

Drainage Report

Chicklade Service
Station, Chicklade,
SP3 5ST



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1. Introduction

This Drainage Report forms part of the Section 73 Material Amendment being submitted in relation to approved application PL/2022/06298 at Chicklade Service Station, Chicklade SP3 5ST. The Material Amendment covers reconfiguration of parking spaces, increasing retail service yard area and retail unit elevation and roof amendments, as well as a change to a permeable surface water drainage strategy.

The report sets out the drainage proposals for foul water and surface water designs, including supporting calculations, treatment processes and drainage maintenance.

2. Site Description

Location:

The proposed site is located along the A303 in Chicklade, Wiltshire SP3 5ST. National Grid Reference (NGR) of ST 90455 34466. The site area is 2.1 hectares.

The proposed site is the former petrol service station with shop, toilets, car parking, petrol pumps and associated buried petrol tanks.

The site is bounded by the A303 to the South with fields to the North, East and West.

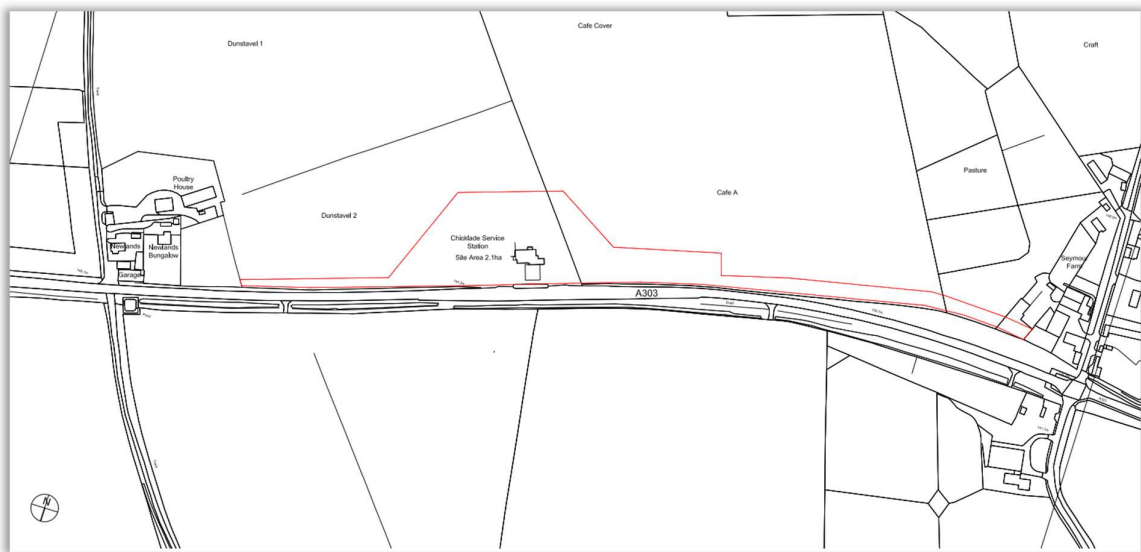


Figure 1: Site Location (Baxter Green Architects)

Flood Risk:

The Environment Agency (EA) Flood Map for Planning shows the site is located within Flood Zone 1 – Low probability in Table 1 of NPPF Planning Practice Guidance.

This zone has less than 1 in 1000 year annual probability of flooding.

The NPPF Planning Practice Guidance states that all types of development are suitable for this flood zone. See below **Figure 2** for the EA map.

