 and 2.

1.4 The Flowcharts of the Appendix E to the Camden Geological, Hydro-geological and Hydrological Study are completed in table format in section 3 of this report and form the screening element of this report, including:

- Surface Flow and Flooding Impact Identification
- Subterranean (groundwater) Flow Impact Identification
- Slope Stability screening flowchart

1.5 23 Downside Crescent is located with an arrow on the relevant Figures of the Camden Geological, Hydro-geological and Hydrological Study, appended to this report, Appendix A.

1.6 Again reflecting the size of the scheme, a brief scoping report is provided in section 4, to be commented upon by Camden. This will satisfy the requirement of DP27 in terms of consideration to the Geological, Hydro-geological and Hydrological effects of the development.

2.0 SITE INFORMATION

2.1 23 Downside Crescent is a Victorian property, three storey semi-detached build circa 1900. The construction is typical for buildings of this era with load bearing masonry walls and timber floors.

2.2 23 Downside Crescent lies within the generally sloped setting of Hampstead & Belsize Park, although the immediate area is relatively flat and reasonable level.

2.3 Neighbouring the property on either side are Nos 21 and 25 Downside Crescent, with 21 being semi-detached with no 23 and 25 being detached. Both these properties are three storeys, level with No. 23. The house is bordered by tennis courts to the rear.

2.4 The site is located approximately 135m northeast of Belsize Park Underground Station, 190m to the south of Royal Free Hospital and 530m southeast of Hampstead Heath railway station.

2.5 The London Underground Northern Line passes 160m to the west of the site and the Belsize and New Belsize Tunnels pass 25m and 85m north of the site respectively.

2.6 From geological maps and borehole data, Downside Crescent is underlain by made ground overlying the London Clay formation. The London Clay is classified by the EA as Unproductive Stratum, which refers to a soil or rock with low permeability and of negligible significance for water supply or river base flow. This is borne out by the site specific site investigation prepared by GEA (ref J1331) dated December 2013 – see Appendix B for details of this report.

2.7 Reference to the Environment Agency maps, as well as the maps appended, locate the site away from the ground source protection zones and secondary aquifers as seen on the Environment Agency Map, below and Figure 8, appended. See Figs 1 & 2 overleaf.

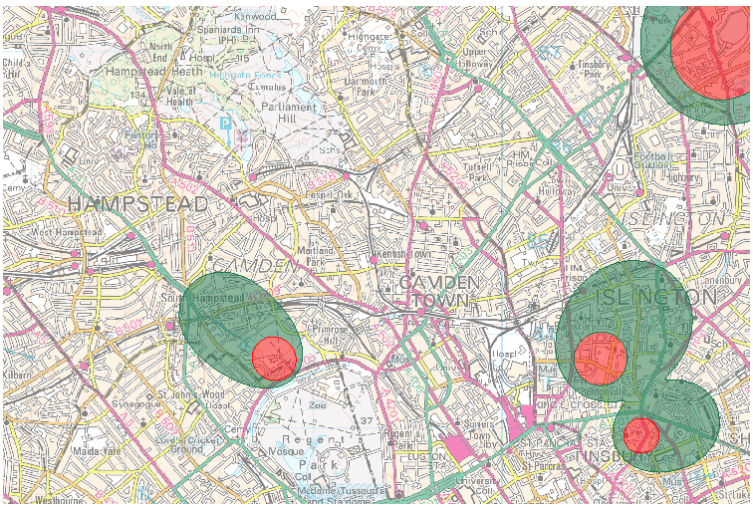

FIG 1. GROUND SOURCE PROTECTION ZONES

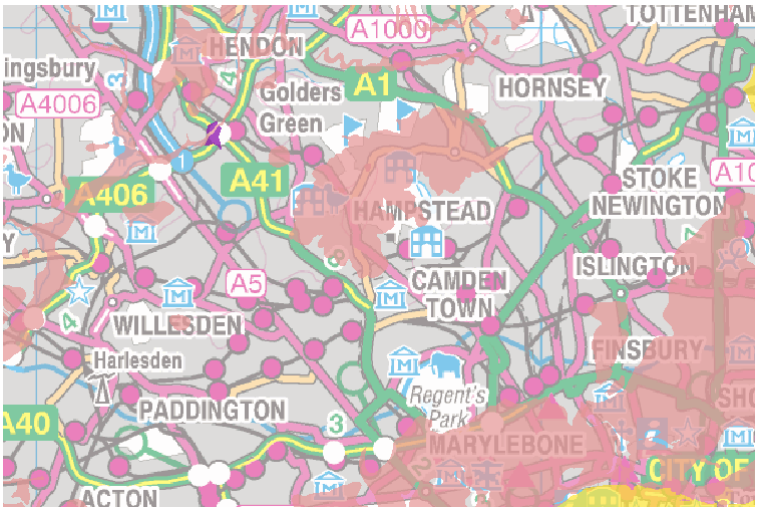

FIG 2. AQUIFER MAP BEDROCK DESIGNATION – PINK IS SECONDARY 'A'

