



Eastlands Lane
Cowfold

Flood Risk Assessment and Drainage
Strategy

For

Eastlands Farm Ltd

Document Control Sheet

Eastlands Lane

Cowfold

Eastlands Farm Ltd

This document has been issued and amended as follows:

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1.0 Introduction

- 1.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been produced by Motion on behalf of their client, Eastlands Farm Ltd. It supports the planning application for the construction of nine residential dwellings on the land at Eastlands Lane, Cowfold, Horsham, RH13 8AQ.
- 1.2 A site layout of the proposed development can be seen in [Appendix A](#).
- 1.3 The 0.5 hectares (ha) site is located within Flood Zone 1 according to the Environment Agency's (EA's) Flood Map for Planning ([Appendix B](#)).
- 1.4 With reference to the EA's Risk of Flooding from Surface Water (RoFSW) map in [Appendix C](#), the site is in the 'very low' surface water flood risk category (areas of less than the 1 in 1,000-year return period).
- 1.5 A drainage strategy is required to demonstrate how the development will manage and discharge surface water generated in all rainfall events up to and including the 1 in 100-year + 45% storm.
- 1.6 This FRA and drainage strategy has been produced to discuss the flood risks to the proposed development, from all sources. This FRA and drainage strategy will also define how the site will manage its surface water so that the development does not increase flood risk in the area or to neighbouring properties/land.
- 1.7 This drainage strategy follows the guidance set out in:
 - ” National Planning Policy Framework (NPPF)
 - ” Planning Practice Guidance (PPG) to the National Planning Policy Framework
 - ” CIRIA SuDS Manual 2015 (C753)
 - ” Environment Agency Rainfall Runoff Management for Developments
 - ” Non-Statutory Technical Standards for SuDS (NSTS)
 - ” New National Standards for SuDS
- 1.8 This FRA and drainage strategy report pertains only to the design of the drainage system for the built site. It does not provide details of how the site will be drained during the construction phase. This is considered to be temporary works and can only be prescribed and provided by the eventual appointed contractor.
- 1.9 Similarly, this report does not provide information on how the drainage infrastructure will be protected during the construction phase of the project. The provision of this information is, again, the responsibility of the appointed contractor and will be secured via a condition.

2.0 Site Description

Table 2.1 – Site Summary

Site Name	Eastlands Lane
Location	Cowfold, Horsham, RH13 8AQ
Grid Reference	East parcel of land: TQ 21820 22273 West parcel of land: TQ 21767 22306
Site Area	The red line boundary of the development is 5,000m ² (0.5 ha)
Development Type	Erection of 9no. dwellings across two parcels of land
Flood Zone	Flood Zone 1
Flood Risk Vulnerability Classification	More Vulnerable
Surface Water Flood Risk	Very Low
Local Water Authority	Southern Water
Local Planning Authority	Horsham District Council (HDC)
Lead Local Flood Authority	West Sussex County Council (WSSCC)

Site Location and Description

- 2.1 The development is located on Eastlands Lane, in Cowfold. A site location plan can be seen in [Appendix D](#).
- 2.2 The existing site consists of greenfield land. The extended area of land to the south of the red line boundary is also owned by Eastlands Farm Ltd.
- 2.3 The proposed development will provide nine residential dwellings. A layout of the proposed development can be seen in [Appendix A](#). The site is across two parcels of land, with seven dwellings proposed on the east side and two dwellings proposed on the west side.
- 2.4 There is woodland on the western side of the development, and immediately adjacent to the site on this boundary within the woodland is a drainage ditch, which is marked on national scale mapping. This drains to a confluence with another ordinary watercourse just to the north of Eastlands Lane. Following Eastlands Lane a single ordinary watercourse flows south before joining the Cowfold Stream, a more significant watercourse that flows west-east in the bottom of the valley.

Topography

- 2.5 A topographic survey has been completed, with results displayed in [Appendix A](#) as part of the proposed site layout.
- 2.6 The site consists of two separate land parcels. On the east side, elevations range from a high point of approximately 26.40 metres above ordnance datum (mAOD) in the northern corner to a low point near 22.50 mAOD in the southern corner. The west side features a peak elevation of about 26.96 mAOD in its northern corner, dropping to around 23.48 mAOD in the southwest corner. Overall, the site's terrain slopes from north to south, as indicated by the contour lines.

Geology

- 2.7 The British Geological Survey (BGS) online 1:50,000 Geoindex mapping identifies that the underlying bedrock geology is Horsham Stone Member - Sandstone. This Horsham Stone Member area is bordered by Weald Clay Formation - mudstone, so both types are likely present.
- 2.8 There is no listed superficial geology for the site.
- 2.9 The Weald Clay Formation is known to have poor infiltration properties therefore infiltration will not be the primary method of discharging surface water run-off from the site.
- 2.10 Defra's Magic Map online application has been referred to, which lists the soils in the area as 'Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils'.
- 2.11 The nearest available BGS borehole log, reference TQ22SW16 ([Appendix E](#)), is located approximately 885 meters northwest of the site. It provides details of the local geology down to 63 meters Below Ground Level (mbGL). The following geological strata was encountered:
- „ Sandy yellow clay with some small stones down to 5 m
 - „ Blue clay from 5 m down to 7 m
 - „ Dark grey clay from 7 m down to 57 m
 - „ Sandstone and sand from 57 m down to 63 m
- 2.12 Water was struck at 57 meters below datum (mbd).

Hydrogeology

- 2.13 Groundwater Source Protection Zones (SPZ's) are defined around groundwater abstraction sources such as wells, boreholes and springs that are used for public drinking water supply.
- 2.14 SPZ's show the risk of contamination to groundwater from any activities that might cause pollution in the area. The closer the activity to the source of abstraction, the greater the risk. The maps show three main zones; inner – Zone 1; outer – Zone 2 and; total catchment – Zone 3.
- 2.15 Defra's Magic Map was reviewed to see where the site is in relation to the Groundwater SPZ's and the site is not within any SPZ's.
- 2.16 The site's bedrock geology (Horsham Stone Member) is listed as a Secondary A aquifer.
- 2.17 The Groundwater Vulnerability Map (England) classification is shown as 'High' in the location of the Horsham Stone Member and is shown as 'Unproductive' in the location of the Weald Clay Formation.

Infiltration Potential

- 2.18 The desk-based geology information in the section above indicates that infiltration will not be feasible at the site due to the clay-based geology (Weald Clay Formation). This is supported by the presence of surface water drainage, ditches and watercourses, which show that surface water is held at the surface.
- 2.19 Therefore, infiltration is not considered a viable means of surface water discharge for the development.

Existing Drainage Regime

Surface Water

- 2.20 The current site is greenfield and drains naturally. Surface water from the development site will currently drain to the south and west towards the drainage ditch immediately adjacent to the western parcel and within the woodland. With this in mind, the site currently has a prescriptive right to drain its surface

water to the drainage ditch (under common law) on the basis that it has been in continuous use for the purpose of land drainage for 20 years or more, and has been accessed without force, without secrecy, and without needing permission to do so.

Foul Water

- 2.21 The site and its neighbouring properties are not currently served by a public drainage system. This has been confirmed by obtaining Southern Water's Asset Location Plans ([Appendix F](#)), which show no public foul (or surface) water sewers serving the eastern extent of Eastlands Land. The existing properties on Eastlands Lane are offline and served by private systems (Septic Tanks).
- 2.22 There are a number of public foul sewers further west on Eastlands Lane, which feed to the Sewage Wastewater Treatment Works (WTW) that is located to the south of Eastlands Lane. Foul sewers lead to this WTW from the western end of Eastlands Lane, as well as from Oakapple Close (northwest) and Acorn Avenue (northeast).
- 2.23 The foul sewer from Acorn Avenue crosses Eastlands Lane by gravity and would provide a suitable connection point for foul waste from the proposed development site.

3.0 Legislative and Policy Framework

- 3.1 LLFA's including WSCC have a responsibility under the FWMA to develop, maintain, apply and monitor the application of a strategy for local flood risk in their area. Local flood risk is defined as flood risk arising from local sources, such as surface water run-off, groundwater and ordinary watercourses (i.e. non main rivers). The EA plays a role in managing the watercourses designated as 'main rivers'.
- 3.2 West Sussex often delegates their LLFA responsibilities to Local Planning Authorities. It is often the case that MSDC consult on local flood risk and drainage matters, and this may be the case for the current application.

The National Planning Policy Framework

- 3.3 The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. The Planning Practice Guidance (PPG) to the NPPF provides further information on the policies set out in the NPPF. It encourages development to take place in areas of lower flood risk wherever possible and stresses the importance of preventing increases in flood risk off-site to the wider catchment area. This includes ensuring that flood risk is considered at all stages of the planning process, avoiding inappropriate development in areas at risk of flooding and directing development away from those areas where risks are highest.
- 3.4 The process of directing development away from those areas where risks are highest is the Sequential Test. It covers all forms of flooding, and this is covered in Paragraphs 23 and 24 of the NPPF. Following the December 2024 update to the NPPF, Paragraph 175 was added and it states that development can be appropriate on sites with flood risk *"in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would not be at risk of flooding from any source, now and in the future"*. This essentially means that if a sequential approach is applied within the site boundary, and areas of flood risk now and in the future are avoided, that flood risk should not prevent the development from coming forward and that the Sequential Test is not required.

The Environment Agency Flood Map for Planning

- 3.5 The updated Environment Agency's Flood Map for Planning was released on 25th March 2025. This updated and new National Flood Risk Assessment (NaFRA) uses both existing detailed local information and improved national data, includes the potential impact of climate change on flood risk, based on UK Climate Projections (UKCP18) and shows potential flood depths. This allows the Flood Map for Planning to provide much higher resolution maps that make it easier to see where there is risk.
- 3.6 The New NaFRA Flood Map for Planning remains split into 'Flood Zones', which demarcate the extent of flooding from rivers or the sea for different return periods.
- 3.7 Table 3.1, on the next page, lists the flood zone categories and explains the flood risk probabilities they represent.

Table 3.1 – Flood Zone Categories

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding (shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of tidal flooding (land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of tidal flooding (land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water must flow or be stored in times of flood, which is typically the 1 in 30-year flood event or greater. Local planning authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map, but may be distinguished in Product 4 information, for example)

- 3.8 A site-specific FRA is required for proposals of 1ha or greater in Flood Zone 1, all proposals for development in Flood Zones 2 and 3, or in an area within Flood Zone 1 that has critical drainage problems (as notified to the local planning authority by the EA). There are areas of surface water flood risk on the boundaries of the site and the site is over 1ha in area, thus flood risk from all sources will be reviewed for the completeness of the application.
- 3.9 An FRA should identify and assess the risks of all forms of flooding and demonstrate how these flood risks will be managed so that a development remains safe throughout its lifetime, taking climate change into account.
- 3.10 Within each Flood Zone, a key factor in determining planning applications for development is the flood risk vulnerability of a development. Table 2 of the PPG to the NPPF categorises different development types according to their vulnerability to flooding. These categories are:
- „ Essential infrastructure;
 - „ Highly vulnerable development;
 - „ More vulnerable development;
 - „ Less vulnerable development, and;
 - „ Water-compatible development.
- 3.11 Within the different Flood Zones each of the above development categories are considered appropriate or not permissible. The Technical Guidance to the NPPF lists these as:
- Flood Zone 1:
- „ All the development categories listed above are appropriate.
- Flood Zone 2:
- „ Water-compatible, less vulnerable development, more vulnerable development and essential infrastructure is appropriate in this zone.

Flood Zone 3a:

- „ Water-compatible and less vulnerable development is appropriate in this zone. Highly vulnerable development should not be permitted in this zone.

Flood Zone 3b:

- „ Only water-compatible development and essential infrastructure that must be there should be permitted in this zone.

- 3.12 The above information sets out the basis by which developments must be assessed in terms of flood risk.
- 3.13 The development will be reviewed against the Flood Zone in which it is located, and an assessment will be made of the appropriateness of the proposed development, as per the advice within the PPG to the NPPF, taking account of the proposed site layout for the development shown in [Appendix A](#).

The New National Standards for SuDS

- 3.14 On 19 June 2025 the UK government published its new National Standards for Sustainable Drainage Systems (SuDS). The new standards are a minor evolution of industry standards and current best practice, many of which practitioners and design engineers had already been actively incorporating in recent years. Therefore, while the New National Standards do not fundamentally change current standards, they are a welcome step in clarifying points that had previously been uncertain and has enshrined them in a single piece of guidance.
- 3.15 The standards emphasise how sustainable drainage and flood risk should be considered in developments, and the importance of site appraisal and early, integrated design with the site's natural features and proposed infrastructure.
- 3.16 The New National Standards for SuDS outline that:
- „ SuDS are mandatory for major developments and drainage strategies must conform with the new national criteria and LLFA guidance.
 - „ There is a stronger emphasis on the 'four pillars' of SuDS. Drainage strategies must demonstrate benefits for water quantity and quality as well as amenity, and biodiversity. This pushes designers to incorporate more surface level SuDS and rely less on below-ground attenuation.
 - „ There is more clarity on long-term adoption and maintenance of the SuDS system and LPA's will expect clearer maintenance and management strategies for drainage systems and require stronger evidence of deliverability.
- 3.17 As stated before, this is a minor evolution of the current approach to drainage design, but there are subtle differences in the design factors, which could lead to an increase in size of attenuation features. In addition to the above overarching principles of the New National Standards for SuDS, there are seven core standards that are to be achieved in drainage design. These are:

Standard 1 – Runoff destinations (Drainage hierarchy)

- 3.18 Surface water runoff must be discharged following a strict five-tier sustainability hierarchy, prioritising solutions that keep water close to where it falls:

Priority 1: Collected for non-potable reuse (e.g. rainwater harvesting)

Priority 2: Infiltrated to ground

Priority 3: Discharged to an above-ground surface water body

Priority 4: Discharged to a surface water sewer or piped system

Priority 5: Discharged to a combined sewer

- 3.19 Use of lower-priority options must be robustly justified.

Standard 2 – Management of everyday rainfall (interception)

- 3.20 SuDS must manage frequent, small rainfall events at source, with the key points being:

- „ The first 5mm of rainfall should be intercepted within the development.
- „ Interception should prevent runoff for most rainfall events, across both summer and winter seasons.
- „ Interception can typically be delivered through features like green roofs, rain gardens, permeable paving, and bioretention.

Standard 3 – Management of extreme rainfall and flooding

- 3.21 SuDS must manage intense and extreme rainfall events to reduce flood risk:

- „ Control surface water runoff rates and volumes to greenfield runoff rates.
- „ Safely manage exceedance flows without negative impact on third-party land.
- „ Ensure flooding (where unavoidable) is shallow, slow, and low-hazard.
- „ Prevent flooding of buildings and critical infrastructure.

Standard 4 – Water quality

- 3.22 SuDS must protect and improve water quality:

- „ Designs must be based on a site-specific water quality risk assessment.
- „ Drainage features should treat runoff according to the pollution risks of the proposed land use and this should be in accordance with Chapter 26 of the CIRIA SuDS Manual (C753).
- „ Multiple treatment stages are expected where risks are high (discharge to protected waters, for example).

Standard 5 – Amenity

- 3.23 SuDS must deliver positive placemaking outcomes, not just drainage quantity benefits:

- „ Contribute to attractive, usable, and safe spaces.
- „ Support recreation, wellbeing, and visual quality.
- „ Be integrated into landscaping and public realm design.

Standard 6 – Biodiversity

- 3.24 SuDS must enhance the natural environment:

- „ Deliver biodiversity benefits, aligned with Biodiversity Net Gain ambitions.
- „ Use vegetated, nature-based solutions wherever possible.
- „ Support habitats for plants, invertebrates, and wildlife.

Standard 7 – Design for construction, operation, maintenance, and structural integrity

- 3.25 SuDS must be designed for their whole lifecycle:

- „ They should be safe and effective to construct.

- ” They should include clear, deliverable maintenance and management plans.
- ” They must remain structurally sound over their design life.
- ” They should allow for decommissioning or adaptation (if required).

