



Your Ref: EEBC Ref: 22/00923/FUL
Our Ref: 332611157/RD/VKR

26th February 2024

Epsom & Ewell Borough Council
Town Hall
The Parade
Epsom
KT18 5BY

Attn: Simon Taylor – Interim Planning Development and Enforcement Manager

Dear Sirs

Site: Former Police Station, Church Road, Epsom, KT17 4PS

Planning Application 22/00923/FUL - Demolition of the existing police station (Use Class E) and ambulance station (Sui Generis) and erection of a new residential, nursing and dementia care home for the frail elderly (Use Class C2) comprising ancillary communal facilities and dementia care, basement parking, reconfigured vehicular access onto Church Street, landscaping and all other associated works.

Thank you for your email requesting our advice on the information submitted in relation to this application, and with specific reference to the potential for groundwater impacts to neighbouring properties.

Background

We understand from the correspondence provided that Epsom and Ewell Borough Council have received an application for the redevelopment of the former police station on Church Street, Epsom (the Site). The redevelopment will include the installation of a tanked basement to provide parking, replacing an existing smaller basement. The proposed basement will sit 3.6 m below ground level (bgl). There will also be a separate underground surface water retention tank at approximately 1.5m bgl.

An objection has been received from a neighbour/adjacent party (50, The Parade) who is concerned about the impacts of the proposed new tanked basement on groundwater flow and the potential for this to cause additional groundwater flooding within the untanked basement at their property. Their basement sits 1.2 m below ground level. The residents have previously suffered from a damp basement in 2003, water ingress to their basement in 2014, and have now installed a sump pump (in 2020). The sump pump is thought to have operated a number of times since its installation, which has been taken to indicate a water table in the vicinity of the floor of the basement, but could equally reflect surface water drainage into voids around the structure. The residents' concern is that the new basement would impede groundwater flow in the area of their property and increase the likelihood of water entering their basement.

SLR have undertaken a number of flooding and drainage assessments to determine the appropriate method of water management for the Site. They have concluded that:

- The Chalk water table typically lies below the River Terrace Deposits, Thanet Formation and made ground on site.
- Groundwater within the Chalk can rise into the overlying deposits.
- Should groundwater rise into the overlying deposits, flow within these will be in the same direction as flow in the Chalk (north-northwest) and may be impacted by structures.

- The groundwater table is unlikely to rise significantly above the base of the proposed basement.
- The proposed basement should be tanked as a precaution.
- The magnitude of impact from subterranean structures on groundwater flow is small.

The residents of 50, The Parade have maintained their objection, and you have requested that Stantec provide independent hydrogeological advice regarding the potential for groundwater impacts in the area and specifically on the neighbouring properties, should the redevelopment of the former police station take place.

Scope of Work and Information Received

Further to your acceptance of our proposal on 12th January 2024, we have carried out the requested review to determine the risk of groundwater flooding following redevelopment of the Site. We have reviewed the following documents, provided by yourselves:

- Proposed Location Plan APL001 Rev B (Sept 23)
- Proposed Basement Plan APL006 Rev E (Sept 23)
- Topographical Plan APL002 Rev B (Sept 23)
- Proposed Site Plan APL004 Rev G (Sept 23)
- Preliminary Land Quality Risk Assessment (SLR May 2022 - Final)
- Flood Risk Assessment and Drainage Strategy (SLR May 2022 – Rev 2)
- 3rd Party Groundwater Information (Oct 30th 2023)
- Members Update (SLR Nov 2023)
- Committee Report (Nov 2023)
- Hydrogeological Basement Impact Assessment Report (SLR December 2023 - Final)
- Letter from Will Anstey (SLR) to Priory CC44 Ltd (28/9/22)
- Excerpts, provided by the Ladd family, of the Jacobs SFRA (2018)
- Letters and Emails from the residents at 50, The Parade

In addition, we have also reviewed the historically recorded groundwater level measurements from GeolIndex borehole logs (BGS, 2 February 2024). While two of the Environment Agency (EA)'s long-term monitoring boreholes are also available (Chipstead and West Horsley Manor) and can be used to place the groundwater elevations at the Site in the context of the hydrological cycle; these do not provide any additional data that can be drawn on in the Epsom area due to their topographic position. The St Philomena borehole data is also available, and is a similar hydrogeological setting to the Site, albeit at a lower elevation.