2.8 A Structural Scheme for the basement is appended to this report, Appendix C.

3.0 RESPONSE TO BIA SCREENING FLOWCHARTS

Appendix E : Camden geological, hydrological and hydrology study: Guidance for subterranean development.

3.1	**Surface Flow and Flooding Impact Identification**	
3.1.1	**Is the site within the catchment of the pond chains on Hampstead Heath?**	**No, refer to Figures 14 & 15 appended.**
3.1.2	**As part of the site drainage, will surface water flows (e.g. rainfall and run-off) be materially changed from the existing one?**	**Not significantly, it is assumed any additional surface water from the extension roof will be attenuated. The lower terrace/patio area will be of similar area to the terrace presently.**
3.1.3	**Will the proposed basement development result in a change in the proportion of hard surface / paved external areas?**	**Not significantly. New 'hard' surfaces will either be attenuated as described above or permeable solutions will be incorporated to ensure for a similar drainage regime to present.**
3.1.4	**Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?**	**No, the extension will not impact on any changes to the profile of surface water inflows given the existing configuration of extensions and neighbouring outbuildings in the immediate vicinity to the site.**
3.1.5	**Will the proposed basement development result in a change to the quality of surface water being received by adjacent properties or downstream watercourses?**	**No change in water quality is expected.**

3.2	**Subterranean (groundwater) Flow Impact Identification**	
3.2.1	**Is the site located directly above an aquifer?**	**No. The site is not within the Secondary A Aquifer. Refer to Figure 8, Appended.**
	○ **Will the proposed basement extend beneath the water table surface?**	**No. Perched water may be present above the London Clay formation level, which may require dewatering during construction.**
3.2.2	**Is the site within 100m of a watercourse, well (used/disused) or potential spring line?**	**No, refer to Figure 11 appended.**
3.2.3	**Is the site within the catchment of the pond chains on Hampstead Heath?**	**No, refer to Figures 14 & 15 appended.**
3.2.4	**Will the proposed basement development result in a change in the proportion of hard surface / paved areas?**	**Not significantly. New 'hard' surfaces will either be attenuated as described above or permeable solutions will be incorporated to ensure for a similar drainage regime to present.**
3.2.5	**As part of the site drainage, will more surface water ((e.g. rainfall and run-off) than present be discharged to the ground? (e.g. via soak-aways and/or SUDS)**	**No, the drainage design will ensure a similar amount of surface water will be discharged into the ground.**

3.3	**Slope Stability screening flowchart**	
3.3.1	**Does the existing site include slopes, natural or manmade, greater than 7 degrees (approx. 1 in 8)?**	**No.**

3.3.2	**Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7 degrees (approx. 1 in 8)?**	**No, the levels of the site and at the site boundaries are to remain the same.**
3.3.3	**Does the development neighbour land, including railway cutting and the like, with a slope greater than 7 degrees (approx. 1 in 8)?**	**No.**
3.3.4	**Is the site within a wider hill setting in which the general slope is greater than 7 degrees (approx. 1 in 8)?**	**The general Belsize Hill & Hampstead area is sloped, however Downside Crescent lies in a more gentle slope shallower than 1 in 8, when 1:25 000 maps are examined.**
3.3.5	**Is the London Clay the shallowest strata at the site?**	**Made ground upto 1m deep was encountered on the site. Below this the London Clay initially comprised of soft brown and grey slightly gravelly clay to depths between 1 and 2m before the stiffer London Clay formation.**
3.3.6	**Will any tree/s be felled as part of the proposed development and/or any works proposed within any tree protection zones where trees are to be retained?**	**No.**
3.3.7	**Is there a history of seasonal shrink-swell subsidence in the local area., and/or evidence of such effects on site?**	**London clay has high shrinkage potential and as such properties near to high water demand trees maybe susceptible to movement, depending on the depth of their foundations. It is our opinion that the existing rear addition is suffering from subsidence due to consolidation of the underlying clay.** **Given the level of movement and the relatively shallow foundations the rear addition is constructed off, it is**