3.26 The below specific points should be borne in mind by designers and included in any drainage strategies:

- ” Standard 2 provides explicit guidance on the management of everyday rainfall. The first 5mm of rainfall (the ‘first flush’) must be managed by interception and should not leave the site. Instead, it should either be collected for reuse, infiltrated into the ground, or else captured, conveyed, and stored within SuDS features (but there are specific criteria that make this last point acceptable).
- ” The latest standards now formalise that the minimum permissible infiltration rate for discharging surface water via a ‘System A’ (Total Infiltration) solution. The minimum infiltration coefficient that can support an infiltration-based drainage solution is 1.0×10^{-6} m/sec. Additionally, the standards now add that the half-drain time in the 3.3% AEP event should be less than 24 hours.
- ” A ‘relaxation factor’ should instead be applied to the target greenfield runoff rates on a brownfield site. It defines that the maximum relaxation factor for runoff rates should be no greater than five times the greenfield rates. This allows for easier implementation on heavily developed urban sites, especially where LLFA’s previously demanded greenfield runoff rates.
- ” The New National Standards confirm a previous ‘grey area’ by stating that SuDS features should be included in the contributing catchment area. It also notes that there is no requirement to provide attenuation for external overland flows entering the site, but these flows should be considered for capacity of the pipe network.
- ” Standard 3 of the New National Standards for SuDS clarifies the expectations with regards to urban creep. It says *“within developments an urban creep uplift factor shall be applied by adding a percentage increase to the calculated area of the impermeable area within the property curtilages. This shall be 10% for all developments unless there are no external private permeable spaces, for example, flats and apartments, when it shall be 0%.”*

3.27 The proposed development at Eastlands Lane acknowledges the requirements of the New National Standards for SuDS and will deliver them through the drainage strategy, where they are achievable alongside the competing technical and regulatory constraints.

4.0 Current Flood Risk

- 4.1 Flooding can arise from a variety or combination of sources. These may be natural, or artificial and may be affected by climate change. These are discussed, below, in the following two sections and are summarised in Table 6.1, which is in Chapter 6.

Tidal Flooding

- 4.2 The site is not in proximity of a tidally influenced river, thus the development cannot be considered at risk of tidal flooding.

Fluvial Flooding

- 4.3 The Environment Agency's Flood Map for Planning ([Appendix B](#)) states that the site is located within Flood Zone 1, which means it is outside the 1 in 1,000-year flood event outline (Flood Zone 2).

Flood Risk and Appropriateness of the Proposed Development

- 4.4 According to the classifications in the NPPF the proposed dwellings are considered to be 'more vulnerable' development.
- 4.5 Table 3 of the PPG to the NPPF (see below) states that 'more vulnerable' development is appropriate in Flood Zone 1, thus the development is appropriate in this location.

Table 3 of the NPPF – Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Surface Water Flooding

- 4.6 Surface water, or pluvial flooding, results from rainfall-generated overland flow, where rainwater has not yet reached a watercourse or sewer and where the local drainage systems become overwhelmed. Pluvial flooding often occurs during short, very intense storms, but can also occur during longer periods of rainfall when the ground is already saturated, or where land has low permeability due to development.

- 4.7 In these conditions surface water can build up where the topography allows it to converge or pond. Where it gathers it will travel down prevailing gradients. Pluvial flooding then occurs at locations where significant surface water flow paths converge, at localised low points and/or due to overland obstructions. In urban areas pluvial flooding often occurs where the built environment channels overland flow routes (down roads that are bounded by kerbs, for example) or where there are obstacles to the natural overland flow routes. Boundary walls and buildings are often the main causes and, hence, the likelihood of pluvial flooding to impact property and built-up areas.
- 4.8 Pluvial flooding is exacerbated in many cases by the mistreatment or failure of the below ground infrastructure (including partial or full blockages of gullies and/or within the combined sewers and the accumulation of fats, oils and greases within the sewer networks).
- 4.9 The EA's Risk of Flooding from Surface Water (RoFSW) map was updated and refined in January 2025. The map uses improvements in data, technology and modelling and includes information and input from LLFAs, where this is available. This New National Model (NNM) for surface water represents a significant improvement over previous national-scale models and, generally speaking, has shown a reduction in overall surface water flood risk (when compared with the previous RoFSW mapping) with more targeted risk areas that tie in better with local land features and overall topography.
- 4.10 The EA's Risk of Flooding from Surface Water (RoFSW) maps for Eastlands Lane can be found in [Appendix C](#). This shows that the entire site is at very low surface water flood risk (areas outside the 1 in 1,000-year return period).
- 4.11 Therefore, it can be seen that the site is not at risk of surface water flooding.

Groundwater Flooding

- 4.12 There are no flood risk maps for groundwater, as stated by the Environment Agency in their 2011 guidance note 'flooding from groundwater'. Mapping products currently available only show areas where the geological and hydrogeological conditions *may* combine to cause groundwater flooding, but they should not be considered as groundwater flood risk maps. They only show *susceptibility* to groundwater flooding.
- 4.13 There are several mapping products that depict areas that may be susceptible to groundwater flooding, but they are not comparable in detail to the risk maps developed for fluvial, tidal and surface water, such as those used by practitioners and risk management authorities to support planning decisions. The mapping does not show the likelihood of groundwater flooding occurring and can only be considered as a hazard, but not a risk-based dataset.
- 4.14 As such, the mapping products can be viewed as indicative at best and should only be used as a prompt to review site-based information to determine whether groundwater is a risk factor that should be considered. Indeed, the Environment Agency state that:
- "The susceptibility data should not be used on its own to make planning decisions at any scale and, in particular, should not be used to inform planning decisions at the site scale. The susceptibility data cannot be used on its own to indicate risk of groundwater flooding."*
- 4.15 This FRA will review the groundwater flooding susceptibility mapping available, which has been supplied in an Envirocheck Landmark Flood Screening Report (FSR) and can be seen in [Appendix G](#).

BGS Geological Indicators of Flooding

- 4.16 The BGS Geological Indicators of Flooding map shows that the site is not in an area with indicators of groundwater flooding.

BGS Groundwater Flooding Susceptibility

- 4.17 The BGS Groundwater Flooding Susceptibility map shows that the site is in an area with limited potential for groundwater flooding to occur.

Geosmart Information Groundwater Flood Map

- 4.18 The Geosmart Information Groundwater Flood Map places the site in an area of 'negligible' risk.

Groundwater Flood Risk Summary

- 4.19 The site is not in an area with any indicators of groundwater flooding and in an area with limited potential for groundwater flooding to occur. Due to this and being in an area of 'negligible' risk, it can be seen that the development site is at very low to low groundwater flood risk.

Flooding from Infrastructure Failure

- 4.20 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or because of a reduction in capacity due to collapse, siltation, blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.
- 4.21 Typically, sewer systems are constructed to accommodate rainstorms with a 30-year return period or less, depending on their age. Consequently, rainstorm events greater than 1 in 30-years would be expected to result in surcharging of some parts of the sewer system. In fact, due to most gullies being poorly maintained and often partially blocked with silt, leaves and other debris, their capacity is often estimated to be closer to the 1 in 10-year storm.
- 4.22 All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the 'DG5 Flood Register'. This includes records of flooding from foul sewers, combined sewers and surface water sewers that are deemed to be public and maintained by the Water Company.
- 4.23 The DG5 Flood Register only records sewer flooding incidents per postcode area and over a 10-year period, thus is not detailed in its resolution but it can provide an indicator of areas that have persistent sewer flooding problems.
- 4.24 The 2020 Strategic Flood Risk Assessment (SFRA) for HDC includes a map showing the historic incidents of sewer flooding by postcode. The map places the site in an area with 9 flood incidents. This is a smaller number over a postcode that covers a wide area, this can be concluded that the site is at low risk of sewer flooding.

Flooding from Artificial sources

- 4.25 The EA provides a map showing the maximum potential flood extent should all reservoirs with a capacity of greater than 25,000 cubic metres fail and release the water they hold.
- 4.26 The map shows that the site would not experience flooding in this scenario.
- 4.27 There are no other artificial sources of flooding (such as canals) in the vicinity of the site that could cause flooding.

Historic Flooding

- 4.28 The Envirocheck Landmark FSR includes a map showing recorded flood outlines, which can be seen in [Appendix H](#).

- 4.29 This map shows that the site has no record of flooding in the past. Thus the Historic Flood Map supports this report's conclusion that the site is at low risk of flooding and that the proposed development is appropriate in this location.

5.0 Future Flood Risk & Climate Change

- 5.1 The 2024 NPPF and the supporting Technical Guidance document sets out how flood risk should be considered over the lifetime of a development. This requires an increase in flood risk due to climate change to be taken into account. Both peak river flows and rainfall intensity should be assessed.

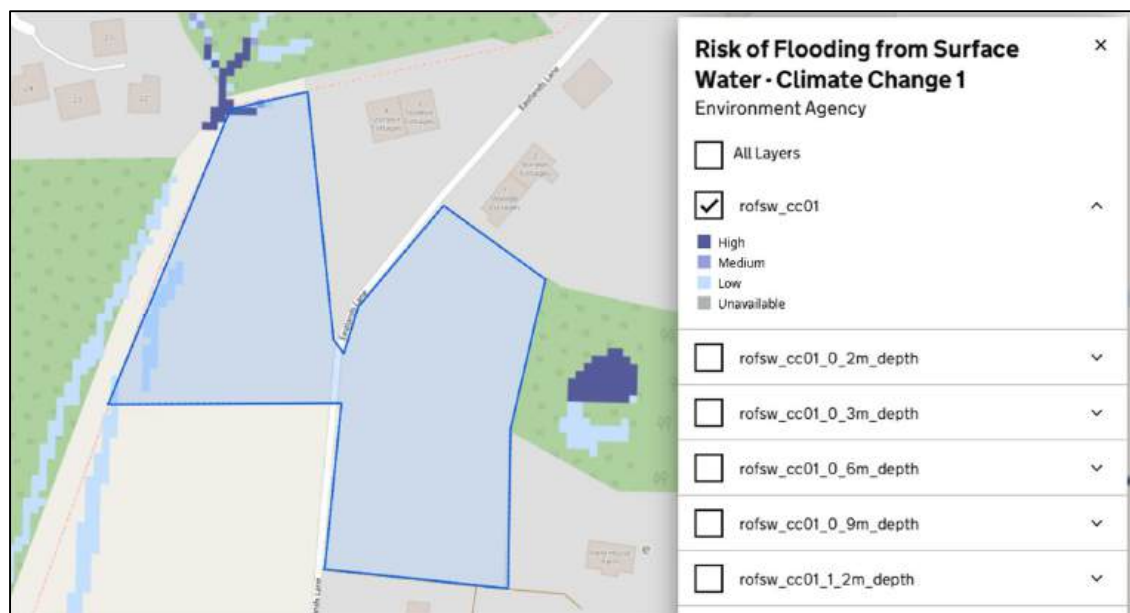
Peak River Flows

- 5.2 The site is within Flood Zone 1 and is not close to any watercourses that could create fluvial flooding, thus future fluvial flood risk does not need to be considered any further.

Peak Rainfall Intensity and Climate Change

- 5.3 The proposed development site is within the Adur and Ouse Management Catchment. The peak rainfall climate change increase predicted for this management catchment is 45% for the 2050's and 45% for the 2070's epochs.
- 5.4 A climate change peak rainfall intensity increase of this amount will increase surface water flood risk in the future. To investigate the impact of this increase in surface water flood risk, the future RoFSW flood mapping has been reviewed, which includes a climate change increase. An excerpt of this mapping in the location of the proposed development can be seen in Figure 5.2, on the next page.

Figure 5.2 – Future surface water flood risk (2050's epoch)



- 5.5 The mapping shows that a small section of the site could be at low risk of surface water flooding along the western edge of the site.
- 5.6 Therefore, the proposed development site will be at risk of surface water in the future.

6.0 Summary of Flood Risk

- 6.1 Historic, current and future flood risk, from all sources, has been reviewed in the context of the proposed development at Eastlands Lane, Cowfold. A summary of these flood risks is shown in Table 6.1, below. The allocation of overall flood risk shows the residual flood risk once the site-specific conditions have been taken into account.

Table 6.1: Summary of Flood Risk From All Sources

Flood Source	Risk Level				Comment
	High	Medium	Low	Very Low	
Fluvial				X	The site is within Flood Zone 1 on EA Flood Map.
Tidal				X	The site is not at risk of tidal flooding.
Groundwater			X	X	In an area with limited potential for groundwater flooding to occur, no indicators of groundwater flooding and at 'negligible' risk.
Surface Water				X	Site at very low risk of surface water flooding.
Canals				X	No canals in the local area.
Reservoirs				X	No reservoirs in the local area.
Infrastructure Failure				X	No indication that local drainage infrastructure would cause elevated levels of flood risk.
Increase due to Climate Change			X		Climate change will only affect surface water flooding, very small area of low risk in the future.

7.0 Surface Water Drainage Strategy

Sustainable Drainage Overview

- 7.1 Current planning policy and Environment Agency guidance requires developments to employ SuDS (Sustainable Drainage Systems) techniques wherever feasible. Careful design of SuDS features can ensure that a development's surface water drainage closely reflects the natural hydrology of the pre-developed site.
- 7.2 The key benefits of SuDS are as follows:
- „ Improving water quality over a conventional piped system by removing pollutants from diffuse pollutant sources (e.g., roads);
 - „ Improving amenity through the provision of open green space;
 - „ Improving biodiversity through increased areas for wildlife habitat; and
 - „ Enabling a natural drainage regime that recharges groundwater (where possible).
- 7.3 SuDS provide a flexible approach to drainage, with a wide range of components from soakaways to large-scale basins or ponds. The individual techniques should be used where possible in a management train that mimics the natural pre-developed pattern of drainage.

Site Area and Greenfield Runoff Rate

- 7.4 The developed site's impermeable (contributing) areas will be 0.311 ha, which is inclusive of urban creep to acknowledge the future impermeable areas of the site.
- 7.5 The greenfield runoff rate has been determined for this impermeable, contributing area, and will guide the developed site's surface water discharge rates.
- 7.6 The greenfield runoff rates have been calculated using the QMED value, which is the index flood in the Flood Estimation Handbook (FEH). QMED has been calculated for rural and urban values in MicroDrainage using the catchment descriptors methodology, which includes the following input variables:
- „ Site Location
 - „ SAAR – Standard Average Annual Rainfall 1961 – 1990 (mm)
 - „ SPR Host - Standard percentage runoff derived from HOST soils data
 - „ URBEXT - The extent of urban and suburban cover
 - „ BFIHOST - Baseflow index derived from Hydrology of Soil Types (HOST) soils data
 - „ FARL - Index of flood attenuation due to reservoirs and lakes
- 7.7 The QMED urban/rural calculation can be seen in [Appendix I](#), but the outputs are summarised in Table 7.1, below.

Table 7.1: QMED Rural/Urban Values

Impermeable Area	QMED Rural Runoff Rate	QMED Urban Runoff Rate
0.311 ha	4.4 l/s	4.6 l/s

- 7.8 Therefore, the target runoff rates for the developed site will be 4.4 l/s. This ensures that the development's runoff will never exceed the QMED greenfield runoff rate, even in higher order storms when the undeveloped site's runoff rate would be far in excess of this. This provides protection to the site and the local area in terms of surface water flood risk because the high levels of runoff that would ordinarily occur during flood events will no longer do so.