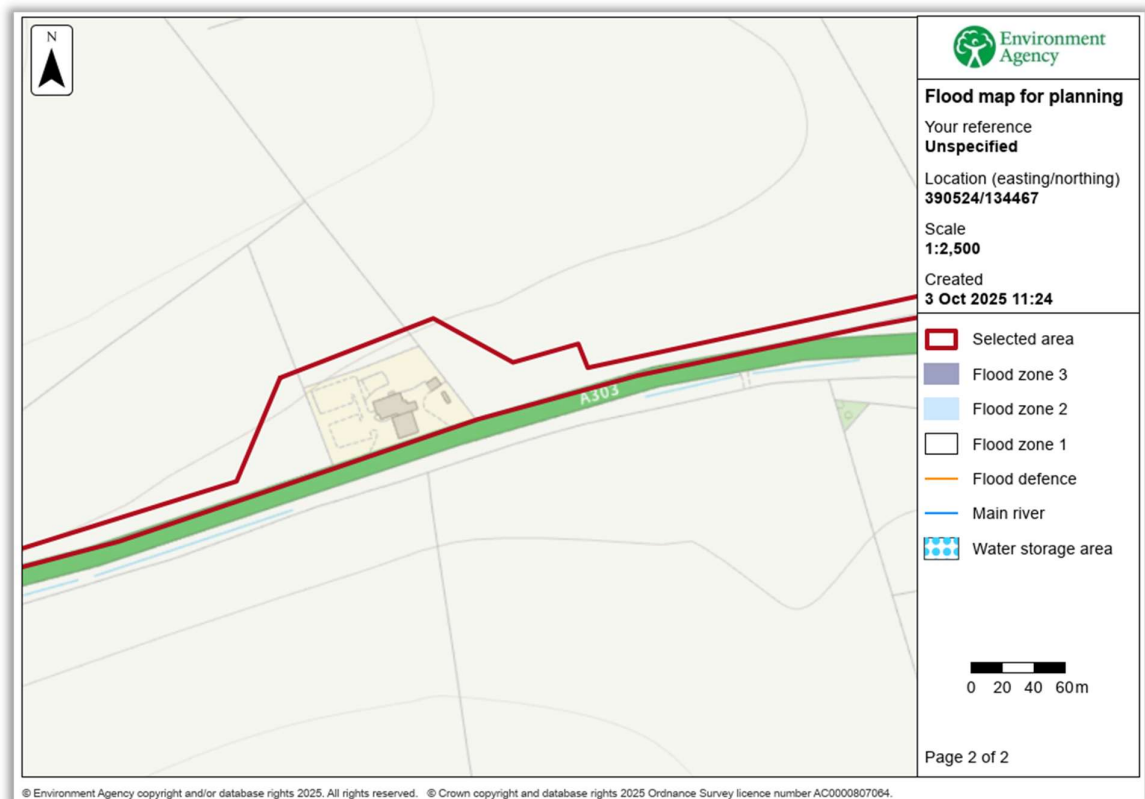


Figure 2: EA Flood map

Topography:

A topographical survey has been undertaken at the site. Refer to **Appendix A**.

Upon review of the topographical survey of the site, it is indicated that for the main service station area, levels broadly fall in a Southerly direction. The levels fall from a high point of 149.00m AOD to 143.35m AOD. The surrounding area falls are generally consistent with this although the further east of the site you go, the more the direction of fall starts to change to heading South-East. For further details on the topography, refer to the survey.

Geology:

The online British Geological Survey (BGS) mapping provides information on the Bedrock Geology and Superficial Deposits. Bedrock is noted as Seaford Chalk Formation and the Superficial Deposits are noted as clay, silt, sand and gravel. See extracts from BGS below.