		suggested that the most practical solution would be to demolish the rear extension, back to the line of the main house, and re-build an extension with foundations in accordance with NHBC Standards Part 4: Foundations. It should be noted that the proposed foundations are below the influence of any trees.
3.3.8	**Is the site within 100m of a watercourse or potential spring line?**	**No, refer to Figure 11.**
3.3.9	**Is the site within an area of previously worked ground?**	**No.**
3.3.10	**Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?**	**The site is not located within an Aquifer. Refer to Figure 8, Appended.**
3.3.11	**Is the site within 50m of Hampstead Heath?**	**No, refer to Figure 11 and other maps appended.**
3.3.12	**Is the site within 5m of a Highway or pedestrian right of way?**	**No.**
3.3.13	**Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.**	**The basement foundation depths will be significantly deeper than the neighbouring property foundation depths, however the full design will ensure the temporary and long term stability of these adjacent structures is maintained at all times.**
3.3.14	**Is the site over (or within the exclusion zone of) any tunnels, e.g. railways lines?**	**No. The Northern Line runs to the west of the site and the Thameslink tunnels run to the north of the site as previously outlined in this report but both are a sufficient distance away to not be of concern.**

4.0 PROPOSED SCHEME – STRUCTURE

4.1 Structural arrangement drawings are in the Appendix C of the report.

4.2 Calculations for the primary structural arrangement are in Appendix C of the report.

4.3 It is proposed to construct a single storey basement under the whole of the existing property and the proposed ground floor extension. The superstructure is to be retained as part of the works. The new basement perimeter walls will support the vertical loads from the existing party walls. The new basement perimeter walls will also be required to support lateral pressures generated by both the earth and some surcharges from adjacent land. In the permanent condition the head of these walls is to be laterally propped by the ground floor construction.

4.4 Hypothetical buoyancy will also have to be considered due to a potential raised groundwater level – this is to be resisted by the weight of the external walls and the mass of the building above.

4.5 The proposed basement slab, and ground floor slabs are to be reinforced concrete.

4.6 The concrete structure will be designed to BS8110.

4.7 As the basement is to form habitable space it will require waterproofing in accordance with BS8102 and Ciria Report 139 to Grade 3. A drained cavity [specified by the architect] will be installed in front of the RC wall. There may be new elements of the existing above ground drainage system that will be extended down to the basement floor and collected as part of this drained system. However, wherever possible, drainage will be discharged through a gravity system.

4.8 It is proposed to form the new basement walls by underpinning the existing walls to a depth no deeper than approximately 4m below existing ground level. These underpin sections will bear into the London Clay. The underpin sections will be carried out on a sequential ‘hit & miss’ basis, no more than 1m in length, and be reinforced concrete and tied together with dowel bars. This will ensure ground movement and movement of the superstructure is minimised.

4.9 The basement slab will be a reinforced concrete slab bearing onto the natural strata. It will act to laterally prop the base of the underpinned walls and prevent sliding of these bases. It will be designed to resist water pressure and heave as previously mentioned.

4.10 The proposed ground floor slab will be a suspended concrete slab spanning between the underpinned walls and a series of beams within the proposed ground floor structure that will also act to support the internal load-bearing walls that are to be retained as part of the works.

4.11 The existing three-storey building is currently occupied as three separate apartments, but with a planning consent for a single family dwelling, which will be its use following the completion of the works. With the addition of the new basement, the building will remain as Building Class 1 in accordance with Section A3 of the current Approved Document A: Structure.

4.12 The property shares its party walls with 21 Downside Crescent and is within 3m of No.25, therefore, the development falls within the scope of the Party Wall Act 1996. The proposed design will not preclude or inhibit similar, or indeed any works on the adjoining properties. The neighbouring properties will be independently monitored using techniques in accordance with the recommendations of IStructE Subsidence of Low Rise Buildings, Second Edition.

4.13 All of the underpinning works are to be carried out by a competent foundation contractor who is familiar with the suggested proposals. Works will be executed to comply with the Considerate Contractors Scheme.

4.14 Prior to the works commencing a construction method statement is to be developed by the Main contractor. The construction method statement is to describe how the works can proceed safely while minimising the impact on adjoining properties.

4.15 The contractor will be required to submit full proposals, method statement and calculations to the Structural Engineer for review prior to the start of any works on site.

