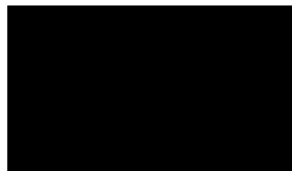


# Drainage and Maintenance Statement



The Civil Engineering Practice  
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George Street  
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Sussex BN41 1RA



Project Clays Farm, North End Road, Yapton  
Project Number 22997  
By Tom Zajac  
Date 5 April 2018

## Proposed Development

The development proposals are for the construction of up to 30 dwellings together with associated vehicular and pedestrian access, car and cycle parking.

This Statement has been produced in support of an Outline Planning Application.

The development site is located on the west side of North End Road in Yapton, West Sussex at grid reference TQ 977 034, Postcode BN18 0DU.



*Existing Site – Google Map Extract*

The site is bounded to the north and the west by undeveloped farm land, the south by Yapton Community Pre-School and the east by residential properties.

The River Arun is located 2.5km to the east of the site.

The site is approximately 1.68 ha in area with ground level varying between 7.9m and 5.8m AOD and a general slope to the west.

The site currently accommodates farm house buildings and undeveloped farm land to the west and existing vehicular access to the east which provides access to North End Road (B2132).



The Civil Engineering Practice Ltd  
Registered Number 278754 England

The site location plan, existing site and proposed site layouts are attached in Appendix 1 at the rear of this Statement.

## Design Criteria

The surface water drainage system has been designed in accordance with the National Planning Policy Framework (NPPF), its accompanying Guidance and Technical Standards for SuDS. It also complies with the requirements under Building Regulations Part H.

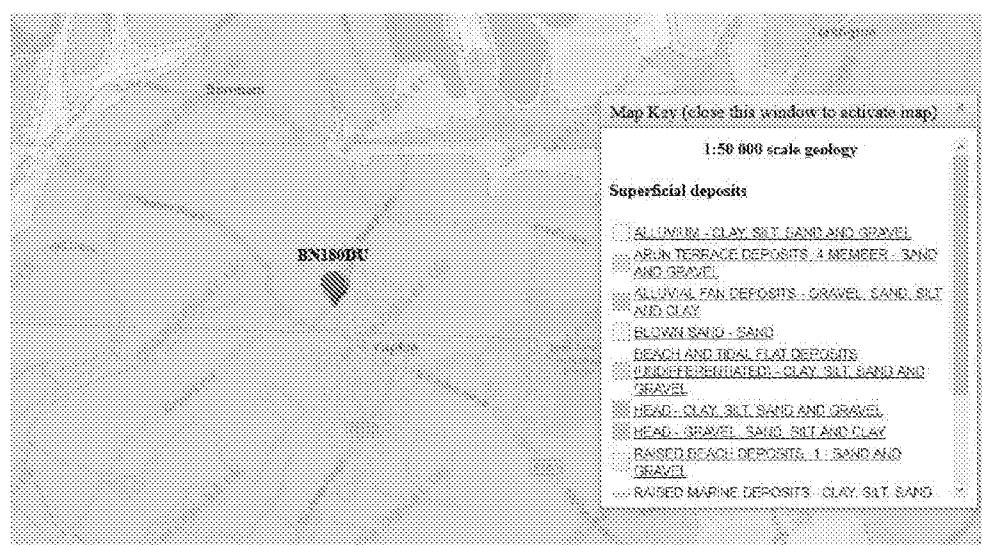
The surface water drainage system incorporating storage/infiltration has been designed to accept the discharge from a 100 year return period pluvial event with a further 40% allowance for future climate change.

In accordance with CIRIA SuDS Manual 2015 (Report C753), NPPF and Building Regulations Part H surface water drainage design follows a discharge destination hierarchy ranging from infiltration to ground as first priority before consideration of discharging to a watercourse and as a last resort discharging to a public sewer.