Drainage Strategy Overview

- 7.9 The drainage strategy for the proposed development will use a mixture of surface level attenuation features and SuDS. These will provide the requisite surface water storage requirements, as well as pollution mitigation while tying into the landscaping and ecological strategy for the development. This summary should be read in conjunction with the Drainage Strategy plan in [Appendix J](#).
- 7.10 The driveways, some of which are shared, will be constructed from System C (tanked) permeable surfacing. Resin-bound surfaces have been specified, and these will be underlain by a porous subbase. This will provide source control for rainfall falling on the roof of the dwellings and driveways (which will discharge directly into the subbase of the permeable surfacing). The 30% porous subbase (nominally 380mm deep) will provide attenuation and pollution mitigation.
- 7.11 As well as the permeable pavements, open SuDS features will be used, which will also offer visual amenity and biodiversity opportunities and ensures that the proposed drainage strategy provides all four SuDS pillars (water quality and quantity improvements, as well as amenity and biodiversity).
- 7.12 An attenuation basin has also been used to provide the requisite attenuation for the development, inclusive of climate change allowance, urban creep, and other conservatively positioned design criteria (as specified by the LLFA). A SuDS basin will provide further information prior to discharging at the final outfall located in the southeast corner of the field. As noted earlier in this report, this land is all within the ownership of the landowner, and can be protected as an easement in perpetuity and suitable conditions can be imposed on SuDS features in this area. The landowner also has riparian rights to the watercourse on the southern field's boundary and, as noted, has a prescriptive right under common law to do so.
- 7.13 The surface water discharges from the site to the ordinary watercourse in the southern corner of the site. As has been established in this report, this ordinary watercourse has ongoing connectivity (which can be seen on Google and OS Mapping) and is a tributary to the Cowfold Stream. The surface water discharges to the ordinary watercourses will be at no more than the QMED greenfield runoff rate, for all storms. This is 4.4 l/s. The flow from the final outfall will be controlled by a hydrobrake and a system of orifice plates will be employed across the site so that attenuation volume in the other SuDS features and permeable pavements is maximised. This also provides the drainage strategy with resilience so that surface water is attenuated across the site and does not rely on a single 'end of pipe' solution for a successful drainage strategy.
- 7.14 It is also proposed to install at least 1no 'Type 2' (200-litre) water butt on each property. Water butts provide small amounts of storage for surface water and can often assist in achieving zero discharge for rainfall depths up to 5mm, which covers 50% of annual rainfall events (according to the EA's Rainfall Runoff Management for Developments report – SC030219) and means that the 'first flush', which can contain contaminants, does not reach the drainage system.

- 7.15 The drainage strategy as proposed can be seen in [Appendix J](#) of this report. It shows the location of the permeable pavements and SuDS features and the proposed discharge to the ordinary watercourse in the southeastern corner of the field.
- 7.16 The proposed drainage strategy as laid out in [Appendix J](#) has been modelled in MicroDrainage's Network hydraulic modelling module. While the full results of this hydraulic model can be seen in [Appendix K](#) of this report, a summary of the proposed runoff rates for different return periods is presented in Table 7.2, below. Due to the FEH data that has been used, a proposed runoff rate for the 1 in 1-year storm is not available and the maximum storm duration available is 5,760-minutes.

Table 7.2: Summary of existing and proposed site runoff rates

Return Period	Proposed Runoff Rate (l/s)
1 in 1	N/A
1 in 2	4.4
1 in 10 (+ 40%)	4.4
1 in 30 (+ 40%)	4.4
1 in 100 (+ 45%)	4.4

- 7.17 All these runoff rates are the QMED greenfield runoff rate for the whole site of 4.4 l/s.
- 7.18 In summary, the proposed drainage strategy provides the requisite attenuation and all four SuDS pillars, while maintaining the QMED greenfield runoff rate for the site. The drainage strategy uses the highest available SuDS pillars and is shown not to flood up to and including the 1 in 100-year + 45% rainfall event, inclusive of the impermeable area increases that will result from urban creep. The drainage strategy also complies with local standards, the National Standards for SuDS and the NPPF (as listed, below), thus is robust in its design and should not be an impediment to the progress of the planning application.
- 7.19 Between the permeable pavements and the open SuDS feature, there is confidence that interception, as required by Standard 2 of the National Standards for SuDS, has been provided. It is recognised that some of the technical criteria of Standard 2 means that infiltration has not been fully provided by each individual SuDS feature on their own, but together and in a SuDS train there is sufficient evidence of interception and the attainment of Standard 2 by the overall drainage system.

Design Criteria

- 7.20 The drainage strategy has been designed in accordance with the design criteria of the National Standards for SuDS and general best practice and the requirements of the NPPF. This includes:
- „ Using FEH 2022 Annual Maximum Catchment data rather than FSR data. It should be noted that the MicroDrainage Results in [Appendix K](#) list 2013 data as being used, but we can assure that 2022 data has been used in full (this is a quirk of MicroDrainage).
 - „ Using a runoff coefficient (CV) value of 1.0 in all hydraulic modelling
 - „ Reducing the MADD Factor (which assumes 10m³ of pipe storage per hectare) to zero.
 - „ Urban Creep has been considered and included.
 - „ The full suite of rainfall events has been used (up to the 5,760-minute storm, which is maximum allowable when using FEH data).

- ” The maximum rainfall intensity has been raised to 550mm/hr to ensure that the full hydrograph is included in the hydraulic calculations.
- ” The impermeable contributing areas for the development are 0.311 ha, and this has set the QMED greenfield runoff rate. The MicroDrainage results show that the contributing areas incorporated into the hydraulic model are 0.347 ha. The additional 0.36 ha included in the hydraulic model reflects the surface areas of the SuDS basin, and its inclusion is a requirement of the New National Standards for SuDS, so the drainage strategy has complied with this requirement.

Urban Creep

- 7.21 An appropriate allowance should be made for urban creep throughout the lifetime of the development as per 'BS 8582:2013 Code of Practice for Surface Water Management for Developed Sites'.
- 7.22 This also complies with Standard 3 of the New National Standards for SuDS, which clarifies the expectations with regards to urban creep. It says “*within developments an urban creep uplift factor shall be applied by adding a percentage increase to the calculated area of the impermeable area within the property curtilages. This shall be 10% for all developments unless there are no external private permeable spaces, for example, flats and apartments, when it shall be 0%.*”
- 7.23 Therefore, a full 10% urban creep has been added to the development's private impermeable areas (roofs and driveways), as per the Table 7.3, below, which shows the uplift to each pipe number in the hydraulic model. Note that any pipes that have not had urban creep applied are not listed within Table 7.3.

Table 7.3: 10% Urban Creep Uplifts Applied to Hydraulic Model

Pipe Number	Total Impermeable Area	Private Impermeable Areas	10% Increase in Private Impermeable Areas	Post-Urban Creep Total Area Applied to Pipe
1.001	0.033	0.033	0.003	0.036
2.001	0.053	0.034	0.003	0.056
3.001	0.043	0.029	0.003	0.046
5.001	0.038	0.021	0.002	0.040
6.001	0.043	0.043	0.004	0.047
4.001	0.082	0.036	0.004	0.086

Freeboard

- 7.24 The SuDS Manual discusses freeboard for drainage strategies and states the following:
- “Ensure that all surface water is retained within the SuDS components for events up to the critical 1:30-year event and contained within appropriate exceedance routes and storage areas up to the critical 1:100-year event, with 300 mm freeboard to points of potential entry to buildings (to meet water quantity standards 3a and 3b), and to include relevant climate change and urban creep allowances.”*
- 7.25 We understand that this is also the approach taken by WSCC as the LLFA, and that freeboard should be to the FFL's of the dwellings.
- 7.26 The approach of 300mm freeboard being measured between the top water level during the critical flood event and points of entry/FFL's of buildings is the approach that Motion have taken and there is 300mm freeboard between the highest water levels and the lowest FFL's on site.

MicroDrainage Hydraulic Modelling

- 7.27 The drainage strategy outlined above has been designed in MicroDrainage's Network hydraulic modelling module.
- 7.28 The results of the MicroDrainage hydraulic modelling for the proposed development can be seen in [Appendix K](#).
- 7.29 The results of the hydraulic modelling show that the drainage strategy as outlined in this section can attenuate and discharge all surface water generated in the 1 in 100-year + 45% rainfall event, inclusive of urban creep, and without flooding. This has been achieved while complying with all national and local standards, as outlined in this report.
- 7.30 The maximum half drain time of the system is 116 minutes (in the 1 in 2-year rainfall event), which is less than the 1,440-minute (24-hour) requirement for this metric in the 1 in 30-year (3.33% AEP) event. The maximum half drain time for all storms is as follows:
- ” 1 in 2-year: 116 minutes
 - ” 1 in 10-year + 40%: 93 minutes
 - ” 1 in 30 year + 40%: 102 minutes
 - ” 1 in 100-year + 45%: 108 minutes

8.0 Surface Water Runoff Quality

- 8.1 The NPPF states that development should not have a detrimental impact on the environment, including the water environment. The technical guidance to the NPPF provides further advice on the benefits of ensuring runoff quality is to an appropriate standard.
- 8.2 The CIRIA SuDS Manual provides guidance on the treatment of surface water runoff. With regards to the proposed development, Table 4.3 of the CIRIA SuDS Manual rates the pollution hazard from roof water runoff as 'very low'. The only requirement for roof water runoff is the removal of gross solids and sediments, which would be achieved using catchpits and silt traps upstream of the permeable surfacing and throughout the drainage network.
- 8.3 With regard to the accesses and parking, Table 4.3 of the CIRIA SuDS Manual rates the pollution hazard from residential car parking and low traffic roads as 'low'. To mitigate a 'low' pollution hazard, the CIRIA SuDS Manual recommends using a simple index approach in line with Section 26.7.1. This is discussed, below.
- 8.4 Table 26.2 of the CIRIA SuDS Manual provides pollution hazard indices for different land use classifications. The land use classification that requires consideration for low traffic roads and parking areas is in Table 8.1 below.

Table 8.1: Excerpt from Table 26.2 of CIRIA SuDS Manual

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
Individual property driveways, residential car parks, low traffic roads (e.g. cul-de-sacs, homezones and general access roads) with less than 300 traffic movements per day.	Low	0.5	0.4	0.4

- 8.5 To deliver adequate pollution treatment and mitigation, the CIRIA SuDS Manual recommends using a SuDS component that has a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type).
- 8.6 Table 26.3 of the CIRIA SuDS Manual provides indicative SuDS mitigation indices for each SuDS type when discharging to surface waters. Table 8.2, below, which is an excerpt from Table 26.3, shows the mitigation index for permeable pavements.

Table 8.2: Pollution Mitigation Indices for Permeable Pavements

Type of pollution removal component	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
Permeable Pavements	0.7	0.6	0.7

- 8.7 The mitigation indices for permeable pavements exceed those of the highest pollution hazard index figures from Table 8.1.
- 8.8 The site will also include a SuDS basin, thus some surface water will pass through two mitigation components. Where two mitigation components are used in series, the SuDS manual states that:

Total SuDS mitigation index = mitigation index (component one) + 0.5 mitigation index (component two)

8.9 The SuDS basin will provide the below mitigation indices as in Table 8.3:

Table 8.3: Pollution Mitigation Indices for Secondary SuDS Feature

Type of pollution removal component	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
SuDS basin	0.25 (0.5 ÷ 2)	0.30 (0.6 ÷ 2)	0.30 (0.6 ÷ 2)

8.10 And the total mitigation indices for the site will be as per Table 8.4, below, which shows the mitigation indices for secondary SuDS features added to the mitigation indices for the primary SuDS feature:

Table 8.4: Total Pollution Mitigation Offered by Permeable Paviours and SuDS Basin:

Contaminant Type	Pollution Hazard Index	Pollution Mitigation Index	Difference
Total Suspended Solids	0.5	0.95 (0.7 + 0.25)	+ 0.45
Metals	0.4	0.90 (0.6 + 0.30)	+ 0.50
Hydrocarbons	0.4	1.00 (0.7 + 0.30)	+ 0.60

8.11 The above evidence shows how the permeable surfaces provide sufficient pollution mitigation on their own, but with the SuDS basin following the permeable paviours, they combine to ensure all pollution hazards are completely mitigated. Where surface water only passes through the SuDS basin prior to discharge the mitigation indices will be as follows in Table 8.5:

Table 8.5: Pollution Mitigation Indices for SuDS Basin

Type of pollution removal component	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
SuDS Basin	0.5	0.5	0.5

8.12 Once again, the mitigation indices for the SuDS basin exceed the pollution hazard indices laid out in Table 8.1. This guarantees that every part of the site will receive adequate pollution mitigation prior to surface water being discharged off site.

9.0 Residual Risk and Infrastructure Maintenance

- 9.1 Whilst the drainage strategy for the development has been designed to attenuate surface water from the 1 in 100-year plus 45% rainfall event, plus an inclusion for urban creep, there could be a small residual risk of flooding due to blockage or failure or poor performance of on-site infrastructure. Therefore, appropriate and regular maintenance of the drainage infrastructure should be undertaken by the site management company or their agents.
- 9.2 Additionally, Standard 7 of the New National Standards for SuDS requires that drainage systems should include clear, deliverable maintenance and management plans.
- 9.3 To assist with this process, a Drainage Management and Maintenance Plan has been prepared, which sets out the principles for the long-term management and maintenance of the proposed surface water drainage system on the development. The Drainage Management and Maintenance Plan can be seen in [Appendix L](#).
- 9.4 The purpose of this document is to ensure that those responsible for site maintenance have a robust inspection and maintenance plan going forwards. This will help ensure the optimum operation of the surface water drainage system and that it will be regularly maintained for the lifetime of the development. This will contribute to reducing the risk of surface water flooding both on- and off-site.

10.0 Exceedance Events

- 10.1 Exceedance events are those greater than the design rainfall event (i.e., greater than the 1 in 100-year rainfall event plus 45% for climate change).
- 10.2 Any rainfall events greater than the design rainfall event may cause flooding due to them 'exceeding' the capacity of the drainage system. In this situation it is imperative to check whether flooding would occur and, if so, whether it needs to be contained on site. Exceedance flows should not ingress into any properties on site and should not cause nuisance to any neighbouring sites or buildings.
- 10.3 Because the drainage system is not shown to flood in the MicroDrainage hydraulic model, it has some 'freeboard' within it that would provide attenuation during exceedance events. This allows for the attenuation of some surface water in storms beyond the 1 in 100-year + 45% event.
- 10.4 Should an exceedance event cause the drainage system to surcharge, the topography of the site and the road network would direct surface water flows and, using these factors as a guide, a high-level plan of exceedance flows has been produced to show the pathway that exceedance flows would take across the site. This can be seen in [Appendix M](#).
- 10.5 The receptor for exceedance would be the field to the south, which is also within the same land ownership of the site, and thereafter there are no properties or infrastructure that could be affected. Therefore, exceedance would not impact any infrastructure or third-party land.

11.0 Compliance with the National Standards for SuDS

- 11.1 The seven core standards for SuDS, as laid out in the National Standards for SuDS, was presented in Section 3 of this report (Paragraphs 3.14 to 3.27).
- 11.2 This section will review how the drainage strategy has attained the seven core standards for SuDS, which is presented below.

Standard 1 – Runoff destinations (Drainage hierarchy)

- 11.3 With regards to the proposed development and its drainage strategy, the tiers of the drainage hierarchy that have been achieved are outlined in Table 12.1, below. These are the highest available tiers, as demonstrated by the discussion of the geoenvironmental characteristics and constraints discussed in Section 2 of this report.

Table 12.1: Compliance with Standard 1 and the Drainage Hierarchy

Tier	Discharge Method	Used?	Notes
1	Collected for non-potable use	Ü	Water Butts are to be used on the dwellings.
2	Use infiltration techniques	Ü	Total infiltration is not viable on this site due to the local geology, but the features will be unlined to provide some infiltration when ground conditions allow.
3	Discharged to an above ground surface water body	Ü	The drainage strategy will discharge surface water at the greenfield runoff rate to an ordinary watercourse, which has ongoing connectivity.
4	Discharged to a surface water sewer, or another piped surface water drainage system	Ů	This tier of the drainage hierarchy will not be required.
5	Discharged to a combined sewer	Ů	This tier of the drainage hierarchy will not be required.

Standard 2 – Management of everyday rainfall (interception) - Ü

- 11.4 Water butts will be fitted to all properties.
- 11.5 Permeable paving is being used.
- 11.6 All SuDS and attenuation features will be unlined, and the slow to marginal infiltration rates available will allow some soakage, particularly in the everyday rainfall events.
- 11.7 Therefore, between the water butts, the permeable pavements and the open SuDS features, there is confidence that adequate interception, as required by Standard 2 of the National Standards for SuDS, has been provided. It is recognised that some of the technical criteria of Standard 2 means that infiltration has not been fully provided by each individual SuDS feature on their own, but together and in a SuDS train there is sufficient evidence of interception and the attainment of Standard 2 by the overall drainage system.

Standard 3 – Management of extreme rainfall and flooding - Ü

- 11.8 The hydraulic modelling carried out in MicroDrainage, as presented in [Appendix K](#), shows that the proposed development can manage all surface water arising from current and future impermeable areas (with inclusions for urban creep and climate change) can be attenuated and discharged at the QMED greenfield runoff rate. This can be achieved without any flooding and is inclusive of all factors of safety.
- 11.9 Exceedance has also been considered and planned for.