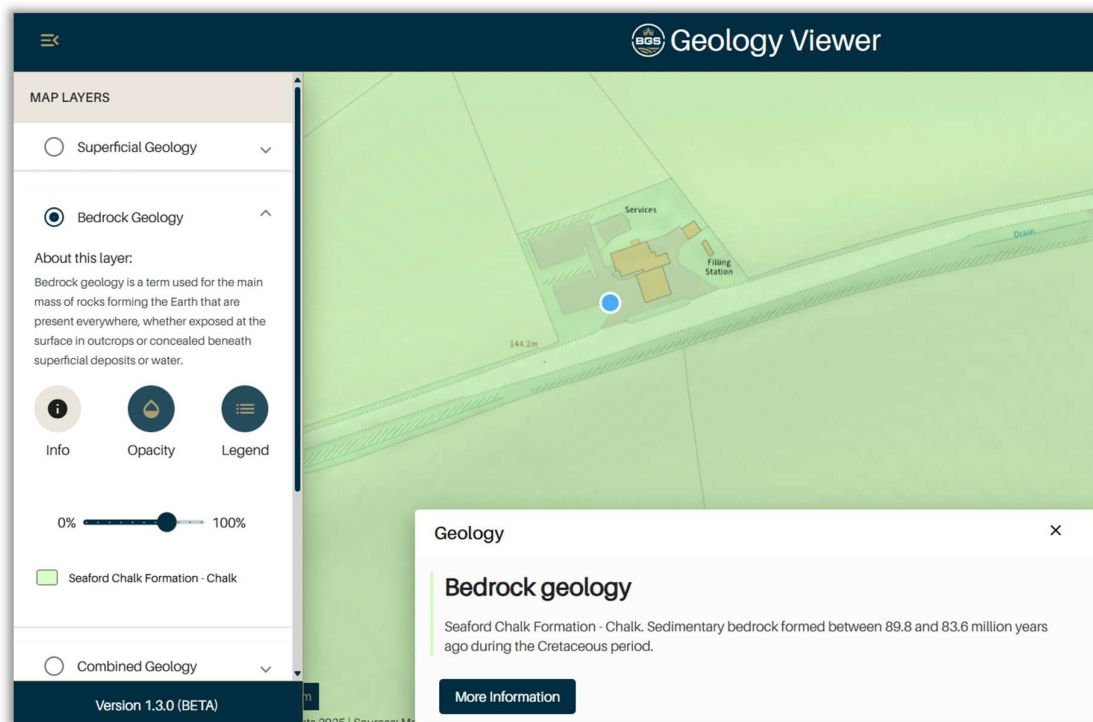


Figure 3 : BGS – Bedrock Geology map

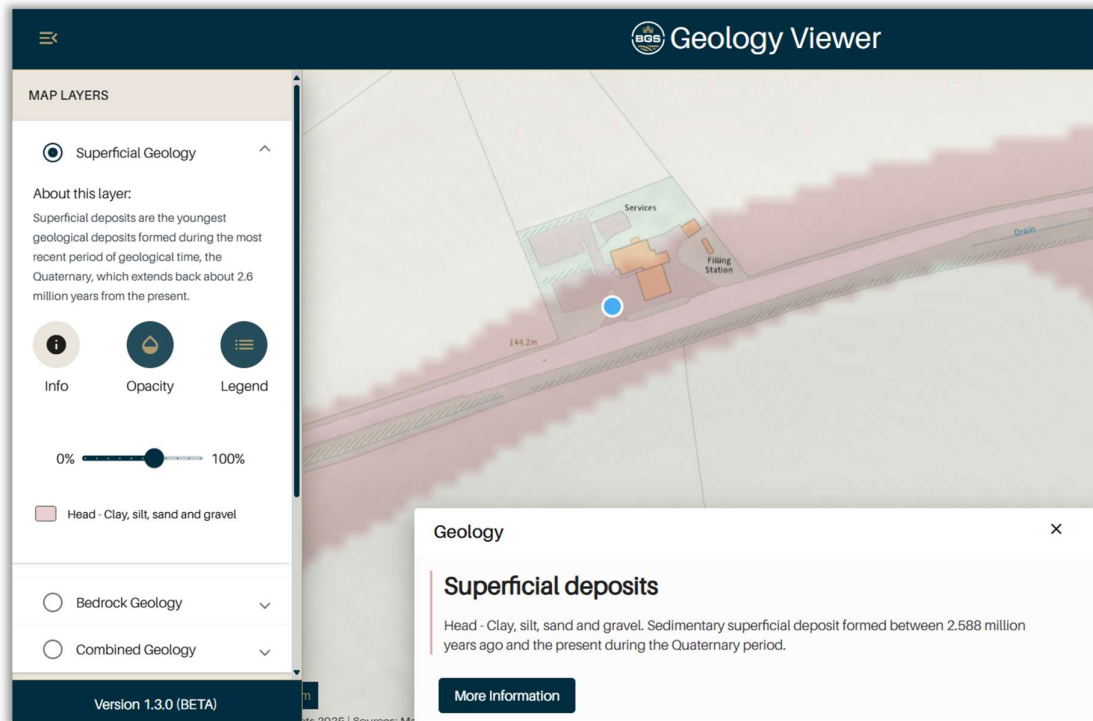


Figure 4 : BGS – Superficial Deposits map

A Geological Appraisal was conducted in December 2022 by ACS providing further details on the soil conditions. See soil conditions extracted below from the Geological Appraisal. For a copy of the full report refer to **Appendix B**.