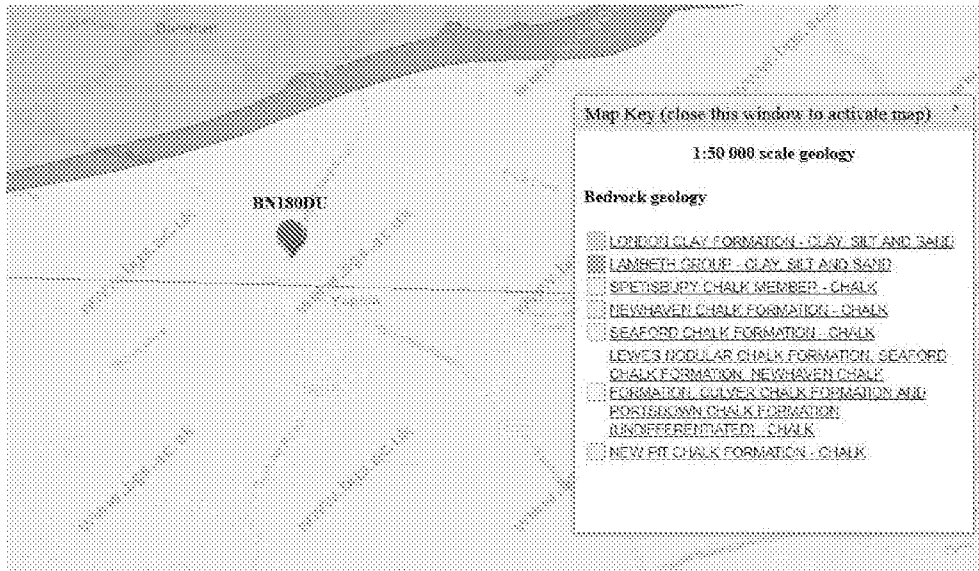
The foul drainage system has been designed to Sewers for Adoption 7th Edition.

## Geology

The available information and borehole logs hosted on the British Geological Survey notes the site is located within the area underlain by Lewes Nodular Chalk Formation overlain by River Terrace Deposits comprising sand, silt and clay layers.