4.16 The Contractor is responsible for the design and erection of all temporary works in accordance with all relevant British Standards. The Contractor is to provide adequate supervision to ensure that the stability of the existing structure, excavations and surrounding structures are maintained at all times.

5.0 SCOPING

5.1 The screening undertaken as observations in reply to the flowcharts in Section 3 highlights the following items that may impact on the design:

5.1.1 *Proportion of hard surfaces.* The difference in proportion is very slight, and the scheme will provide suitable surfaces and attenuation to ensure that on balance the proposals will not result in an increase in ground and subsurface water flows.

5.1.2 *Water table.* It is possible a modicum of perched water may be encountered may enter the site during construction if heavy rain is experienced. Therefore de-watering may be required.

5.1.3 *Neighbouring Properties.* The basement foundation depths will be significantly deeper than the neighbouring property foundation depths, however the design will ensure the temporary and long term stability of these adjacent structures is maintained at all times. The adjacent structures are to be monitored during the construction process and the contractors method statement is to be carefully considered prior to any works taking place.

5.2 In conclusion, it is considered that there are no negative impacts anticipated in this basement proposal on the hydro-geological and hydrological conditions of the local environment that cannot be suitably addressed in the detailed design of this proposal.

Keith Hirst

MSc BEng (Hons) CEng MIStructE

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23 DOWNSIDE CRESCENT

APPENDIX A – MARK-UP HYDRO-GEOLOGICAL FIGURES

SEPTEMBER 2014

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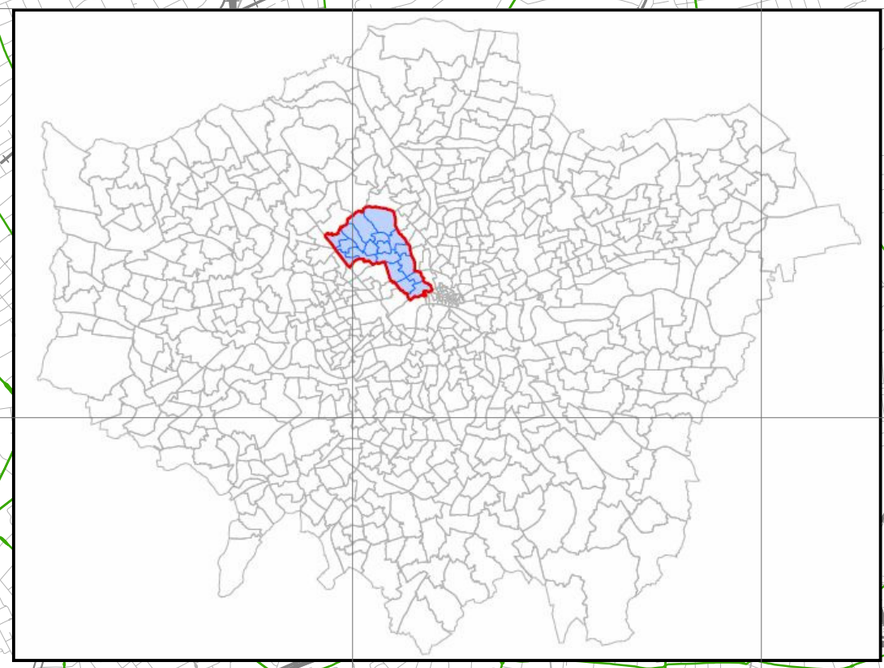
524000 526000 528000 530000 532000 534000

188000 186000 184000 182000

Highgate
Hampstead Town
Frognal and Fitzjohns
Fortune Green
Gospel Oak
Kentish Town
West Hampstead
Belsize
Haverstock
Cantelowes
Swiss Cottage
Camden Town with Primrose Hill
Kilburn
St. Pancras and Somers Town
Regent's Park
King's Cross
Bloomsbury
Holborn and Covent Garden



N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

- London Borough of Camden
- Camden Wards
- Railway Lines
- A Roads

23 Downside Crescent

Camden Geological, Hydrogeological and Hydrological Study

Camden Administrative Boundaries

213923 FIGURE 1

524000 526000 528000 530000 532000 534000

188000 186000 184000 182000

23 Downside Crescent

Data source - BGS Mapping - Scale 1:10,000

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

- London Borough of Camden
- Railway Lines
- A Roads

BGS 1:10K Artificial Ground

- MADE GROUND
- WORKED GROUND

BGS 1:10K Drift Geology

- ALLUVIUM
- HACKNEY GRAVEL FORMATION
- LANGLEY SILT FORMATION
- LYNCH HILL GRAVEL FORMATION
- STANMORE GRAVEL FORMATION

BGS 1:10K Solid Geology

- BAGSHOT FORMATION
- CLAYGATE MEMBER
- LAMBETH GROUP
- LONDON CLAY FORMATION

NB: Geological boundaries are largely indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