Standard 4 – Water quality- Ü

- 11.10 Section 8 of this report has demonstrated that the proposed development can mitigate all expected pollution hazards that will arise on site using the specified SuDS features, complying with the requirements of Chapter 26 of the CIRIA SuDS Manual (C753).

Standard 5 – Amenity- Ü

- 11.11 The proposed drainage strategy uses surface level SuDS, that tie into the landscape and provide visual interest and a sense of space. The permeable pavements will also provide an interesting textured resin-bound surface to increase visual appeal (over tarmac for example).

Standard 6 – Biodiversity - Ü

- 11.12 The SuDS strategy uses a SuDS basin, both of which can be planted and maintained to provide biodiversity benefits and will support BNG targets, as required.

Standard 7 – Design for construction, operation, maintenance, and structural integrity- Ü

- 11.13 By using surface-level SuDS in the drainage strategy, a system that is safe to construct and is sustainable to use and maintain, and safely integrates into the development, has been specified.
- 11.14 A clear and detailed management and maintenance plan has been produced, which specifies how the drainage system should be maintained in perpetuity.

12.0 Foul Drainage Strategy

- 12.1 The peak foul flow rate from the proposed development has been calculated based on Southern Water's foul sewerage modelling criteria. In summary, the calculation is based on the foul flow element, plus an allowance for misconnected surface water. While this is unlikely noting the specific drainage strategy that is proposed, it provides a precautionary approach.
- 12.2 Based on Southern Water's foul sewerage modelling criteria, the calculated design foul flow from the proposed development is 0.07 l/s.
- 12.3 The initial foul drainage from the site will be via gravity drainage to the south via Eastlands Lane. Where the road turns 90-degrees to the west represents a low point and, therefore, foul water will be pumped from this point to the west along Eastlands Lane. The location where the foul sewer from Acorn Avenue crosses Eastlands Lane by gravity, just prior to the Southern Water WTW, represents a viable connection point for the site's foul water. Therefore, it is proposed to connect foul water from the site at this location. This is shown in the drainage strategy layout in [Appendix J](#).
- 12.4 The ability to make this connection, along with the capacity of the existing 150m diameter foul sewer crossing Eastlands Lane from Acorn Avenue, and any required network reinforcement will be explored with Southern Water at the appropriate project juncture. However, because of the small peak flow rate proposed, and its proximity to the WTW, it is not expected that network reinforcement will be required, or that there will be a lack of available capacity.
- 12.5 All Water and Sewerage Companies (WaSC's) have a legal obligation under Section 94 of the Water Industry Act 1991 (the Act) to provide developers with the right to connect to a public sewer regardless of capacity issues. This, in conjunction with Section 91(1) of the Act effectively means that Southern Water cannot object and the LPA cannot refuse to grant planning permission on the grounds of insufficient capacity or that no improvement works are planned for an area. The case precedent for this is a Supreme Court decision in *Barratt Homes vs Welsh Water*, in which the court held that the developer has an absolute right to connect to the existing sewer, whether or not it overloads the system. It ruled that the specific wording of the legislation allows for this right to be exercised, at no cost to the developer, apart from the normal connection charges.
- 12.6 Where local sewerage infrastructure constraints are identified, network reinforcements are delivered by the WaSC through New Infrastructure Charges on developers. For non-strategic sites, the WaSC company have a maximum of 24 months to deliver sewerage improvements from the date of the outline or full planning consent.
- 12.7 New Infrastructure Charge on developers mean that the delivery of improvements to drainage is generally linked to funding made available from approved planning permissions.
- 12.8 Therefore, if there are any existing capacity issues in the local public foul sewerage, this would be addressed by the network reinforcement process, and the proposed development would bring about an increase in the capacity and condition of the local foul sewerage so that it will have capacity for the new development's foul drainage.

13.0 Summary and Conclusions

- 13.1 This Flood Risk Assessment and Drainage Strategy has been produced by Motion on behalf of their client, Eastlands Farm Ltd. It supports the planning application for the construction of nine residential dwellings on land at Eastlands Lane, Cowfold, Horsham, West Sussex.
- 13.2 The EA's Flood Map for Planning shows that the proposed development site is entirely within Flood Zone 1. Therefore, the site is at very low risk of flooding from rivers.
- 13.3 The site is within an area of Very Low surface water flood risk, being outside the 1 in 1,000-year return period extent.
- 13.4 All other forms of flooding, including tidal, reservoir, canal, artificial sources, and historic events, are assessed as low or very low risk to the site and the proposed development.
- 13.5 Flood risk does not materially increase as a result of projected climate change, although a very small area on the western boundary may experience future low-risk surface water flooding. This does not pose a constraint on the development.
- 13.6 With the above in mind, flood risk should not form an impediment to the progress of this development as it does not place residents at risk.
- 13.7 The drainage strategy for the proposed development has been produced in line with the NPPF, the New National Standards for SuDS, and WSCC's local standards. It complies with the seven core standards, utilises the highest available tiers of the drainage hierarchy, and will use a train of SuDS features to provide attenuation, source control, pollution mitigation and amenity and biodiversity benefits. The site's surface water will discharge at no more than the QMED rural runoff rate, for all storms, to an ordinary watercourse (by gravity), which has ongoing connectivity. This means that the drainage also maintains the existing hydraulic regime and health of the watercourses.
- 13.8 In terms of attenuation, permeable surfacing with an attenuating subbase are being used where appropriate in the site. Additional attenuation will be provided through a SuDS basin.
- 13.9 This drainage strategy has been hydraulically modelled in MicroDrainage's Network module and has shown that it can attenuate the 1 in 100-year + 45% rainfall event without flooding, with an inclusion for urban creep, as well as using the technical design criteria and factors of safety specified by WSCC as the LLFA.
- 13.10 The proposed drainage system successfully mitigates pollution risks, with treatment trains (permeable paving + basin) exceeding the CIRIA SuDS Manual pollution hazard indices for all contaminants.
- 13.11 A drainage management and maintenance plan has been prepared, setting out long-term maintenance responsibilities to ensure the system operates effectively for the lifetime of the development.
- 13.12 Exceedance flow routing has been assessed and planned. In the event of extreme storms beyond design capacity, surface water will be safely directed southwards into land under the same ownership, avoiding property and third-party risk.
- 13.13 In conclusion, this flood risk assessment and drainage strategy has shown that the proposed development is at a very low residual risk of flooding, and this makes it appropriate in this location. Similarly, the drainage strategy has shown that the development can manage surface water sustainably. Therefore, flood risk and surface water management should not form an impediment to the progress of this application.

Appendix A

Proposed Site Layout



Proposed Site Plan
Scale 1:500



**LLOYD
HARDEN**

Design • Planning • Architecture

MATERIALS

- 1.2m high estate rail fence
- 1.8m high timber panel fence
- Driveway & Parking areas to be Gravel Resin
- Terraced areas to gardens - to be 900x900 slabs
- Area of land given to No. 1 Eastfields Lane
- New planting - species to be confirmed by Landscape Designer
- Proposed shed/bike store

HOUSE TYPES

- House Type 1 - 3 Bed Bungalow (1797sqft)
- House Type 2 - 4 Bed 2 Storey (1786sqft)
- House Type 3 - 3 Bed 2 Storey Semi (1216sqft)
- House Type 4 - 4 Bed 2 Storey (1786sqft)
- House Type 5 - 4 Bed 1 1/2 Storey (1700sqft)
- House Type 6 - 4 Bed 2 Storey (1800sqft)

REV BY DATE DETAILS

SCALE @ A2

0 5m 10m 15m 20m 25m 1:500

CLIENT

Lee Goosens
Eastlands Lane, Cowfold, West Sussex, RH13 8AY

PROJECT

9 No - 3 & 4 Bed Homes

DRAWN BY

SJB

CHECKED BY

LKH

CONCEPTUAL DRAFT

DRAWING TITLE

Proposed Site Plan

DATE DRAWING NUMBER REVISION

21.11.25 2562-03

+44 (0)116 482 9284

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Appendix B

EA's Flood Map for Planning

Flood map for planning

Your reference	Location (easting/northing)	Created
Unspecified	521796/122282	20 January 2026 12:03

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
Unspecified

Location (easting/northing)
521796/122282

Scale
1:2,500

Created
20 Jan 2026 12:03

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



0 20 40 60m

Appendix C

EA's RoFSW Map

Surface Water Flood Risk

Datasets

- ☐ Flood zones 2 and 3
- ☒ Surface water
- ☐ None

Annual likelihood of flooding

- ☐ 1 in 30
- ☐ 1 in 100
- ☒ 1 in 1000



Datasets

- ☐ Flood zones 2 and 3
- ☒ Surface water
- ☐ None

Annual likelihood of flooding

- ☐ 1 in 30
- ☒ 1 in 100
- ☐ 1 in 1000



Datasets

- ☐ Flood zones 2 and 3
- ☒ Surface water
- ☐ None

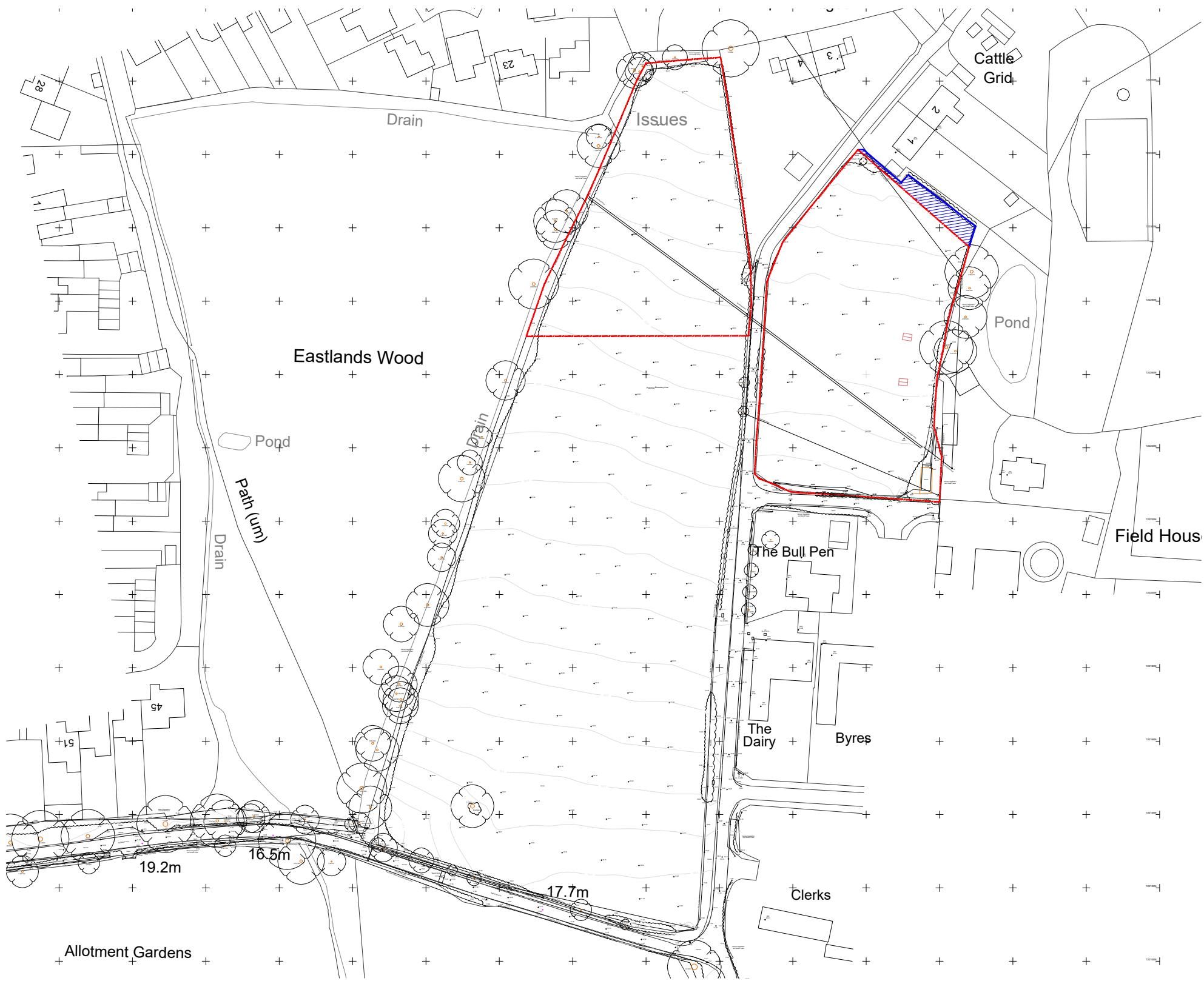
Annual likelihood of flooding

- ☒ 1 in 30
- ☐ 1 in 100
- ☐ 1 in 1000



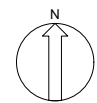
Appendix D

Site Location Plan



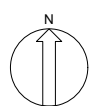
Ordnance Survey, (c) Crown Copyright 2025. All rights reserved. Licence number 100022432

Site Location Plan
Scale 1:1250



Ordnance Survey, (c) Crown Copyright 2025. All rights reserved. Licence number 100022432

Proposed Block Plan
Scale 1:500



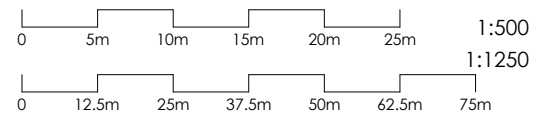
**LLOYD
HARDEN**

Design • Planning • Architecture

MATERIALS

REV BY DATE DETAILS

SCALE @ A1



CLIENT

Lee Goosens
Eastlands Lane, Cowfold, West Sussex, RH13 8AY

PROJECT

9 No - 3 & 4 Bed Homes

DRAWN BY

SJB

CHECKED BY

LKH

CONCEPTUAL DRAFT

DRAWING TITLE

Location Plan & Proposed Block Plan

DATE

24.11.25

DRAWING NUMBER

2562-01

REVISION

--

+44 (0)116 482 9284

www.lloydharden.co.uk

DO NOT CONSTRUCT FROM THIS DRAWING. Responsibility is Not Accepted For Errors Made By Others In Scaling From This Drawing. All Construction Information Must Be Taken From Figured Dimensions Only. All Dimensions And Levels Must Be Checked On Site And Any Discrepancies Between Drawings Must Be Reported To Lloyd Harden Design Ltd. THESE DRAWINGS ARE FOR CONCEPT USE ONLY.