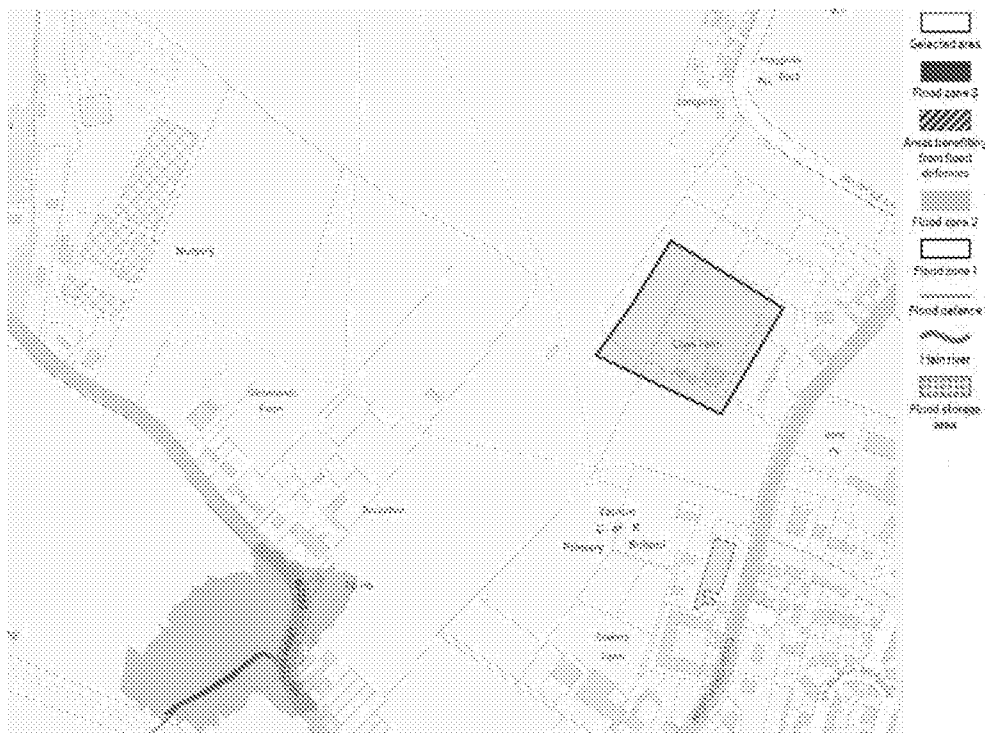


**BGS Superficial Geology Map Extract**



### **BGS Bedrock Geology Map Extract**

The Environment Agency Flood Map indicates the proposed site to be within an area identified as Flood Zone 1 and as not affected by flooding from any source.



### **Environment Agency Flood Map Extract**

From publicly available topographical survey information for the area there is no indication of any existing drainage system within the proposed site. It has been assumed that the existing site including the existing outbuildings and other impermeable areas naturally drain to ground with overland flow.

The available BGS borehole log information indicates groundwater level varying between 1.6m – 2.0m below ground level.



|                                    |                                                                                   |                                      |            |            |                |
|------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------|------------|------------|----------------|
| SU 90 SE 29 2738 8335              |                                                                                   | North-east end of Drive Lane, Tipton |            | Block 8    |                |
| Surface level +6.8 m               |                                                                                   |                                      |            | Overburden | 2.4 m          |
| Water struck at +1.9 m             |                                                                                   |                                      |            | Mineral    | 1.6 m          |
| October 1981                       |                                                                                   |                                      |            | Bedrock    | 2.3 m+         |
| LOG                                |                                                                                   |                                      |            |            |                |
| Geological classification          | Lithology                                                                         | Thickness<br>m                       | Depth<br>m |            |                |
|                                    | Soil                                                                              | 0.5                                  | 0.5        |            |                |
| Brickearth                         | Clay, brown, silty                                                                | 1.4                                  | 1.9        |            |                |
| Raised Beach Deposits<br>(younger) | Silt, chalky, with chalk pebbles                                                  | 1.0                                  | 2.9        |            |                |
|                                    | 'Very clayey' sandy gravel                                                        | 1.8                                  | 3.9        |            |                |
|                                    | Gravel: coarse with flint dominant, and fine<br>with chalk dominant; some nodules |                                      |            |            |                |
|                                    | Sand: fine with some medium and coarse; coarse<br>mostly chalk                    |                                      |            |            |                |
|                                    | Fines: silt and clay, chalky                                                      |                                      |            |            |                |
| Upper Chalk                        | Chalk, noddy, soft, silty and sandy to 6.0 m                                      | 2.3                                  | 6.2        |            |                |
| GRAINING                           |                                                                                   |                                      |            |            |                |
| Mean for deposit<br>percentages    | Depth below<br>surface (m)                                                        | Percentages                          |            |            |                |
| Fines Sand Gravel                  |                                                                                   | Fines                                | Sand       | Gravel     |                |
|                                    |                                                                                   | <2                                   | +2 -4      | +4 -16     | +16 -64 +64 mm |
| 24 38 37                           | 2.9-3.8                                                                           | 35                                   | 28         | 4          | 8 10 14 3      |

## BGS Borehole Log Extract.

Extract of the British Geological Survey map extracts together with borehole information are attached in Appendix 2 at the rear of this Statement.

## Surface Water

From Table 25.1 SuDS Manual the typical infiltration coefficient based on soil texture for Silty Clayey Sand is anticipated to vary between  $1 \times 10^{-4}$  and  $3 \times 10^{-5}$  m/s.

The infiltration viability should be given full consideration where rates of  $10^{-6}$  m/s or greater exist on the site.

A geotechnical investigation together with onsite percolation tests based on BRE 365 Digest method will be undertaken to confirm the achievable percolation rates and groundwater levels.

