SUDS REPORT FOR 72 FERRERS AVENUE, WEST DRAYTON, UB7 7AB

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1. INTRODUCTION

1.1 Appointment

Nimbus Engineering have been appointed by Mr Whitley to provide a detailed solution on the management of Surface Water run off and to ensure that there is no risk of flooding caused by the demolition of the existing bungalow and construction of the proposed Scandia Hus dwelling, with associated drive way, and landscaping, at 72 Ferrers Avenue, West Drayton, UB7 7AB.

1.2 Objectives

This report will provide information on a suitable Sustainable Urban Drainage System (SuDS) in order to reduce the surface water run off leaving the site and show that the proposed development will not increase Flood Risk at the site or elsewhere.

1.3 Limitations

The general limitations of this report are:

- A number of data and information sources have been used to prepare this report. Whilst Nimbus Engineering believes them to be trustworthy, Nimbus Engineering is unable to guarantee the accuracy of data and information that has been provided by others;

- This report has been prepared using the best data and information that was available at the time of writing. There is the potential for further information or data to become available, leading to changes in the conclusions drawn by this report, for which Nimbus Engineering cannot be held responsible.

2. GEOLOGY OF THE AREA

According to the British geological survey, the site is listed as 'alluvium', which consists of an amalgamation of clay, silt, sand and gravel, as shown in Figure 1, below. The bedrock in the area is a part of the London Clay Formation, consisting of clay, and silt, as shown in Figure 2, below.

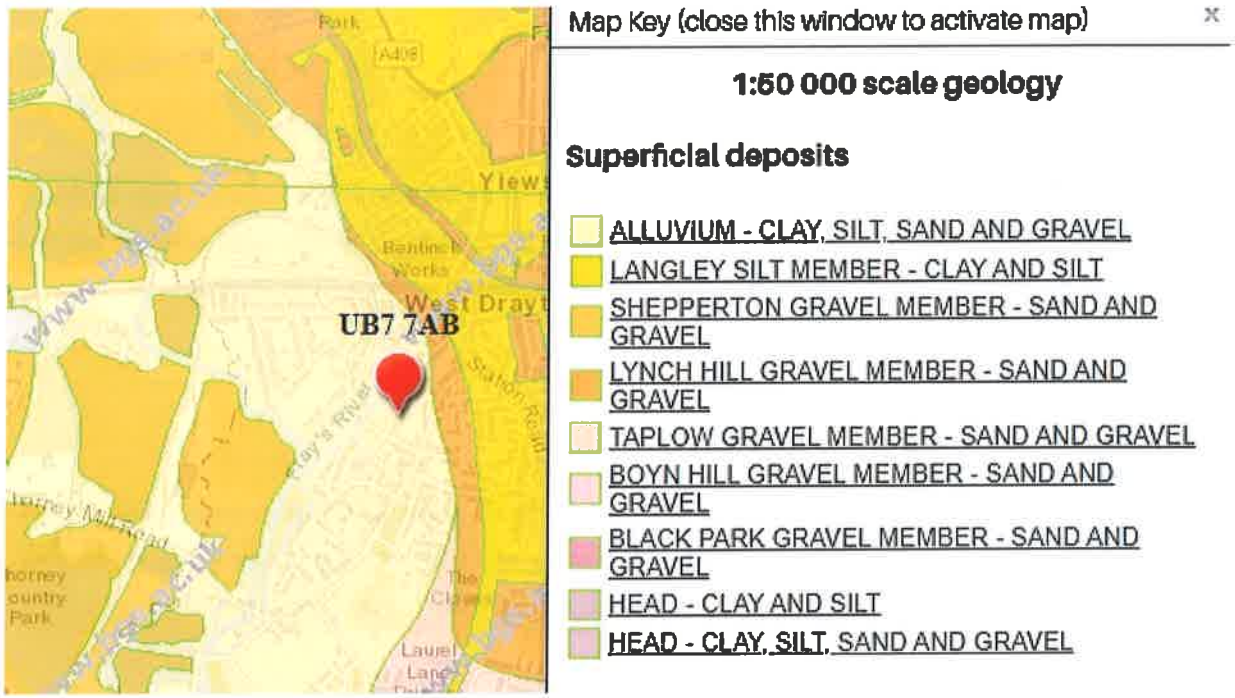


Figure 1 - Superficial deposits at the site. (Source: British Geological Society Website (Contains British Geological Survey materials © URKI [2020]. Base mapping is provided by ESRI)).