Site Setting

The Site comprises predominantly buildings and hardstanding. It is intended to redevelop it as a care home with basement (underground) parking.

According to the SLR (2022) reports, the Site is situated on Made Ground and River Terrace Deposits (in the east of the Site), overlying the Thanet Formation and Lewes Nodular Chalk. The exploratory hole records (in the SLR Report) for the Site indicate the presence of River Terrace Deposits, including in the west of the Site, to a depth of up to 5.9 m, but they do not positively identify the presence of the Thanet Formation. This is explained in the SLR report as likely due to difficulties in differentiating between the River Terrace Deposits and Thanet Formation which can present as very similar in nature. Both the Thanet Formation and the River Terrace Deposits are designated as a Secondary A Aquifer, while the Chalk is a Principal Aquifer. Groundwater within the Chalk is abstracted for public supply as the Site is located within a groundwater Source Protection Zone (SPZ) 1 – Inner Catchment. The closest property with an active groundwater abstraction licence is a Thames Water Utilities facility, located 486 m north of the Site and understood to be associated with a water treatment works and a listed abstraction limit of 21,584 m³/day. There are two other groundwater abstraction licences relating to locations within 1 km of the Site which are also held by Thames Water (Crossfield Consulting, 2019),

one located on East Street in Epsom. The positioning of the Thames Water abstraction on East Street is unlikely to reflect significantly higher groundwater levels in this area (as asserted within the 3rd party information reviewed), and merely reflects historical understanding that the permeability of the Chalk is greatest close to the Thanet Formation outcrop.

SLR undertook groundwater monitoring in 2 wells (BH1 and BH2) remaining on the Site from previous investigations, between November 2021 and March 2022. BH2 was recorded as dry on each monitoring visit during the monitoring period. BH1 was recorded as dry in the later part of the monitoring period (Feb-March 2022) but from November 2021 to January 2022, groundwater is indicated by SLR to have been recorded between 8.06 m below ground level (bgl) and 9.01 m bgl. The borehole is only 9.3 m deep and thus water levels are indicated to have dropped below the base of the monitoring well after January 2022. Assessment of the EA's monitoring location in Chipstead suggests that this was an average period of groundwater level, and that monitoring occurred within the seasonal high groundwater period in the 2022 winter. A wider review of the BGS GeoIndex borehole records suggest that groundwater in the Epsom area is typically encountered within the Chalk at more than 20 m bgl. This elevation is likely to be impacted by abstraction from the Chalk at the Thames site.

No further groundwater elevation data is available for the Site.

The Jacobs (2018) SFRA identifies reported groundwater flooding at 2 locations down the hydraulic gradient (northwest) of the Site associated with exceptionally high groundwater levels in 2000, 2002 and 2014, and a groundwater emergence risk of >25% for the site area. It is noted however, that the SFRA describes the groundwater emergence maps as '*suitable for national assessment and, as such, do not pinpoint sites where groundwater flooding will occur. Instead, they define broad areas of risk based on geology and topography.*'

Hydrogeological Conceptualisation

The Site is indicated to be situated on 8 m of unsaturated materials comprising up to 1.1 m of made ground, and up to 5.2 m of Thanet Formation and River Terrace Deposits. The top of the Lewes Nodular Chalk is described in two borehole logs as structureless Chalk comprising slightly gravelly clay. During the site investigation, groundwater was not encountered. Groundwater monitoring (undertaken following the site investigation) places the water table over 8 m bgl, (as shown in the SLR report), within the Lewes Nodular Chalk.

The shape of the SPZ and the topography suggests that groundwater flow within the Chalk is generally to the north – northwest towards lower topography and the abstraction point, and away from 50, The Parade.