Camden Geological Map

213923 FIGURE 3

524000 526000 528000

186000

23 Downside Crescent

Data Source: BGS Mapping - Scale 1:10,000

N

Scale at A3: 1:15,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.25 0.5 1 1.5
Kilometers

Legend

- London Borough of Camden
- Railway Lines
- A Roads

BGS 1:10K Artificial Ground

- MADE GROUND
- WORKED GROUND

BGS 1:10K Drift Geology

- ALLUVIUM
- HACKNEY GRAVEL FORMATION
- LANGLEY SILT FORMATION
- LYNCH HILL GRAVEL FORMATION
- STANMORE GRAVEL FORMATION

BGS 1:10K Solid Geology

- BAGSHOT FORMATION
- CLAYGATE MEMBER
- LAMBETH GROUP
- LONDON CLAY FORMATION

NB. Geological boundaries are largely indicative based on available geological mapping data

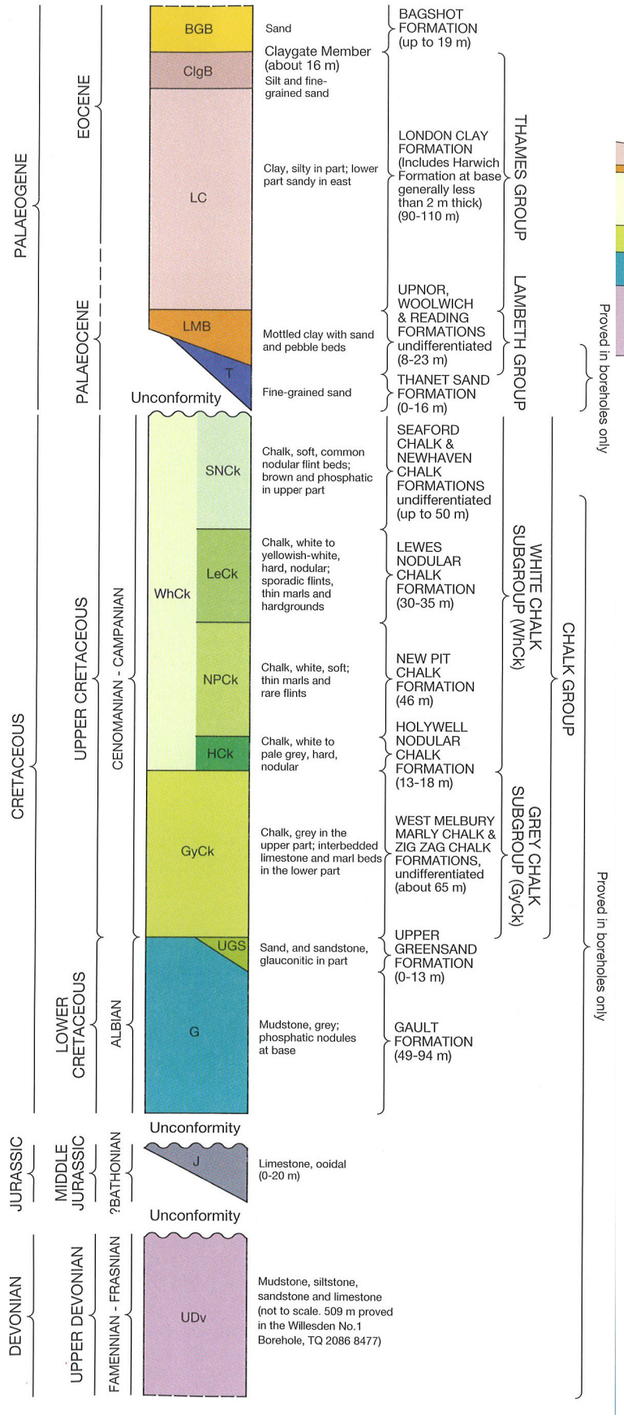
Camden Geological, Hydrogeological and Hydrological Study