Table 1: Summary of Trial Pit Geology

Geological Unit	Exploratory Holes	Depth to Base (mbgl)	Unit Description
Topsoil/Subsoil	All	0.30-0.40	Brown slightly sandy slightly gravelly SILT. Gravel comprised fine to coarse angular to sub-rounded flint and chalk.
Head	TP01-TP05	1.00-2.00	Brown gravelly SILT. Gravel is fine to coarse angular to rounded flint.
Seaford Chalk Formation (Dc)	All	Proven to 2.70	Structureless CHALK composed of sandy silty, angular to sub-rounded, fine to coarse GRAVEL. Gravel is very weak, low density, and white. Matrix is uncompact and cream. (Grade Dc).

Figure 5 : ACS Geological Appraisal – Typical Geological Profile

Hydrogeology:

The British Hydrogeological Survey mapping shows that the site is underlain by a Principal Aquifer.

The published site hydrogeology map is illustrated below in **Figure 6**.

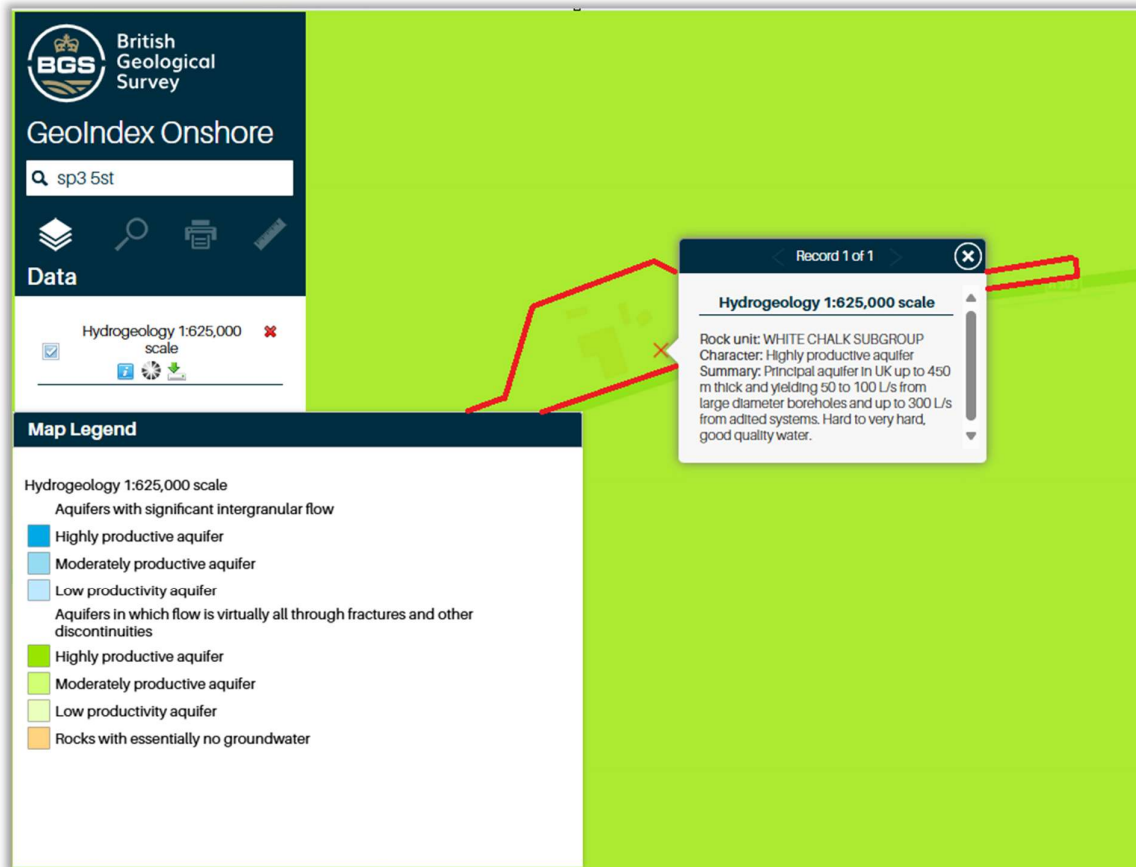


Figure 6: BGS Hydrogeological Survey Map

The Environment Agency Source protection zone map indicates that the Western half of the site is located within Source Protection Zone 3 (SPZ3) Total Catchment and the Eastern half of the site is located within Source Protection Zone 2 (SPZ2) Outer Protection Zone.