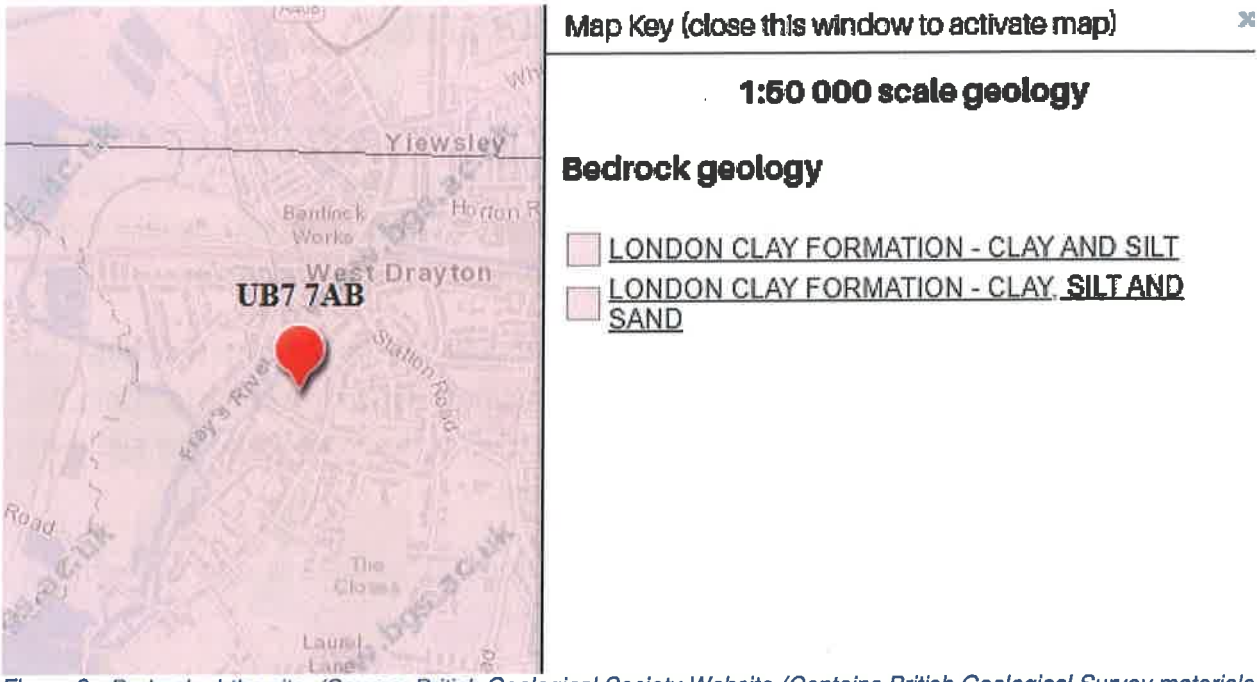


Figure 2 - Bedrock at the site. (Source: British Geological Society Website (Contains British Geological Survey materials © URKI [2020]. Base mapping is provided by ESRI)).

3. SUSTAINABLE URBAN DRAINAGE SYSTEMS

The total area of the site is 589 m^2, and the existing impermeable areas at the site are 234 m^2. Following the development proposals, the impermeable areas at the site will have increased to 259 m^2, consisting of the roof area of the proposed development, as well as the proposed hardstanding areas, prior to any SuDS mitigation.

Surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

Reducing the rate of surface water discharge from urban sites is one of the most effective ways of reducing and managing flood risk.

Traditional piped surface water systems work by removing surface water from our developments as quickly as possible, however this can cause various adverse impacts:

- Increased downstream flooding, and sudden rises in flow rates and water levels in local water courses.
- Reduction in groundwater levels and dry weather flows in watercourses.
- Reduce amenity and adversely affect biodiversity due to the surface water run-off containing contaminants such as oil, organic matter and toxic materials.