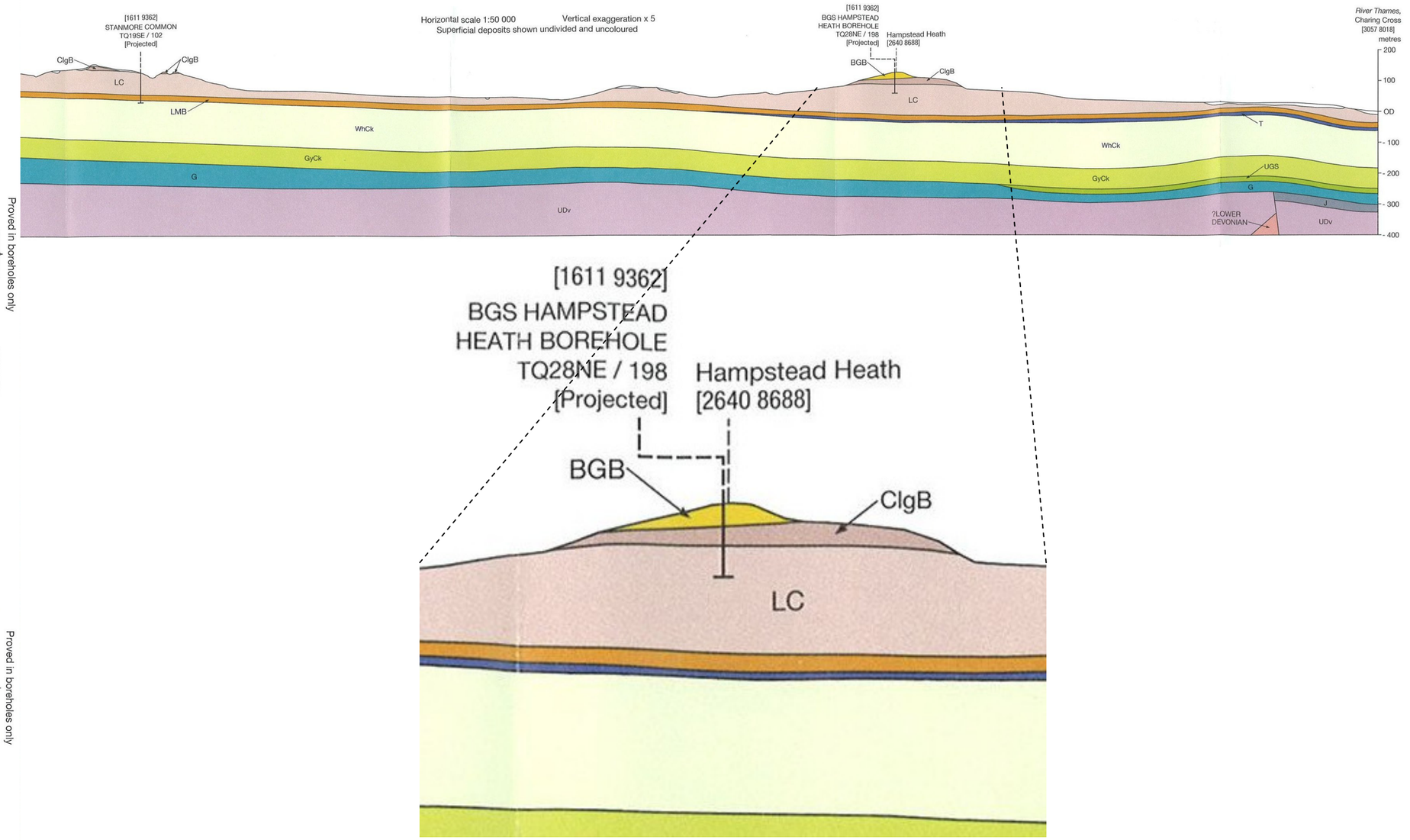
North Camden Geological Map

213923 FIGURE 4

GENERALIZED VERTICAL SECTION

Scale 1:2500 (1 cm to 25 m)





Source - British Geological Society, 1:50,000 Series
England and Wales Sheet 256 – North London

Camden Geological, Hydrogeological and Hydrological Study

Geological Long Section (NW – SE)

213923 **FIGURE 7**

524000 526000 528000 530000 532000 534000

188000 186000 184000 182000

23 Downside Crescent

Environment Agency Aquifer Designation based on BGS Mapping

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

- Borough of Camden
- Railway Lines
- A Roads

Aquifer Designation

- Secondary A Aquifer
- Unproductive Strata

Source Protection Zone

- Outer Source Protection Zone
- Inner Source Protection Zone

NB. Aquifer boundaries are indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

Camden Aquifer Designation Map

213923

FIGURE 8