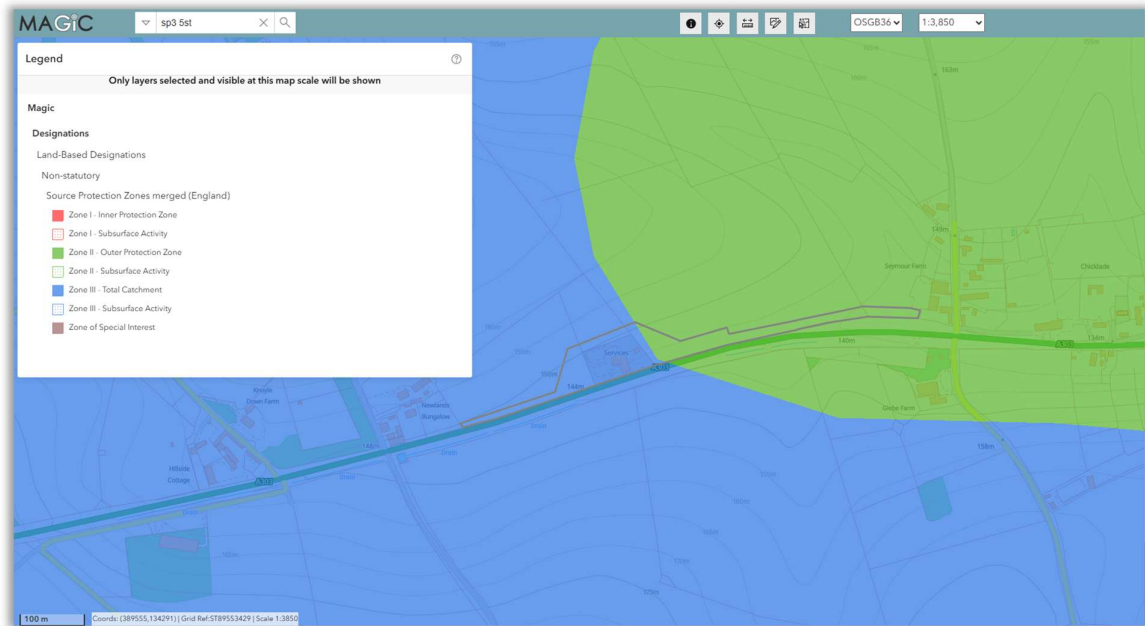


Figure 7 : EA Source Protection Zone mapping

Hydrology:

The Environment Agency (EA) online mapping indicates that the nearest 'Main River' is a tributary to the Fonthill Lake, which is located approximately 2.5k South East of the proposed site.

During the Geological Appraisal, trial pits were excavated to a depth of 2.7m. Groundwater was not encountered, trial pits were dry with no groundwater seepage. Further Site Investigation works are currently underway at the site and preliminary feedback notes that groundwater has not been encountered when undertaking a number of 10 metre boreholes.

The Environment Agency (EA) online mapping indicates that the entire site lies in a drinking water safeguard zone (groundwater).

Soakage testing was undertaken on the site during August 2022 and November 2025. The testing carried out was fully BRE 365 compliant. Refer to **Appendix C** for the soakage testing results.

Existing Drainage:

There are no public sewers in the area of the site. All drainage on the site is private and therefore maintained by the owner or owner appointed maintenance company.

The large hard paved area of roads, service station and parking, along with the buildings, are all served by a private gravity fed surface water system discharging to ground via onsite private soakaways. The surface water runoff passes through a petrol interceptor prior to the soakaway. This existing surface water system is understood to be inadequate and undersized, particularly compared to modern standards.

The foul water generated by the site is served by a gravity fed foul water system that conveys all flows to a sewage treatment plant located to the eastern edge of the site.

Refer to **Appendix A** for a copy of the Topographical Survey showing the existing drainage arrangements. .

3. Proposed Development

Development Description:

The proposed redevelopment involves the demolition of the service station, removal of all petrol tanks, existing drainage and the erection of a new service station comprising electric vehicle charging points, shop, restaurant/café, toilets and associated infrastructure, parking and landscaping. An amended site access is proposed from the A303, which is to be provided under a Section 278 highway agreement by another consultancy.

Refer to **Appendix D** for a copy of the Architect's Site Plan detailing the development proposals.