Groundwater level will be investigated to ensure that the base of the proposed infiltration components is at least 1m above the maximum groundwater level taking account of seasonal variations in levels and any underlying trends. A 1m separation distance ensures a depth of unsaturated soils to help ensure the infiltration performance of the component and protect underlying groundwater from contamination.

Surface water calculations have been undertaken on the assumed infiltration rate of  $1 \times 10^{-5}$  m/s.

Surface water runoff from the proposed site will be collected and discharged into the shallow soakaways.

The proposed surface water drainage system will be designed to accommodate all storm events up to 1 in 100 year rainfall event including 40% allowance for climate change.

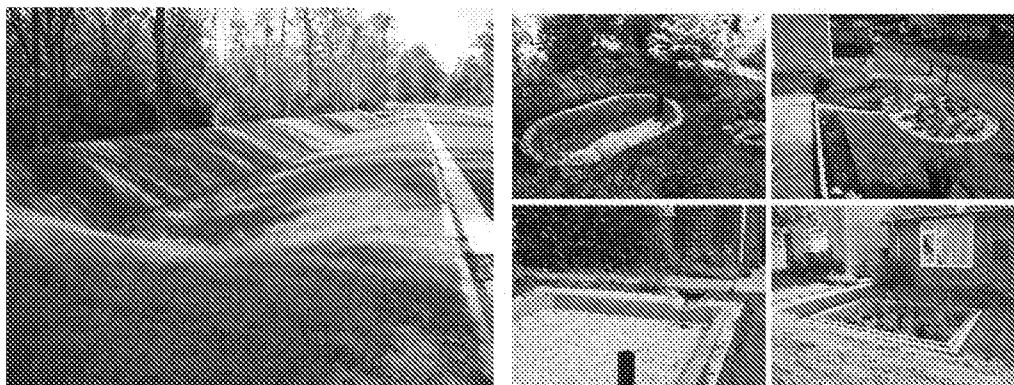
## Surface Water Quality

Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types and uses and defines residential roofs to be at very low potential for pollution. The table below summarises the anticipated pollution hazard index from the proposed development.

| Land Use                                         | Pollution hazard level | Total suspended solids (TSS) | Metals | Hydro-carbons |
|--------------------------------------------------|------------------------|------------------------------|--------|---------------|
| Residential roof                                 | Very low               | 0.2                          | 0.2    | 0.05          |
| Individual property driveways, low traffic roads | Low                    | 0.5                          | 0.4    | 0.4           |

Using the worst case for the low risk element to mitigate water quality the site will need to provide SuDS elements with mitigation indices that equal or exceed the hazard index above.

To meet the mitigation indices and provide treatment for all surface water runoff the proposed surface water system will incorporate a combination of permeable surfacing, dry swales or bio retention units and raingardens which together with catchpits and road gullies will provide additional settlement for suspended solids before discharging into the ground.



***Typical Highway Swale and Raingarden examples***

The following table details the mitigation indices for the proposed drainage system. Where multiple drainage components are used in series the

individual mitigation index of secondary and tertiary components are lowered due to reduced performance associated with primary treatment. The total mitigation indices with the combined surface water drainage system is as follows:

| Highway/Parking Areas | Mitigation Indices           |        |               |
|-----------------------|------------------------------|--------|---------------|
| SuDS Type             |                              |        |               |
|                       | Total suspended solids (TSS) | Metals | Hydro-carbons |
| Swale                 | 0.5                          | 0.6    | 0.6           |
| Bioretention System   | 0.8                          | 0.8    | 0.8           |
| Permeable Surface     | 0.7                          | 0.6    | 0.7           |

The mitigation indices for the proposed drainage network will be in excess of the minimum level required to achieve effective treatment as suggested in C753 The SuDS Manual and therefore the risk of pollution of receiving water from the site has been mitigated.

## Foul Water

Available Southern Water network asset information indicates that there is an existing public foul sewer along North End Road to the east of the site.

Other available survey information indicates that there is no existing foul sewer connection from the site.

Any new connection will be subject to agreement with Southern Water under Section 106 of the Water Industry Act 1991.