Appendix E

BGS Borehole Log

WR38: Borehole record form

Borehole record form



British
Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Environment
Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for Cowfold Developments Ltd
Location Cowfold Horsham Rh13 8AH
NGR (ten digits) TQ 21195 22991 Please attach site plan
Ground level (if known) 41 meters metres Above Ordnance Datum
Drilling company Sussex Boreholes
Date drilling commenced 22/08/2022 (DD/MM/YYYY) Completed 27/08/2022 (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) _____ metres (m). Please tick if this is above ☐ or below ☐ ground level.
(point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter 200 mm from 0 to 63 m/depth
_____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth

Casing material _____ diameter _____ mm from _____ to _____ m/depth
and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material UPVC Plain diameter 113 mm from 0 to 50 m/depth

Casing material UPVC Slotted diameter 113 mm from 50 to 61 m/depth

Casing material _____ diameter _____ mm from _____ to _____ m/depth

Grouting details Gravel pack, bentonite pellets and cement grout to surface

Water struck at 1. 57 m (depth below datum – mbd) 2. _____ m (mbd)
3. _____ m (mbd) 4. _____ m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum _____ m. Please tick if this is above ☐ or below ☐ ground level.
(if different from borehole datum)

Pump suction depth 40 mbd

Water level (start of test) 24.3 mbd

Water level (end of test) _____ mbd

Type of test (for example, bailer, step, constant rate)

electric pump

Pumping rate 2.5 m³/hour ☒ or litres/second ☐. Please tick as appropriate.
for _____ days, 2 hours, _____ mins

Recovery to _____ mbd in _____ days, _____ hours, _____ mins
(from end of pumping)

Date(s) of measurements Pump started _____ (DD/MM/YYYY)

Pump stopped _____ (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box ☐

WR38: Borehole record form

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	Sandy yellow clay with some small stones	5	5
	Blue clay	2	7
	Dark gray clay	50	57
	Sand stone and sand	6	63
	(continue on separate page if necessary)		
	Other comments (for example, gas encountered, saline water intercepted)		

E Completing this form

How long did it take you to fill in this form? _____

For Official use only

Date received (DD/MM/YYYY)	File	Consent number	BGS reference number
_____	_____	_____	_____
Accession number	Wellmaster number	SOBI number	NGR
_____	_____	_____	_____
LIC NO	Purpose	EA reference number	
_____	_____	_____	
Copy number	Entered by		
_____	_____		

Appendix F

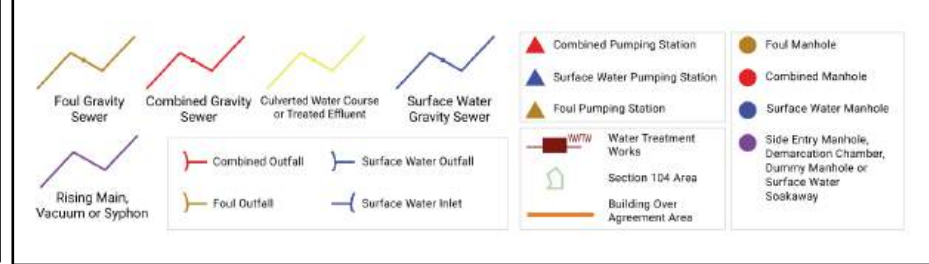
Southern Water Asset Location Plan



(c) Crown copyright and database rights 2026 Ordnance Survey AC0000808122 Date: 10/02/26 Scale: 1:1250 Map Centre: 521497,122224 Data updated: 16/01/26 Our Ref: 2023496 - 1 Wastewater Plan A2
Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2026 Ordnance Survey AC0000808122. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

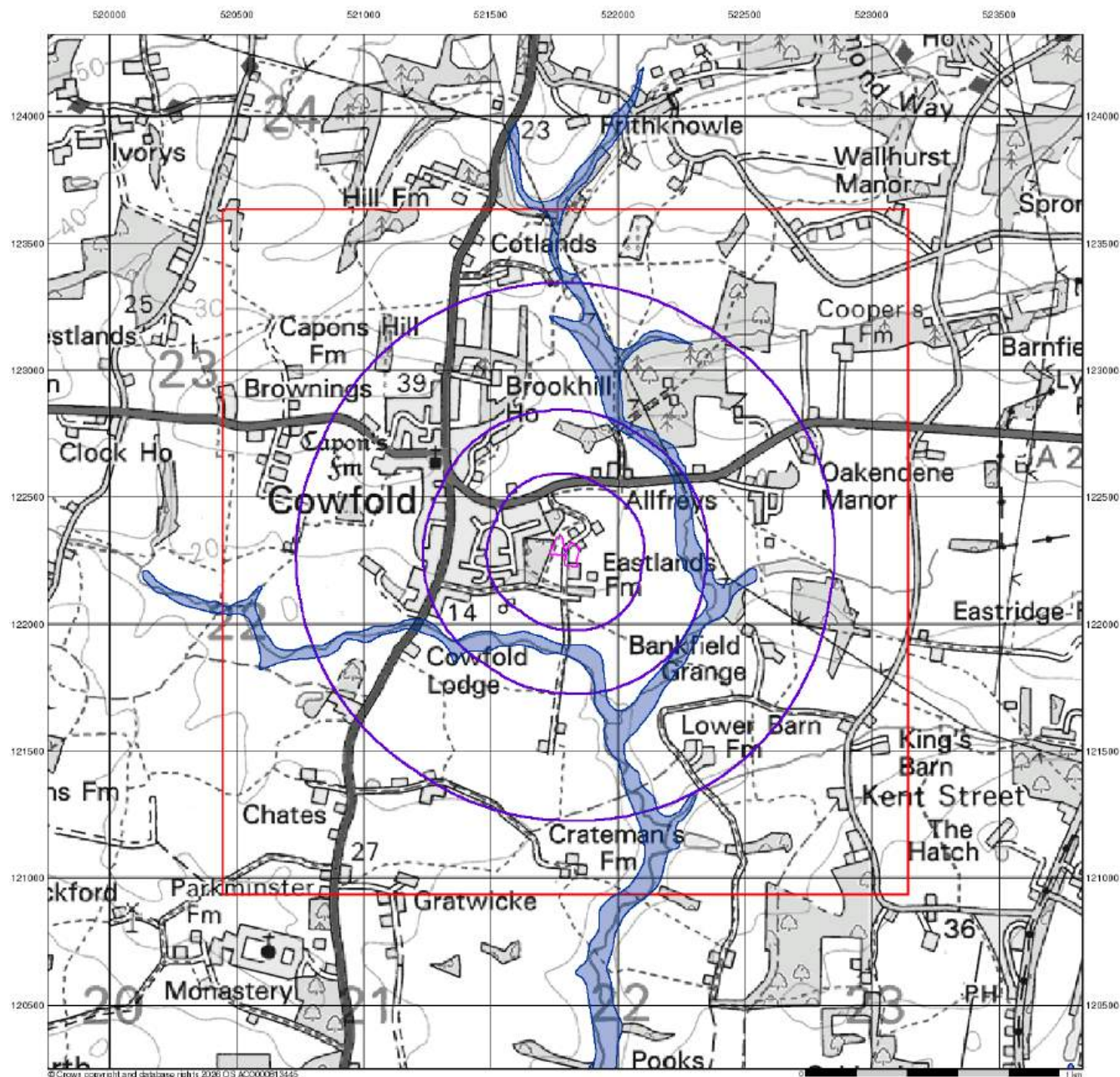


pallen@motion.co.uk	
lecco2	



Appendix G

Envirocheck FSR: Groundwater



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motion BGS Flood Data (1:50,000)

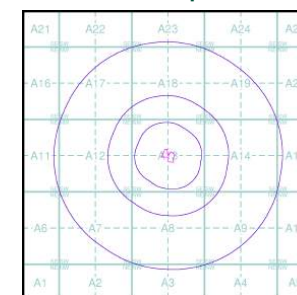
General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Slice
-  Map ID

BGS Geological Indicators of Flooding

-  Coastal
-  Inland
-  Bodies of Water

BGS Flood Data Map - Slice A



Order Details

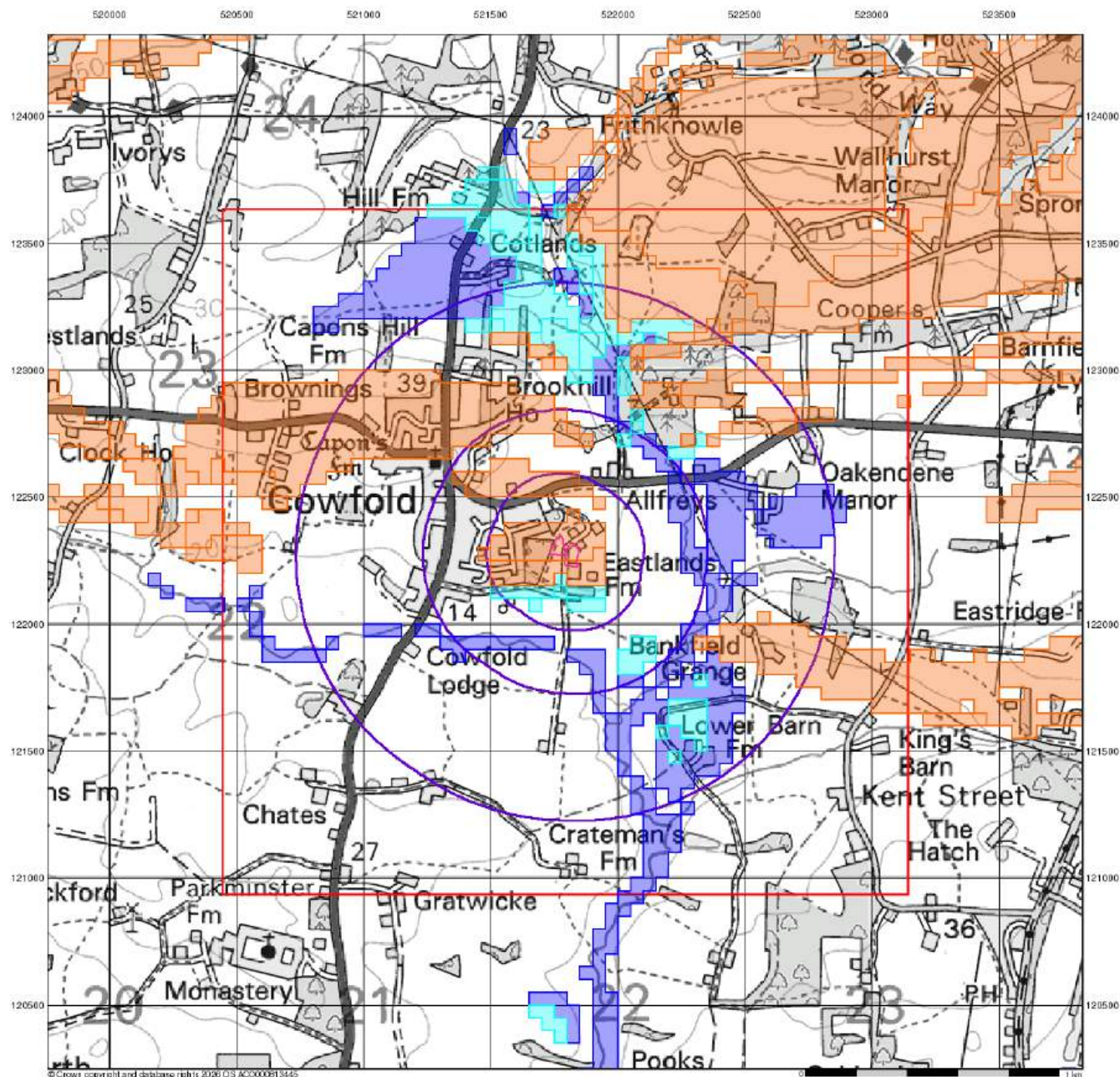
Order Number: 393800925 1 1
 Customer Ref: 1ecc02/2510088-LJ
 National Grid Reference: 521790, 122280
 Slice: A
 Site Area (Ha): 0.71
 Search Buffer (m): 1000

Site Details

The Bull Pen, Eastlands Lane, Cowfold, Horsham, RH13 8AY

Landmark
 INFORMATION GROUP

Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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motion

BGS Flood Data (1:50,000)

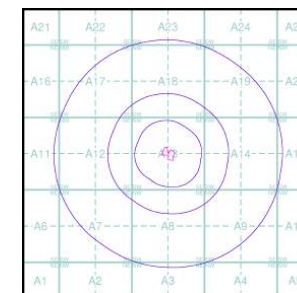
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

BGS Groundwater Flooding Susceptibility

- Potential for Groundwater Flooding to Occur at Surface
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Limited Potential for Groundwater Flooding to Occur

BGS Flood Data Map - Slice A



Order Details

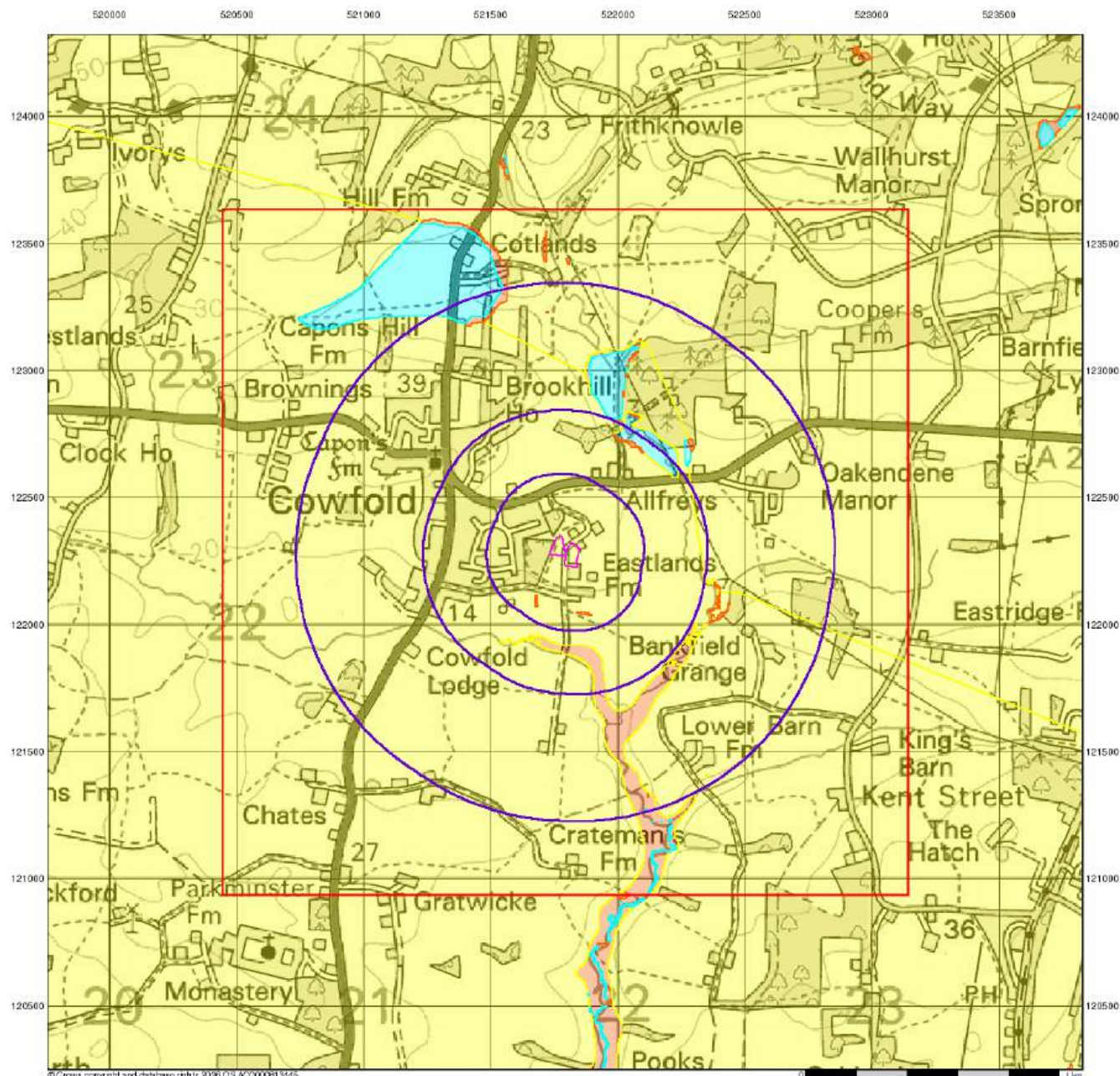
Order Number: 393800925 1 1
 Customer Ref: 1eccc2/2510088-LJ
 National Grid Reference: 521790, 122280
 Slice: A
 Site Area (Ha): 0.71
 Search Buffer (m): 1000

Site Details

The Bull Pen, Eastlands Lane, Cowfold, Horsham, RH13 8AY

Landmark
 INFORMATION GROUP

Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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GeoSmart Information Groundwater Flood Map (1:50,000)

General

Specified Site Specified Buffer(s) X Bearing Reference Point

Slice

GeoSmart Information Groundwater Flooding Risk

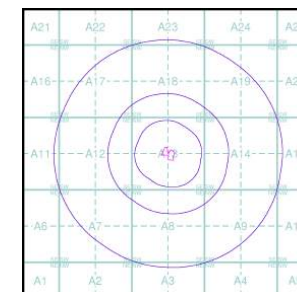
High Risk

Moderate Risk

Low Risk

Negligible Risk

GeoSmart Information Groundwater Flood Map - Slice A



Order Details

Order Number: 393800925 1 1
Customer Ref: 1ecco2/2510088-LJ
National Grid Reference: 521790, 122280
Slice: A
Site Area (Ha): 0.71
Search Buffer (m): 1000