4. Proposed Drainage Design

The Drainage Design described below can be found in **Appendix E** along with details, exceedance routing plan, catchment plan and supporting surface water and foul water calculations.

Foul Water:

A new foul water drainage network will be required to serve the proposed development.

The Building Regulations Part H1 states that an adequate system of drainage shall be provided to carry foul water from appliances within the building to one of the following, listed in order of priority:

- A public sewer; or, where that is not reasonably practicable,
- A private sewer communication with a public sewer; or, where that is not reasonably practicable,
- Either a septic tank which has an appropriate form of secondary treatment or another wastewater treatment system; or, where that is not reasonably practicable,
- A cesspool.

A connection to the public sewer network has been discounted due to the lack of public sewers within the area of the site.

A connection to a private sewer network has been discounted due to there being none within the area of the site.

The next discharge option in the list above is a sewage treatment plant and associated drainage field, which is the chosen option for this site, due to the known infiltration available on the site.

The new foul water drainage system is a traditional gravity fed pipe and manhole system collecting all flows generated by the site and conveying them to the low end of the site in the South-east corner, where flows are discharged into a treatment plant. A grease separator is proposed within the foul water system prior to the treatment plant, to serve the kitchen within the building. The flows from the treatment plant are pumped from the treatment plant to a large drainage field for secondary treatment and discharge to ground. The foul water system has been designed and sized to cater for the anticipated flows generated by the site. The foul water drainage field has been designed in accordance with British standard guidance BS6297-2007+A1 2008. The VP rate used within the calculations for the drainage field design has been derived by converting a soakage test rate recorded on site. Refer to **Appendix E** for a copy of the foul water calculations.

An environmental permit will be required in order to allow the treated foul water to infiltrate to ground.

Surface Water:

Current legislation and guidance requires developers to manage surface water runoff from new developments to mitigate flood risk to the site and the surrounding area, and also provide a sustainable means of disposing of runoff from impermeable areas.

Based on the Non-statutory Technical Standards for Sustainable Drainage: Practice Guidance, surface water runoff should be disposed of according to the following hierarchy:

- Into the ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain, or another drainage system;
- To a combined sewer.

It is proposed to utilise infiltration to ground to dispose of the surface water generated by the site.

The proposed surface water drainage strategy utilises infiltration throughout the development in various forms. The majority of the hard paved pedestrian and vehicular surfaces are permeable paved, infiltrating runoff landing on them to ground. The two main trafficked aisles through and around the main parking areas are of impermeable construction with surface falls towards the permeable parking bays, ensuring runoff drains to ground within the parking bays. The aisles cannot be drain to ground below the aisles due to extensive layout of service cables encased in concrete proposed below them for electric vehicle (EV) charging. Refer to **Appendix F** for a Layout showing the EV cabling. Part of the entrance road and turning areas at the end of the main parking areas drain to ground via the infiltration swale arrangement proposed in the field to the east of the site.

The turning area to the north of the site behind the building is drained to ground via a soakaway. The service yard to the north of the site behind the building drains into a filter drain which infiltrates to ground and also connects to a soakaway for additional capacity to infiltrate to ground. The entire building runoff is drained to ground via a soakaway proposed to east of the building. All of the surface water system is drained via gravity.

The surface water system has been designed to cater for the 1 in 100 year storm event plus 45% allowance for climate change. An additional 10% urban creep has been added to the roof area catchment within the calculations. No flooding occurs. All infiltration devices have been designed based on BRE 365 compliant soakage test results. Refer to hydraulic calculations and associated Catchment plan within **Appendix E**. All infiltration devices have been positioned 10 metres away from the A303 road.

Exceedance:

Exceedance flows and routing will remain as per the existing scenario. However, the new surface water drainage system provides a modern drainage system with greater spare capacity to cater for exceedance events. Exceedance flows are maintained and dealt with onsite and do not affect or impact the A303. Refer to **Appendix G** for the Exceedance Plan.

5. Sustainable Drainage Systems & Water Quality

The site is located across both Source Protection Zones 2 (SPZ2) and 3 (SPZ3), with the main site located within SPZ3 and the eastern end of the site located in SPZ2.

Due to the site proposals and constraints approved at planning, it is not possible to position the foul water discharge point within the main site area and the less sensitive SPZ3. The land take for the drainage field is large and can only be accommodated to the east of the site within the adjacent field. This area is the more sensitive SPZ2.