SuDS are defined as a sequence of management principles and control structures designed to drain surface water in a more sustainable fashion than conventional piped drainage techniques. SuDS should utilise the natural landscape of an area which as well as slowing down the rate of runoff provides a number of environmental, ecological and social benefits.

These include:

- Protection and enhancement of water quality. As well as providing on-site attenuation, SuDS treat the water, resulting in an improved quality of water leaving the site. This is achieved when the water passes through fine soils and the roots of specially selected plants. Pollutants washed off the hard landscaping by rainfall will be safely removed before the water reaches the natural receiving water course.

- A sympathetic approach to the environmental setting by providing opportunities to create habitats for flora and fauna in urban watercourses and open spaces.

- Meeting the amenity and social needs of the local community and residents in the creation of attractive green spaces.

The various types of SuDS include:

Permeable paving	
Soakaways;	
Swales and basins;	
Bioretention/ rain gardens;	

Green roofs and rainwater re-use;	

Preferably a combination of these techniques should be used as part of the surface water management train, and it is important for all stakeholders, such as developers, architects, landscape architects and engineers to work in order to determine a feasible solution.

4. PROPOSED SOLUTION

In order to ensure that the SuDS management train has been considered fully:

All hardstanding areas will be formed of permeable surfacing underlain by a hydrocarbon removing geotextile membrane at the driveway areas to ensure there is no contamination of the receiving groundwater, in order to deal with as much of the surface water run off at source.

Furthermore, we have proposed two rainwater harvesting tanks from the downpipes at the rear of the house, which will ensure that surface water run off from the roof is re-used and dealt with at source.

All remaining run off from the above will then be conveyed into an attenuation tank, which has been sized for a 1 in 100 year plus 40% climate change storm event. The proposed SuDS solution can be found on the drawings in Appendix A.

The surface water leaving the proposed development site will be discharged into the river to the rear of the site at a controlled rate of 0.475 l/s.

All surface water run off calculations have been provided in Appendix B.

5. TIMESCALE AND MAINTENANCE OF WORKS

All drainage works shall be completed prior to occupation and there shall be no adoption of any of the drainage works within the site. The owner of the site will be responsible in overseeing the long term, maintenance of all drains. The following outline maintenance strategy sets out recommended timescales for maintenance of the proposed drainage works, in line with CIRIA SuDS Design Guide:

- Regular inspection will comprise the inspection and cleaning of catchment, gutters, filters and tanks to reduce the likelihood of contamination, this is recommended to be carried out every 3 to 6 months.

- Jet washing of permeable surfaces should be undertaken every 3 to 6 months in order to ensure that the system works properly

- The catch pit chamber to the attenuation tank should be emptied every 3 months, and after every large storm event to ensure that there are no blockages.

The following table outlines the maintenance requirements for the new permeable paving:

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations or clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this is the most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48hr after large storms in six months
	Inspect slit accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 1: Operation and maintenance requirements for pervious pavements.

The following table outlines the maintenance requirements for the new rainwater harvesting systems:

Maintenance schedule	Required action	Typical Frequency
Regular maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdraw devices, overflow areas, pumps, filters	Annually (and following poor performance)
	Cleaning of tank, inlets, outlets, gutters. Withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
Occasional maintenance	Cleaning and/ or replacement of any filters	Three monthly (or as required)
Remedial actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

Table 2: Operation and maintenance requirement for RWH systems.

The following table outlines the maintenance requirements for the new attenuation storage tank:

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that re not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment pre-treatment structures and/or internal forebays.	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required
	Inspect slit accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 3: Operation and maintenance requirements for attenuation storage tanks

6. CONCLUSIONS

The purpose of this report and associated drawings, is to satisfy the local planning authority that the surface water run of arising from the proposed development will be dealt with at source, through the use of Sustainable Urban Drainage Systems.

The timetable of works is to complete all drainage prior to occupation of the dwelling, and maintenance requirements are also included in this report.

APPENDIX A – DRAWINGS