Site Details

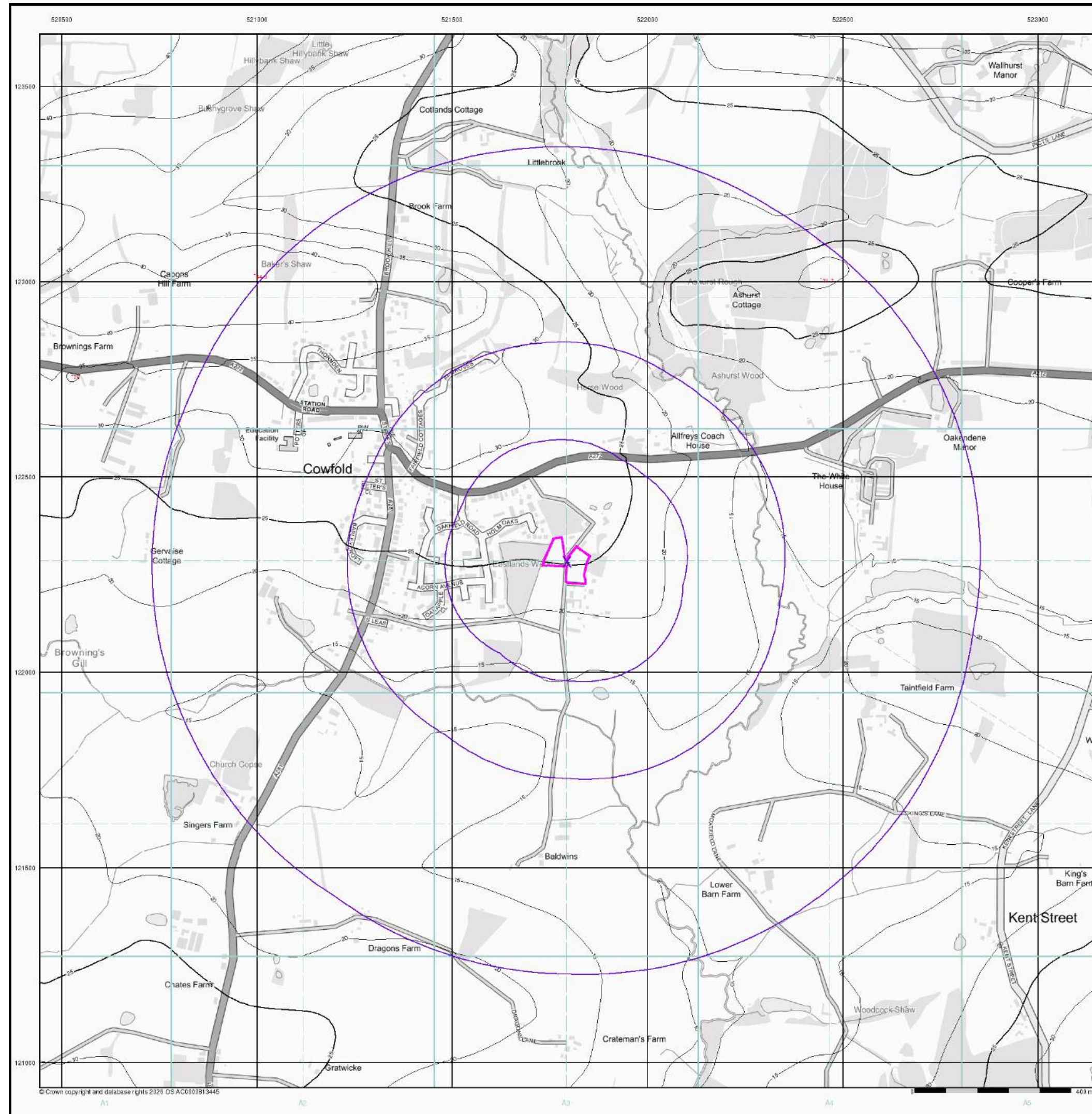
The Bull Pen, Eastlands Lane, Cowfold, Horsham, RH13 8AY

Landmark
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Appendix H

Envirocheck FSR: Historic



Appendix I

QMED Runoff Calculations

Motion		Page 1																		
84 North Street																				
Guildford																				
Surrey GU1 4AU																				
Date 20/01/2026 15:01	Designed by commonuser																			
File	Checked by																			
Innovyze	Source Control 2020.1.3																			
<u>FEH Mean Annual Flood</u> Input <table><tr><td>QMED Method</td><td>2008</td><td>SAAR (mm)</td><td>789</td><td>BFIHOST</td><td>0.264</td></tr><tr><td>Site Location</td><td>GB 521750 121900 TQ 21750 21900</td><td>URBEXT (1990)</td><td>0.0253</td><td>FARL</td><td>0.990</td></tr><tr><td>Area (ha)</td><td>0.311</td><td>SPRHOST</td><td>48.740</td><td></td><td></td></tr></table> Results QMED Rural (l/s) 4.4 QMED Urban (l/s) 4.6			QMED Method	2008	SAAR (mm)	789	BFIHOST	0.264	Site Location	GB 521750 121900 TQ 21750 21900	URBEXT (1990)	0.0253	FARL	0.990	Area (ha)	0.311	SPRHOST	48.740		
QMED Method	2008	SAAR (mm)	789	BFIHOST	0.264															
Site Location	GB 521750 121900 TQ 21750 21900	URBEXT (1990)	0.0253	FARL	0.990															
Area (ha)	0.311	SPRHOST	48.740																	
©1982-2020 Innovyze																				

Appendix J

Proposed Drainage Strategy Layout



C:\Users\jhalley\Videos\SurfSite - 1.eco2 2510088-0500-P02-Drainage Strategy.dwg



Notes

1. This Drainage Strategy Plan is for planning purposes and does not constitute detailed designs and should not be used for construction purposes.
2. All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
3. This drawing has been based upon survey supplied information and Motion cannot guarantee the accuracy of the data provided.
4. The drainage levels are based on existing levels, but also proposed levels where existing site features present unusual changes in gradient.
5. Any discrepancies should be reported to the engineer immediately, so that clarification can be sought prior to the commencement of works.
6. This drawing should be read in conjunction with all other relevant engineering details, drawings and specification.
7. 350mm minimum cover is to be provided for private pipes laid in soft/paved areas, with 900mm minimum cover to be provided for private pipes laid beneath roads / driveways unless not practicable. Where unachievable, shallow pipe drains may require protection using concrete surround or paving slabs bridging the trench, subject to the HWBC Inspector's requirements.
8. Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.
9. All foul sewage to have levels confirmed once detailed design commences and slab/FFL's are finalised.

Legend

- Site Boundary
- Permeable Paviments
- Surface Water Gravity Pipe
- Surface Water Manhole
- Orifice Flow Control
- Hydrobrake Flow Control
- Proposed Headwall
- Foul Water Inspection Chamber (600mmØ)
- Foul Water Manhole (1200mmØ)
- Foul Gravity Pipe
- Foul Rising Main
- Existing Public Foul Gravity Sewer
- Existing Public Foul Inspection Chamber / Manhole

P02	Second Issue	PA	PA	PA	10.02.2026
P01	First Issue	PA	PA	PA	21.01.2026
Rev.	Description	Drm	Chk	App	Date

Drawing Status:

**FOR PLANNING
NOT FOR CONSTRUCTION**

motion
Guildford - Reading - London
www.motion.co.uk

Client:
Lee Goossens

Project:
Eastlands Lane, Cowfold

Title:
Drainage Strategy Layout

Scale: 500 (@ A1)

Drawing:
2510088-0500

Revision:
P02

Appendix K

MicroDrainage Network Hydraulic Model Results

Motion

84 North Street
Guildford
Surrey GU1 4AU

Date 10/02/2026 09:59
File lecco2-MD-NW-09.02.2026.MDX

Innovyze

Designed by commonuser
Checked by

Network 2020.1.3

Page 1



STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)

FEH Rainfall Version

Site Location

Data Type

Maximum Rainfall (mm/hr)

Maximum Time of Concentration (mins)

Foul Sewage (l/s/ha)

100

2013

GB 521750 121900 TQ 21750 21900

Catchment

550

15

0.000

Volumetric Runoff Coeff.

PIMP (%)

Add Flow / Climate Change (%)

Minimum Backdrop Height (m)

Maximum Backdrop Height (m)

Min Design Depth for Optimisation (m)

Min Vel for Auto Design only (m/s)

Min Slope for Optimisation (1:X)

1.000

100

0

0.200

1.500

0.450

1.00

500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)

Area (ha)

Time (mins)

Area (ha)

0-4

0.217

4-8

0.130

Total Area Contributing (ha) = 0.347

Total Pipe Volume (m³) = 7.780

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN

Length (m)

Fall (m)

Slope (1:X)

I.Area (ha)

T.E. (mins)

Base Flow (l/s)

k (mm)

HYD SECT

DIA (mm)

Section Type

Auto Design

1.000

1.785

0.018

100.0

0.000

15.00

0.0

0.600

o

100

Pipe/Conduit



1.001

3.999

0.620

6.5

0.036

0.00

0.0

0.600

o

100

Pipe/Conduit



1.002

20.633

0.710

29.1

0.000

0.00

0.0

0.600

o

150

Pipe/Conduit



2.000

1.496

0.019

80.0

0.000

15.00

0.0

0.600

o

100

Pipe/Conduit



2.001

3.562

0.530

6.7

0.056

0.00

0.0

0.600

o

100

Pipe/Conduit



1.003

22.771

1.040

21.9

0.000

0.00

0.0

0.600

o

150

Pipe/Conduit



3.000

1.601

0.020

80.0

0.000

15.00

0.0

0.600

o

100

Pipe/Conduit



3.001

2.328

0.670

3.5

0.046

0.00

0.0

0.600

o

100

Pipe/Conduit



4.000

0.975

0.032

30.8

0.000

15.00

0.0

0.600

o

100

Pipe/Conduit



4.001

36.202

0.770

47.0

0.086

0.00

0.0

0.600

o

100

Pipe/Conduit



Network Results Table

PN

Rain (mm/hr)

T.C. (mins)

US/IL (m)

E I.Area (ha)

Σ Base Flow (l/s)

Foul (l/s)

Add Flow (l/s)

Vel (m/s)

Cap (l/s)

Flow (l/s)

1.000

87.92

15.00

25.238

0.000

0.0

0.0

0.0

0.77

6.0

0.0

1.001

87.92

15.00

25.220

0.036

0.0

0.0

0.0

3.06

24.1

11.4

1.002

87.92

15.00

24.550

0.036

0.0

0.0

0.0

1.87

33.1

11.4

2.000

87.92

15.00

24.439

0.000

0.0

0.0

0.0

0.86

6.8

0.0

2.001

87.92

15.00

24.420

0.056

0.0

0.0

0.0

3.00

23.6

17.8

1.003

87.92

15.00

23.840

0.092

0.0

0.0

0.0

2.16

38.2

29.2

3.000

87.92

15.00

23.540

0.000

0.0

0.0

0.0

0.86

6.8

0.0

3.001

87.92

15.00

23.520

0.046

0.0

0.0

0.0

4.18

32.8

14.6

4.000

87.92

15.00

23.652

0.000

0.0

0.0

0.0

1.39

11.0

0.0

4.001

87.92

15.00

23.620

0.086

0.0

0.0

0.0

1.13

8.9«

27.3

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Motion		Page 2
84 North Street Guildford Surrey GU1 4AU		
Date 10/02/2026 09:59	Designed by commonuser	
File 1ecco2-MD-NW-09.02.2026.MDX	Checked by	
Innovyze	Network 2020.1.3	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.004	18.176	0.108	167.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	1.736	0.022	80.0	0.000	15.00	0.0	0.600	o	100	Pipe/Conduit	
5.001	5.459	0.570	9.6	0.040	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.005	16.389	1.092	15.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	1.958	0.024	80.0	0.000	15.00	0.0	0.600	o	100	Pipe/Conduit	
6.001	12.595	0.570	22.1	0.047	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.006	45.074	1.920	23.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	31.145	1.124	27.7	0.000	0.00	0.0	0.700	o	225	Pipe/Conduit	
1.008	34.948#	1.150	30.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	36.178#	0.980	36.9	0.036	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.004	87.92	15.00	22.725	0.224	0.0	0.0	0.0	1.01	40.0κ	71.1
5.000	87.92	15.00	23.242	0.000	0.0	0.0	0.0	0.86	6.8	0.0
5.001	87.92	15.00	23.220	0.040	0.0	0.0	0.0	2.51	19.7	12.7
1.005	87.92	15.00	22.617	0.264	0.0	0.0	0.0	3.40	135.0	83.8
6.000	87.92	15.00	22.244	0.000	0.0	0.0	0.0	0.86	6.8	0.0
6.001	87.92	15.00	22.220	0.047	0.0	0.0	0.0	1.65	13.0κ	14.9
1.006	87.92	15.00	21.525	0.311	0.0	0.0	0.0	2.71	107.8	98.7
1.007	87.92	15.00	19.605	0.311	0.0	0.0	0.0	2.44	97.2κ	98.7
1.008	87.92	15.00	18.481	0.311	0.0	0.0	0.0	2.38	94.7κ	98.7
1.009	87.92	15.00	17.180	0.347	0.0	0.0	0.0	1.66	29.4κ	110.2