Typically, strata such as the Thanet Formation are considered to form a continuous aquifer with the Chalk and can intersect Chalk water tables. However, the reported depth to the Chalk groundwater in the Epsom area, and the lack of water in the boreholes at the Site suggests that, typically the elevation of groundwater in this area is below the Thanet Formation. Groundwater levels in the Chalk do vary with rainfall, and the range of that fluctuation varies with topography - with greater ranges exhibited at higher elevations. However, it should be noted that the unsaturated zone at higher elevations is also greater, while Chalk groundwater tends to be close to the surface in valleys. The Site is situated at approximately 48 m AOD and is not in a position in the landscape where we would anticipate Chalk groundwater springs or discharges near the ground surface (as asserted within the 3rd party information reviewed). Historically, these have occurred to the north-northwest, although this is based on anecdotal historical information. The St Philomena borehole sits at a lower elevation than the Site, and Chalk groundwater does reach the surface in periods of higher water table, due to this lower elevation.

At this Site, it is likely that water flow between the Lewes Chalk and the Thanet Formation/River Terrace Deposits is partially impeded by the presence of weathered Chalk (described as clay in the exploratory

hole records presented in the SLR report) which can slow water percolating into the water table. This may allow some groundwater to be perched in the River Terrace Deposits, above the Chalk water table, in times of high rainfall, before the water table rises.

Stratum	Thickness	Characteristics
Made ground	<1.1 m	Variable in nature, high permeability allows water flow.
River Terrace Deposits/Thanet Sands	<5.2 m	Variable in nature, high permeability allows water flow
Weathered Lewes Chalk	Unknown (>4.1m in BH1 and BH2)	Variably permeable due to clayey nature, contains groundwater
Lewes Nodular Chalk	Unknown	Highly permeable, contains groundwater that is abstracted for supply.

The lines of evidence indicate therefore, under typical conditions, that the aquifer beneath the Site is typically within the Lewes Nodular Chalk and is unlikely to intercept the base of the basement beneath the new buildings, and further that there is reasonable thickness of unsaturated material (typically) beneath the proposed basement. The installation of a basement carpark to 3.6 m bgl, is therefore considered unlikely to intersect or disrupt groundwater flow away from the site and towards the abstraction during typical periods. Flow from upgradient is unlikely to be impeded or back-up as there is adequate permeable strata present to convey water down the hydraulic gradient.

Following periods of exceptional rainfall, groundwater will be continuous throughout the Chalk aquifer, Thanet Formation and River Terrace Gravels. Flow to the north-northwest in these deposits will continue and may be affected by below ground infrastructure that it then encounters, which can slow or increase flow. Flow will however be routed around structures, and whilst this may cause a little groundwater mounding, the transmissivity of the superficial materials, as described by SLR, will mean that this will be minimal.

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface, or into made ground and structures. This may be as a result of persistent rainfall that recharges large aquifers, such as the Chalk, until they are full; or may be as a result of periods of sustained moderate rainfall, or high river levels, or tides, driving water through near-surface deposits. Groundwater flooding can be caused both by rising groundwater levels reaching surface, as well as by development of a shallow water table which therefore impedes rainfall infiltration and increases the risk of surface water flooding (surface flooding driven by groundwater conditions).

As you are aware, the periods of 2000 and 2014 were both exceptionally high groundwater events and a number of areas were impacted by groundwater flooding. Whilst these events may have been caused by high Chalk groundwater levels in some areas, at this location it is likely that they were caused by a combination of surface water and rainfall flowing through the shallow strata as proposed by SLR (September 2022), and an increased groundwater table. Based on the information reviewed, there is nothing to suggest that the proposed tanked basement would impede groundwater flows or impact on groundwater levels at the Site or in the surrounding area. The conclusions that SLR have made in their FRA and associated documents appear reasonable.

Conclusion

On balance, considering the lines of evidence and information reviewed, we consider it is unlikely that the proposed development of the former police station will impact groundwater flow in such a way that it would affect the residents in 50, The Parade.

Please do not hesitate to contact us if we can be of further assistance.

Yours faithfully



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