Foul drainage can be discharged to the existing 150mm diameter public sewer beneath North End Road.

Taking account of the existing topography of the site and depending upon the final designed layout for the site an onsite pumping station may be required to discharge into the public foul sewer.

It is assumed that a Type 2 Pumping Station (typically for six to twenty dwellings) may be required to serve the proposed development.

From 1 April 2018 Southern Water has introduced a new Infrastructure Charging System and confirmed that where a connection can be undertaken using the same size or smaller diameter pipe as the existing public sewer there is no requirement for offsite improvement works.

It is proposed that both surface water and foul water sewers within the site will be kept privately maintained by a Maintenance Management Company and Property Owners.

The Impermeable Areas Plan, Storm Water Calculations and Indicative Surface Water and Foul Drainage Layout are attached in Appendix 3 at the rear of this Statement.



## Indicative Schedule of Maintenance

Once appointed the Contractor will prepare a site specific method statement for the control of silt and other pollutants during construction. CIRIA Report C532, Control of water pollution from construction sites, provides further guidance on this.

The Contractor will maintain the proposed drainage system during construction and until the handing over of the site. Upon completion the maintenance will be passed on to the property owner.

The attached maintenance schedule details the typical tasks to be undertaken at different intervals.

## Indicative Schedule of Maintenance for the Proposed Drainage System:

| Maintenance Schedule   | Required Action                                                                           | Frequency                    |
|------------------------|-------------------------------------------------------------------------------------------|------------------------------|
| Regular Maintenance    | Remove sediment and debris from silt trap chambers, ACO channels and inlet chambers       | 6 monthly                    |
|                        | Litter and debris removal – above ground/Bioretention Units                               | Monthly or as required       |
|                        | Litter and debris removal – Catch Pits                                                    | Monthly or as required       |
|                        | Surface and Foul water pipe work – jetting/rodding                                        | Every 2 years or as required |
|                        | Manage other vegetation and remove nuisance plants – aesthetics                           | As required                  |
|                        | Visual Inspection of permeable driveway for defects and settlement                        | Annually                     |
|                        | Sweeping/brushing of permeable driveway                                                   | Twice Annually               |
| Irregular Maintenance  | Remove debris/blockages to silt traps/ACO Channels                                        | As required                  |
| Corrective Maintenance | Repairs to access chambers/MH covers                                                      | As required                  |
|                        | Replace any broken permeable blocks/surface, remedial works to any depressions or rutting | As required                  |
|                        | Inspect inlet, outlet from downpipe and gullies for blockages, standing water and clear   | As required                  |

**Clay Farm, North End Road, Yapton  
 Drainage System Maintenance Summary Sheet:  
 For Maintenance Management Company**

| <b>Inspection/<br/>Action<br/>Required</b> | <b>Gullies/<br/>ACO<br/>Channels<br/>/ Gutters</b> | <b>Catchpits/<br/>Silt Traps/</b> | <b>Bioretention<br/>Units</b> | <b>Permeable<br/>Surface</b> | <b>Surface<br/>Water<br/>Pipework</b> |
|--------------------------------------------|----------------------------------------------------|-----------------------------------|-------------------------------|------------------------------|---------------------------------------|
| After leaf fall<br>in Autumn               | ✓                                                  | ✓                                 | ✓                             |                              |                                       |
| 6 Months                                   | ✓                                                  | ✓                                 |                               | ✓                            |                                       |
| 1 Year                                     |                                                    |                                   | ✓                             | ✓                            |                                       |
| 2 Years                                    |                                                    |                                   |                               |                              | ✓                                     |

## List of Appendices

- |            |                                                                                                                 |
|------------|-----------------------------------------------------------------------------------------------------------------|
| Appendix 1 | Site Location Plan, Existing and Proposed Site Layouts                                                          |
| Appendix 2 | British Geological Survey Extracts                                                                              |
| Appendix 3 | Impermeable Areas Plan, Storm Water Calculations and Proposed Indicative Surface and Foul Water Drainage Layout |