Motion	Page 3
84 North Street Guildford Surrey GU1 4AU	
Date 10/02/2026 09:59	
File 1ecco2-MD-NW-09.02.2026.MDX	
Innovyze	Network 2020.1.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	25.700	0.462	Junction		1.000	25.238	100				
PP1 + Orifice	25.700	0.480	Open Manhole	600	1.001	25.220	100	1.000	25.220	100	
3	25.600	1.050	Open Manhole	1200	1.002	24.550	150	1.001	24.600	100	
4	25.320	0.881	Junction		2.000	24.439	100				
PP2 + Orifice	24.900	0.480	Open Manhole	600	2.001	24.420	100	2.000	24.420	100	
6	24.890	1.050	Open Manhole	1200	1.003	23.840	150	1.002	23.840	150	
								2.001	23.890	100	
7	24.000	0.460	Junction		3.000	23.540	100				
PP3 + Orifice	24.000	0.480	Open Manhole	600	3.001	23.520	100	3.000	23.520	100	
16	24.100	0.448	Junction		4.000	23.652	100				
PP6 + Orifice	24.100	0.480	Open Manhole	600	4.001	23.620	100	4.000	23.620	100	
9	23.850	1.125	Open Manhole	1200	1.004	22.725	225	1.003	22.800	150	
								3.001	22.850	100	
								4.001	22.850	100	
10	23.700	0.458	Junction		5.000	23.242	100				
PP4 + Orifice	23.700	0.480	Open Manhole	600	5.001	23.220	100	5.000	23.220	100	
12	23.600	0.983	Open Manhole	1200	1.005	22.617	225	1.004	22.617	225	
								5.001	22.650	100	
13	22.700	0.456	Junction		6.000	22.244	100				
PP5 + Orifice	22.700	0.480	Open Manhole	600	6.001	22.220	100	6.000	22.220	100	
15	22.600	1.075	Open Manhole	1200	1.006	21.525	225	1.005	21.525	225	
								6.001	21.650	100	
19	20.730	1.125	Open Manhole	1200	1.007	19.605	225	1.006	19.605	225	
20	19.520	1.039	Open Manhole	1200	1.008	18.481	225	1.007	18.481	225	
SuDS Basin + Hydrobrake	18.180	1.000	Open Manhole	1200	1.009	17.180	150	1.008	17.331	225	226
Ordinary Watercourse	16.900	0.700	Open Manhole	0		OUTFALL		1.009	16.200	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	-3460.050	87.538			No Entry	
PP1 + Orifice	-3461.745	86.980	-3461.745	86.980	Required	
3	-3465.670	87.747	-3465.670	87.747	Required	
4	-3470.637	69.952			No Entry	
PP2 + Orifice	-3472.133	69.933	-3472.133	69.933	Required	
6	-3475.688	69.710	-3475.688	69.710	Required	
7	-3473.424	47.513			No Entry	
PP3 + Orifice	-3475.012	47.307	-3475.012	47.307	Required	
16	-3510.643	62.138			No Entry	
PP6 + Orifice	-3510.635	61.163	-3510.635	61.163	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
9	-3477.320	46.997	-3477.320	46.997	Required	
10	-3471.362	29.757			No Entry	
PP4 + Orifice	-3473.079	29.499	-3473.079	29.499	Required	
12	-3478.500	28.860	-3478.500	28.860	Required	
13	-3465.149	13.412			No Entry	
PP5 + Orifice	-3467.104	13.320	-3467.104	13.320	Required	
15	-3479.673	12.513	-3479.673	12.513	Required	
19	-3482.871	-32.448	-3482.871	-32.448	Required	
20	-3483.796	-63.579	-3483.796	-63.579	Required	
SuDS Basin + Hydrobrake	-3510.819	-77.274	-3510.819	-77.274	Required	
Ordinary Watercourse	-3583.963	-83.753			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	100	PP1 + Orifice	1 25.700	25.238	0.362	Junction	
1.001	o	100		25.700	25.220	0.380	Open Manhole	600
1.002	o	150		3 25.600	24.550	0.900	Open Manhole	1200
2.000	o	100	PP2 + Orifice	4 25.320	24.439	0.781	Junction	
2.001	o	100		24.900	24.420	0.380	Open Manhole	600
1.003	o	150		6 24.890	23.840	0.900	Open Manhole	1200
3.000	o	100	PP3 + Orifice	7 24.000	23.540	0.360	Junction	
3.001	o	100		24.000	23.520	0.380	Open Manhole	600
4.000	o	100	PP6 + Orifice	16 24.100	23.652	0.348	Junction	
4.001	o	100		24.100	23.620	0.380	Open Manhole	600
1.004	o	225		9 23.850	22.725	0.900	Open Manhole	1200
5.000	o	100	PP4 + Orifice	10 23.700	23.242	0.358	Junction	
5.001	o	100		23.700	23.220	0.380	Open Manhole	600
1.005	o	225		12 23.600	22.617	0.758	Open Manhole	1200
6.000	o	100	PP5 + Orifice	13 22.700	22.244	0.356	Junction	
6.001	o	100		22.700	22.220	0.380	Open Manhole	600
1.006	o	225		15 22.600	21.525	0.850	Open Manhole	1200
1.007	o	225		19 20.730	19.605	0.900	Open Manhole	1200
1.008	o	225		20 19.520	18.481	0.814	Open Manhole	1200
1.009	o	150	SuDS Basin + Hydrobrake	18.180	17.180	0.850	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	1.785	100.0	PP1 + Orifice	25.700	25.220	0.380	Open Manhole	600
1.001	3.999	6.5		3 25.600	24.600	0.900	Open Manhole	1200
1.002	20.633	29.1		6 24.890	23.840	0.900	Open Manhole	1200
2.000	1.496	80.0	PP2 + Orifice	24.900	24.420	0.380	Open Manhole	600
2.001	3.562	6.7		6 24.890	23.890	0.900	Open Manhole	1200
1.003	22.771	21.9		9 23.850	22.800	0.900	Open Manhole	1200
3.000	1.601	80.0	PP3 + Orifice	24.000	23.520	0.380	Open Manhole	600
3.001	2.328	3.5		9 23.850	22.850	0.900	Open Manhole	1200
4.000	0.975	30.8	PP6 + Orifice	24.100	23.620	0.380	Open Manhole	600
4.001	36.202	47.0		9 23.850	22.850	0.900	Open Manhole	1200
1.004	18.176	167.6		12 23.600	22.617	0.758	Open Manhole	1200
5.000	1.736	80.0	PP4 + Orifice	23.700	23.220	0.380	Open Manhole	600
5.001	5.459	9.6		12 23.600	22.650	0.850	Open Manhole	1200
1.005	16.389	15.0		15 22.600	21.525	0.850	Open Manhole	1200
6.000	1.958	80.0	PP5 + Orifice	22.700	22.220	0.380	Open Manhole	600
6.001	12.595	22.1		15 22.600	21.650	0.850	Open Manhole	1200
1.006	45.074	23.5		19 20.730	19.605	0.900	Open Manhole	1200
1.007	31.145	27.7		20 19.520	18.481	0.814	Open Manhole	1200
1.008	34.948#	30.4	SuDS Basin + Hydrobrake	18.180	17.331	0.624	Open Manhole	1200
1.009	36.178#	36.9	Ordinary Watercourse	16.900	16.200	0.550	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.036	0.036	0.036
1.002	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.056	0.056	0.056
1.003	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.046	0.046	0.046
4.000	-	-	100	0.000	0.000	0.000
4.001	-	-	100	0.086	0.086	0.086
1.004	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.000	0.000	0.000
5.001	-	-	100	0.040	0.040	0.040
1.005	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.000	0.000	0.000
6.001	-	-	100	0.047	0.047	0.047
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	User	-	100	0.036	0.036	0.036
				Total	Total	Total
				0.347	0.347	0.347

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.009 Ordinary Watercourse 16.900 16.200 0.000 0 0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.700	37	0.700	73	0.700	109	0.700	145	0.700	181	0.700	217	0.700	253	0.700	289	0.700
2	0.700	38	0.700	74	0.700	110	0.700	146	0.700	182	0.700	218	0.700	254	0.700	290	0.700
3	0.700	39	0.700	75	0.700	111	0.700	147	0.700	183	0.700	219	0.700	255	0.700	291	0.700
4	0.700	40	0.700	76	0.700	112	0.700	148	0.700	184	0.700	220	0.700	256	0.700	292	0.700
5	0.700	41	0.700	77	0.700	113	0.700	149	0.700	185	0.700	221	0.700	257	0.700	293	0.700
6	0.700	42	0.700	78	0.700	114	0.700	150	0.700	186	0.700	222	0.700	258	0.700	294	0.700
7	0.700	43	0.700	79	0.700	115	0.700	151	0.700	187	0.700	223	0.700	259	0.700	295	0.700
8	0.700	44	0.700	80	0.700	116	0.700	152	0.700	188	0.700	224	0.700	260	0.700	296	0.700
9	0.700	45	0.700	81	0.700	117	0.700	153	0.700	189	0.700	225	0.700	261	0.700	297	0.700
10	0.700	46	0.700	82	0.700	118	0.700	154	0.700	190	0.700	226	0.700	262	0.700	298	0.700
11	0.700	47	0.700	83	0.700	119	0.700	155	0.700	191	0.700	227	0.700	263	0.700	299	0.700
12	0.700	48	0.700	84	0.700	120	0.700	156	0.700	192	0.700	228	0.700	264	0.700	300	0.700
13	0.700	49	0.700	85	0.700	121	0.700	157	0.700	193	0.700	229	0.700	265	0.700	301	0.700
14	0.700	50	0.700	86	0.700	122	0.700	158	0.700	194	0.700	230	0.700	266	0.700	302	0.700
15	0.700	51	0.700	87	0.700	123	0.700	159	0.700	195	0.700	231	0.700	267	0.700	303	0.700
16	0.700	52	0.700	88	0.700	124	0.700	160	0.700	196	0.700	232	0.700	268	0.700	304	0.700
17	0.700	53	0.700	89	0.700	125	0.700	161	0.700	197	0.700	233	0.700	269	0.700	305	0.700
18	0.700	54	0.700	90	0.700	126	0.700	162	0.700	198	0.700	234	0.700	270	0.700	306	0.700
19	0.700	55	0.700	91	0.700	127	0.700	163	0.700	199	0.700	235	0.700	271	0.700	307	0.700
20	0.700	56	0.700	92	0.700	128	0.700	164	0.700	200	0.700	236	0.700	272	0.700	308	0.700
21	0.700	57	0.700	93	0.700	129	0.700	165	0.700	201	0.700	237	0.700	273	0.700	309	0.700
22	0.700	58	0.700	94	0.700	130	0.700	166	0.700	202	0.700	238	0.700	274	0.700	310	0.700
23	0.700	59	0.700	95	0.700	131	0.700	167	0.700	203	0.700	239	0.700	275	0.700	311	0.700
24	0.700	60	0.700	96	0.700	132	0.700	168	0.700	204	0.700	240	0.700	276	0.700	312	0.700
25	0.700	61	0.700	97	0.700	133	0.700	169	0.700	205	0.700	241	0.700	277	0.700	313	0.700
26	0.700	62	0.700	98	0.700	134	0.700	170	0.700	206	0.700	242	0.700	278	0.700	314	0.700
27	0.700	63	0.700	99	0.700	135	0.700	171	0.700	207	0.700	243	0.700	279	0.700	315	0.700
28	0.700	64	0.700	100	0.700	136	0.700	172	0.700	208	0.700	244	0.700	280	0.700	316	0.700
29	0.700	65	0.700	101	0.700	137	0.700	173	0.700	209	0.700	245	0.700	281	0.700	317	0.700
30	0.700	66	0.700	102	0.700	138	0.700	174	0.700	210	0.700	246	0.700	282	0.700	318	0.700
31	0.700	67	0.700	103	0.700	139	0.700	175	0.700	211	0.700	247	0.700	283	0.700	319	0.700
32	0.700	68	0.700	104	0.700	140	0.700	176	0.700	212	0.700	248	0.700	284	0.700	320	0.700
33	0.700	69	0.700	105	0.700	141	0.700	177	0.700	213	0.700	249	0.700	285	0.700	321	0.700
34	0.700	70	0.700	106	0.700	142	0.700	178	0.700	214	0.700	250	0.700	286	0.700	322	0.700
35	0.700	71	0.700	107	0.700	143	0.700	179	0.700	215	0.700	251	0.700	287	0.700	323	0.700
36	0.700	72	0.700	108	0.700	144	0.700	180	0.700	216	0.700	252	0.700	288	0.700	324	0.700

Motion

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Guildford

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
361	0.700	437	0.700	513	0.700	589	0.700	665	0.700	741	0.700	817	0.700	893	0.700	969	0.700	1045	0.700
362	0.700	438	0.700	514	0.700	590	0.700	666	0.700	742	0.700	818	0.700	894	0.700	970	0.700	1046	0.700
363	0.700	439	0.700	515	0.700	591	0.700	667	0.700	743	0.700	819	0.700	895	0.700	971	0.700	1047	0.700
364	0.700	440	0.700	516	0.700	592	0.700	668	0.700	744	0.700	820	0.700	896	0.700	972	0.700	1048	0.700
365	0.700	441	0.700	517	0.700	593	0.700	669	0.700	745	0.700	821	0.700	897	0.700	973	0.700	1049	0.700
366	0.700	442	0.700	518	0.700	594	0.700	670	0.700	746	0.700	822	0.700	898	0.700	974	0.700	1050	0.700
367	0.700	443	0.700	519	0.700	595	0.700	671	0.700	747	0.700	823	0.700	899	0.700	975	0.700	1051	0.700
368	0.700	444	0.700	520	0.700	596	0.700	672	0.700	748	0.700	824	0.700	900	0.700	976	0.700	1052	0.700
369	0.700	445	0.700	521	0.700	597	0.700	673	0.700	749	0.700	825	0.700	901	0.700	977	0.700	1053	0.700
370	0.700	446	0.700	522	0.700	598	0.700	674	0.700	750	0.700	826	0.700	902	0.700	978	0.700	1054	0.700
371	0.700	447	0.700	523	0.700	599	0.700	675	0.700	751	0.700	827	0.700	903	0.700	979	0.700	1055	0.700
372	0.700	448	0.700	524	0.700	600	0.700	676	0.700	752	0.700	828	0.700	904	0.700	980	0.700	1056	0.700
373	0.700	449	0.700	525	0.700	601	0.700	677	0.700	753	0.700	829	0.700	905	0.700	981	0.700	1057	0.700
374	0.700	450	0.700	526	0.700	602	0.700	678	0.700	754	0.700	830	0.700	906	0.700	982	0.700	1058	0.700
375	0.700	451	0.700	527	0.700	603	0.700	679	0.700	755	0.700	831	0.700	907	0.700	983	0.700	1059	0.700
376	0.700	452	0.700	528	0.700	604	0.700	680	0.700	756	0.700	832	0.700	908	0.700	984	0.700	1060	0.700
377	0.700	453	0.700	529	0.700	605	0.700	681	0.700	757	0.700	833	0.700	909	0.700	985	0.700	1061	0.700
378	0.700	454	0.700	530	0.700	606	0.700	682	0.700	758	0.700	834	0.700	910	0.700	986	0.700	1062	0.700
379	0.700	455	0.700	531	0.700	607	0.700	683	0.700	759	0.700	835	0.700	911	0.700	987	0.700	1063	0.700
380	0.700	456	0.700	532	0.700	608	0.700	684	0.700	760	0.700	836	0.700	912	0.700	988	0.700	1064	0.700
381	0.700	457	0.700	533	0.700	609	0.700	685	0.700	761	0.700	837	0.700	913	0.700	989	0.700	1065	0.700
382	0.700	458	0.700	534	0.700	610	0.700	686	0.700	762	0.700	838	0.700	914	0.700	990	0.700	1066	0.700
383	0.700	459	0.700	535	0.700	611	0.700	687	0.700	763	0.700	839	0.700	915	0.700	991	0.700	1067	0.700
384	0.700	460	0.700	536	0.700	612	0.700	688	0.700	764	0.700	840	0.700	916	0.700	992	0.700	1068	0.700
385	0.700	461	0.700	537	0.700	613	0.700	689	0.700	765	0.700	841	0.700	917	0.700	993	0.700	1069	0.700
386	0.700	462	0.700	538	0.700	614	0.700	690	0.700	766	0.700	842	0.700	918	0.700	994	0.700	1070	0.700
387	0.700	463	0.700	539	0.700	615	0.700	691	0.700	767	0.700	843	0.700	919	0.700	995	0.700	1071	0.700
388	0.700	464	0.700	540	0.700	616	0.700	692	0.700	768	0.700	844	0.700	920	0.700	996	0.700	1072	0.700
389	0.700	465	0.700	541	0.700	617	0.700	693	0.700	769	0.700	845	0.700	921	0.700	997	0.700	1073	0.700
390	0.700	466	0.700	542	0.700	618	0.700	694	0.700	770	0.700	846	0.700	922	0.700	998	0.700	1074	0.700
391	0.700	467	0.700	543	0.700	619	0.700	695	0.700	771	0.700	847	0.700	923	0.700	999	0.700	1075	0.700
392	0.700	468	0.700	544	0.700	620	0.700	696	0.700	772	0.700	848	0.700	924	0.700	1000	0.700	1076	0.700
393	0.700	469	0.700	545	0.700	621	0.700	697	0.700	773	0.700	849	0.700	925	0.700	1001	0.700	1077	0.700
394	0.700	470	0.700	546	0.700	622	0.700	698	0.700	774	0.700	850	0.700	926	0.700	1002	0.700	1078	0.700
395	0.700	471	0.700	547	0.700	623	0.700	699	0.700	775	0.700	851	0.700	927	0.700	1003	0.700	1079	0.700
396	0.700	472	0.700	548	0.700	624	0.700	700	0.700	776	0.700	852	0.700	928	0.700	1004	0.700	1080	0.700
397	0.700	473	0.700	549	0.700	625	0.700	701	0.700	777	0.700	853	0.700	929	0.700	1005	0.700	1081	0.700
398	0.700	474	0.700	550	0.700	626	0.700	702	0.700	778	0.700	854	0.700	930	0.700	1006	0.700	1082	0.700
399	0.700	475	0.700	551	0.700	627	0.700	703	0.700	779	0.700	855	0.700	931	0.700	1007	0.700	1083	0.700
400	0.700	476	0.700	552	0.700	628	0.700	704	0.700	780	0.700	856	0.700	932	0.700	1008	0.700	1084	0.700
401	0.700	477	0.700	553	0.700	629	0.700	705	0.700	781	0.700	857	0.700	933	0.700	1009	0.700	1085	0.700
402	0.700	478	0.700	554	0.700	630	0.700	706	0.700	782	0.700	858	0.700	934	0.700	1010	0.700	1086	0.700
403	0.700	479	0.700	555	0.700	631	0.700	707	0.700	783	0.700	859	0.700	935	0.700	1011	0.700	1087	0.700
404	0.700	480	0.700	556	0.700	632	0.700	708	0.700	784	0.700	860	0.700	936	0.700	1012	0.700	1088	0.700
405	0.700	481	0.700	557	0.700	633	0.700	709	0.700	785	0.700	861	0.700	937	0.700	1013	0.700	1089	0.700
406	0.700	482	0.700	558	0.700	634	0.700	710	0.700	786	0.700	862	0.700	938	0.700	1014	0.700	1090	0.700
407	0.700	483	0.700	559	0.700	635	0.700	711	0.700	787	0.700	863	0.700	939	0.700	1015	0.700	1091	0.700
408	0.700	484	0.700	560	0.700	636	0.700	712	0.700	788	0.700	864	0.700	940	0.700	1016	0.700	1092	0.700
409	0.700	485	0.700	561	0.700	637	0.700	713	0.700	789	0.700	865	0.700	941	0.700	1017	0.700	1093	0.700
410	0.700	486	0.700	562	0.700	638	0.700	714	0.700	790	0.700	866	0.700	942	0.700	1018	0.700	1094	0.700
411	0.700	487	0.700	563	0.700	639	0.700	715	0.700	791	0.700	867	0.700	943	0.700	1019	0.700	1095	0.700
412	0.700	488	0.700	564	0.700	640	0.700	716	0.700	792	0.700	868	0.700	944	0.700	1020	0.700	1096	0.700
413	0.700	489	0.700	565	0.700	641	0.700	717	0.700	793	0.700	869	0.700	945	0.700	1021	0.700	1097	0.700
414	0.700	490	0.700	566	0.700	642	0.700	718	0.700	794	0.700	870	0.700	946	0.700	1022	0.700	1098	0.700
415	0.700	491	0.700	567	0.700	643	0.700	719	0.700	795	0.700	871	0.700	947	0.700	1023	0.700	1099	0.700
416	0.700	492	0.700	568	0.700	644	0.700	720	0.700	796	0.700	872	0.700	948	0.700	1024	0.700	1100	0.700
417	0.700	493	0.700	569	0.700	645	0.700	721	0.700	797	0.700	873	0.700	949	0.700	1025	0.700	1101	0.700
418	0.700	494	0.700	570	0.700	646	0.700	722	0.700	798	0.700	874	0.700	950	0.700	1026	0.700	1102	0.700
419	0.700	495	0.700	571	0.700	647	0.700	723	0.700	799	0.700	875	0.700	951	0.700	1027	0.700	1103	0.700
420	0.700	496	0.700	572	0.700	648	0.700	724	0.700	800	0.700	876	0.700	952	0.700	1028	0.700	1104	0.700
421	0.700	497	0.700	573	0.700	649	0.700	725	0.700	801	0.700	877	0.700	953	0.700	1029	0.700	1105	0.700
422	0.700	498	0.700	574	0.700	650	0.700	726	0.700	802	0.700	878	0.700	954	0.700	1030	0.700	1106	0.700
423	0.700	499	0.700	575	0.700	651	0.700	727	0.700	803	0.700	879	0.700	955	0.700	1031	0.700	1107	0.700
424	0.700	500	0.700	576	0.700	652	0.700	728	0.700	804	0.700	880	0.700	956	0.700	1032	0.700	1108	0.700
425	0.700	501	0.700	577	0.700	653	0.700	729	0.700	805	0.700	881	0.7						