However, the discharge level is close to the surface allowing plenty of filtration before flows reach the groundwater table, which is over 10 metre below ground level. Groundwater was not encountered in the 10 metre deep boreholes performed onsite. Furthermore, the foul water will be treated to a very high standard by the treatment plant, prior to reaching the drainage field.

The foul water drainage proposals include a number of treatment processes including a grease separator treatment unit to serve the kitchen's waste, a sewage treatment plant and a drainage field treatment serving all foul water generated by the site. The treatment plant is a bespoke Bio-bubble treatment plant by Advanced Aeration comprising of screen chamber, balance tank and reactor tank.

The proposed treatment processes for the foul water drainage system are considered to offer a high standard of treatment and therefore deemed to be acceptable to be discharged to ground within SPZ2.

The surface water discharge points are mostly at source or as close as possible to source. This allows for the majority of surface water runoff to be discharged within the main site area and SPZ3 area. Due to site constraints, it is not possible to discharge all surface water within the main site area and SPZ3. A small percentage of surface water will be discharged to the field to the east of the main site and within SPZ2.

The surface water drainage proposals include a number of treatment processes including a SPEL Smartceptor bypass separator/catchpit, two SPEL ESR bypass separators, porous paving, a filter drain, soakaways and an infiltrating swale system.

The proposed treatment processes for the surface water drainage system are considered to offer a high standard of treatment and therefore deemed to be acceptable to be discharged to ground within SPZ2 and SPZ3.

The “pollution hazard indices for different land use classifications” table has been extracted from CIRIA C753 The SuDS Manual, and applied to the development proposals. The highest pollution hazard level for the proposed development is deemed to be ‘medium’. The treatment process applied within the surface water drainage design, noted in sections 4 and 5 above, provide sufficient treatment for all runoff generated by the site. It is therefore considered suitable to discharge the surface water to ground within Source Protection Zones 2 and 3. Refer to **Appendix H** for Water Quality Risk Management providing details of the Pollution Hazard Indices and the SuDS Mitigation Indices.

6. SuDS Management & Maintenance

Maintenance of the drainage system and SuDS features would be carried out in accordance with CIRIA C753 The SuDS manual to minimise the residual flood risk of drainage system blockage.

Maintenance would be the responsibility of Instavolt to assign to an appropriate maintenance company, however the maintenance requirements have been extracted from The SuDS Manual and are presented in **Appendix I**.

7. Conclusion & Recommendations

The proposed surface water drainage strategy is one that utilises infiltration to ground at source for the majority of the site with part of the site infiltrating to ground as close as possible to source. A number of treatment processes including a SPEL Smartceptor bypass separator/catchpit, two SPEL ESR bypass separators, porous paving, a filter drain, soakaways and an infiltrating swale system will treat the surface water to a high level and are therefore deemed suitable for discharge to ground within SPZ2 and SPZ3.

The surface water system has been modelled with InfoDrainage design software for all storm events up to and including the 100 year event with a 45% allowance for climate change and additional 10% for urban creep. The results show that there is no flooding and therefore no impact on the public A303 road. Surface water drainage calculations are provided within this report. The Swales are positioned 10 metres or more away from the road and will not impact it.

Maintenance will be provided for the lifetime of the development by the appointed maintenance company. Maintenance details are provided within this report.

The surface water proposals are shown to adequately serve the site with water cleansed to high quality levels so as to be suitable for discharge to ground within Source Protection Zones 2 and 3.

The foul water proposals are for a gravity fed pipe and manhole system collecting all flows generated by the site and conveying them to a bespoke sewage treatment plant for initial treatment. Secondary treatment will be provided by a drainage field.

The foul water proposals are shown to adequately serve the site with foul water cleansed to a high level so as to be able to be discharged to ground within Source Protection Zone 2. An EA permit will be required in order for treated foul water to be able to be discharged to ground.

In conclusion, the proposed drainage design is an up to date system meeting current national and local design standards. It is deemed suitable; to serve the site without increasing flood risk on or off site, to discharge cleansed surface within SPZ2 and SPZ3 and foul water within SPZ2 at acceptable levels, to not impact the A303 road, and will be maintained throughout its entire design life.