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1121	0.700	1153	0.700	1185	0.700	1217	0.700	1249	0.700	1281	0.700	1313	0.700	1345	0.700	1377	0.700
1122	0.700	1154	0.700	1186	0.700	1218	0.700	1250	0.700	1282	0.700	1314	0.700	1346	0.700	1378	0.700
1123	0.700	1155	0.700	1187	0.700	1219	0.700	1251	0.700	1283	0.700	1315	0.700	1347	0.700	1379	0.700
1124	0.700	1156	0.700	1188	0.700	1220	0.700	1252	0.700	1284	0.700	1316	0.700	1348	0.700	1380	0.700
1125	0.700	1157	0.700	1189	0.700	1221	0.700	1253	0.700	1285	0.700	1317	0.700	1349	0.700	1381	0.700
1126	0.700	1158	0.700	1190	0.700	1222	0.700	1254	0.700	1286	0.700	1318	0.700	1350	0.700	1382	0.700
1127	0.700	1159	0.700	1191	0.700	1223	0.700	1255	0.700	1287	0.700	1319	0.700	1351	0.700	1383	0.700
1128	0.700	1160	0.700	1192	0.700	1224	0.700	1256	0.700	1288	0.700	1320	0.700	1352	0.700	1384	0.700
1129	0.700	1161	0.700	1193	0.700	1225	0.700	1257	0.700	1289	0.700	1321	0.700	1353	0.700	1385	0.700
1130	0.700	1162	0.700	1194	0.700	1226	0.700	1258	0.700	1290	0.700	1322	0.700	1354	0.700	1386	0.700
1131	0.700	1163	0.700	1195	0.700	1227	0.700	1259	0.700	1291	0.700	1323	0.700	1355	0.700	1387	0.700
1132	0.700	1164	0.700	1196	0.700	1228	0.700	1260	0.700	1292	0.700	1324	0.700	1356	0.700	1388	0.700
1133	0.700	1165	0.700	1197	0.700	1229	0.700	1261	0.700	1293	0.700	1325	0.700	1357	0.700	1389	0.700
1134	0.700	1166	0.700	1198	0.700	1230	0.700	1262	0.700	1294	0.700	1326	0.700	1358	0.700	1390	0.700
1135	0.700	1167	0.700	1199	0.700	1231	0.700	1263	0.700	1295	0.700	1327	0.700	1359	0.700	1391	0.700
1136	0.700	1168	0.700	1200	0.700	1232	0.700	1264	0.700	1296	0.700	1328	0.700	1360	0.700	1392	0.700
1137	0.700	1169	0.700	1201	0.700	1233	0.700	1265	0.700	1297	0.700	1329	0.700	1361	0.700	1393	0.700
1138	0.700	1170	0.700	1202	0.700	1234	0.700	1266	0.700	1298	0.700	1330	0.700	1362	0.700	1394	0.700
1139	0.700	1171	0.700	1203	0.700	1235	0.700	1267	0.700	1299	0.700	1331	0.700	1363	0.700	1395	0.700
1140	0.700	1172	0.700	1204	0.700	1236	0.700	1268	0.700	1300	0.700	1332	0.700	1364	0.700	1396	0.700
1141	0.700	1173	0.700	1205	0.700	1237	0.700	1269	0.700	1301	0.700	1333	0.700	1365	0.700	1397	0.700
1142	0.700	1174	0.700	1206	0.700	1238	0.700	1270	0.700	1302	0.700	1334	0.700	1366	0.700	1398	0.700
1143	0.700	1175	0.700	1207	0.700	1239	0.700	1271	0.700	1303	0.700	1335	0.700	1367	0.700	1399	0.700
1144	0.700	1176	0.700	1208	0.700	1240	0.700	1272	0.700	1304	0.700	1336	0.700	1368	0.700	1400	0.700
1145	0.700	1177	0.700	1209	0.700	1241	0.700	1273	0.700	1305	0.700	1337	0.700	1369	0.700	1401	0.700
1146	0.700	1178	0.700	1210	0.700	1242	0.700	1274	0.700	1306	0.700	1338	0.700	1370	0.700	1402	0.700
1147	0.700	1179	0.700	1211	0.700	1243	0.700	1275	0.700	1307	0.700	1339	0.700	1371	0.700	1403	0.700
1148	0.700	1180	0.700	1212	0.700	1244	0.700	1276	0.700	1308	0.700	1340	0.700	1372	0.700	1404	0.700
1149	0.700	1181	0.700	1213	0.700	1245	0.700	1277	0.700	1309	0.700	1341	0.700	1373	0.700	1405	0.700
1150	0.700	1182	0.700	1214	0.700	1246	0.700	1278	0.700	1310	0.700	1342	0.700	1374	0.700	1406	0.700
1151	0.700	1183	0.700	1215	0.700	1247	0.700	1279	0.700	1311	0.700	1343	0.700	1375	0.700	1407	0.700
1152	0.700	1184	0.700	1216	0.700	1248	0.700	1280	0.700	1312	0.700	1344	0.700	1376	0.700	1408	0.700

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Manhole Headloss Coeff (Global)	0.500	Inlet Coefficient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	7	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 521750 121900 TQ 21750 21900	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	30

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Online Controls for Storm

Orifice Manhole: PP1 + Orifice, DS/PN: 1.001, Volume (m³): 0.1

Diameter (m) 0.082 Discharge Coefficient 0.600 Invert Level (m) 25.220

Orifice Manhole: PP2 + Orifice, DS/PN: 2.001, Volume (m³): 0.1

Diameter (m) 0.068 Discharge Coefficient 0.600 Invert Level (m) 24.420

Orifice Manhole: PP3 + Orifice, DS/PN: 3.001, Volume (m³): 0.1

Diameter (m) 0.068 Discharge Coefficient 0.600 Invert Level (m) 23.520

Orifice Manhole: PP6 + Orifice, DS/PN: 4.001, Volume (m³): 0.1

Diameter (m) 0.068 Discharge Coefficient 0.600 Invert Level (m) 23.620

Orifice Manhole: PP4 + Orifice, DS/PN: 5.001, Volume (m³): 0.1

Diameter (m) 0.068 Discharge Coefficient 0.600 Invert Level (m) 23.220

Orifice Manhole: PP5 + Orifice, DS/PN: 6.001, Volume (m³): 0.1

Diameter (m) 0.098 Discharge Coefficient 0.600 Invert Level (m) 22.220

Hydro-Brake® Optimum Manhole: SuDS Basin + Hydrobrake, DS/PN: 1.009, Volume (m³): 2.5

Unit Reference	MD-SHE-0099-4400-1000-4400	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	99
Design Flow (l/s)	4.4	Invert Level (m)	17.180
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points			Control Points		
	Head (m)	Flow (l/s)		Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.4	Kick-Flo®	0.636	3.6
Flush-Flo™	0.297	4.4	Mean Flow over Head Range	-	3.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	0.600	3.8	1.600	5.5	2.600	6.9	5.000	9.4	7.500	11.3
0.200	4.3	0.800	4.0	1.800	5.8	3.000	7.3	5.500	9.8	8.000	11.7
0.300	4.4	1.000	4.4	2.000	6.1	3.500	7.9	6.000	10.2	8.500	12.0
0.400	4.3	1.200	4.8	2.200	6.4	4.000	8.4	6.500	10.6	9.000	12.4
0.500	4.2	1.400	5.1	2.400	6.6	4.500	8.9	7.000	11.0	9.500	12.7

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Storage Structures for Storm

Porous Car Park Manhole: PP1 + Orifice, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	25.220	Depression Storage (mm)	5
Max Percolation (l/s)	22.0	Width (m)	8.9	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	8.9	Cap Volume Depth (m)	0.380

Porous Car Park Manhole: PP2 + Orifice, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	24.420	Depression Storage (mm)	5
Max Percolation (l/s)	52.8	Width (m)	19.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.380

Porous Car Park Manhole: PP3 + Orifice, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	23.520	Depression Storage (mm)	5
Max Percolation (l/s)	38.9	Width (m)	14.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.380

Porous Car Park Manhole: PP6 + Orifice, DS/PN: 4.001

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	23.620	Depression Storage (mm)	5
Max Percolation (l/s)	97.2	Width (m)	35.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.380

Porous Car Park Manhole: PP4 + Orifice, DS/PN: 5.001

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	23.220	Depression Storage (mm)	5
Max Percolation (l/s)	47.2	Width (m)	17.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.380

Porous Car Park Manhole: PP5 + Orifice, DS/PN: 6.001

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	22.220	Depression Storage (mm)	5
Max Percolation (l/s)	30.6	Width (m)	11.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	10.0	Cap Volume Depth (m)	0.380

Tank or Pond Manhole: SuDS Basin + Hydrobrake, DS/PN: 1.009

Invert Level (m) 17.180			
Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	183.8	1.000	356.2

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Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000		1	0.000	0.014	0.000
1.001	PP1 + Orifice	0.136	0.031	9.030	9.197
1.002		3	1.188	0.365	0.000
2.000		4	0.000	0.012	0.000
2.001	PP2 + Orifice	0.136	0.028	21.660	21.824
1.003		6	1.188	0.402	0.000
3.000		7	0.000	0.013	0.000
3.001	PP3 + Orifice	0.136	0.018	15.960	16.114
4.000		16	0.000	0.008	0.000
4.001	PP6 + Orifice	0.136	0.284	39.900	40.320
1.004		9	1.272	0.723	0.000
5.000		10	0.000	0.014	0.000
5.001	PP4 + Orifice	0.136	0.043	19.380	19.559
1.005		12	1.112	0.652	0.000
6.000		13	0.000	0.015	0.000
6.001	PP5 + Orifice	0.136	0.099	12.540	12.775
1.006		15	1.216	1.792	0.000
1.007		19	1.272	1.238	0.000
1.008		20	1.175	1.390	0.000
1.009	SuDS Basin + Hydrobrake	1.131	0.639	265.263	267.034
Total		10.368	7.780	383.733	401.880

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	7	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 521750 121900 TQ 21750 21900	Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)	300.0	DTS Status	OFF
Analysis Timestep	Fine	DVD Status	ON
Inertia Status	ON		

Profile(s)		Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760	
Return Period(s) (years)		2, 10, 30, 100
Climate Change (%)		0, 40, 40, 45

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Overflow Vol (m ³)	Maximum Vol (m ³)	Discharge Vol (m ³)
1.000		1 120 minute 2 year Summer I+0%	120	25.700	25.308	-0.030	0.000		0.065	0.000
1.001	PP1 + Orifice	120 minute 2 year Summer I+0%	120	25.700	25.308	-0.012	0.000		2.115	6.476
1.002		3 120 minute 2 year Summer I+0%	120	25.600	24.578	-0.122	0.000		0.026	6.474
2.000		4 180 minute 2 year Summer I+0%	180	25.320	24.514	-0.025	0.000		0.070	0.000
2.001	PP2 + Orifice	180 minute 2 year Summer I+0%	180	24.900	24.514	-0.006	0.000		5.386	11.360
1.003		6 120 minute 2 year Summer I+0%	120	24.890	23.875	-0.115	0.000		0.039	15.540
3.000		7 120 minute 2 year Summer I+0%	120	24.000	23.612	-0.028	0.000		0.067	0.000
3.001	PP3 + Orifice	120 minute 2 year Summer I+0%	120	24.000	23.612	-0.008	0.000		3.893	7.766
4.000		16 240 minute 2 year Summer I+0%	240	24.100	23.719	-0.033	0.000		0.062	0.000
4.001	PP6 + Orifice	240 minute 2 year Summer I+0%	240	24.100	23.719	-0.001	0.000		10.428	18.832
1.004		9 180 minute 2 year Summer I+0%	180	23.850	22.801	-0.149	0.000		0.080	44.845
5.000		10 180 minute 2 year Summer I+0%	180	23.700	23.294	-0.048	0.000		0.048	0.000
5.001	PP4 + Orifice	180 minute 2 year Summer I+0%	180	23.700	23.295	-0.025	0.000		3.827	7.907
1.005		12 180 minute 2 year Summer I+0%	180	23.600	22.662	-0.180	0.000		0.092	52.748
6.000		13 120 minute 2 year Summer I+0%	120	22.700	22.311	-0.033	0.000		0.062	0.000
6.001	PP5 + Orifice	120 minute 2 year Summer I+0%	120	22.700	22.311	-0.009	0.000		3.030	8.363
1.006		15 120 minute 2 year Summer I+0%	120	22.600	21.579	-0.171	0.000		0.060	50.105
1.007		19 120 minute 2 year Summer I+0%	120	20.730	19.662	-0.168	0.000		0.068	50.097
1.008		20 120 minute 2 year Summer I+0%	120	19.520	18.539	-0.167	0.000		0.070	50.079
1.009	SuDS Basin + Hydrobrake	360 minute 2 year Summer I+0%	360	18.180	17.399	0.069	0.000		44.019	90.391

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		1	0.0	OK*
1.001	PP1 + Orifice	36	2.5	OK
1.002		3	2.5	OK
2.000		4	0.0	OK*
2.001	PP2 + Orifice	72	2.3	OK
1.003		6	4.6	OK
3.000		7	0.0	OK*
3.001	PP3 + Orifice	56	2.2	OK
4.000		16	0.0	OK*
4.001	PP6 + Orifice	116	2.5	OK
1.004		9	8.9	OK
5.000		10	0.0	OK*
5.001	PP4 + Orifice	72	1.6	OK
1.005		12	10.6	OK
6.000		13	0.0	OK*
6.001	PP5 + Orifice	40	3.1	OK
1.006		15	13.4	OK
1.007		19	13.4	OK
1.008		20	13.4	OK
1.009	SuDS Basin + Hydrobrake		4.3	SURCHARGED

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria			
Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000
		MADD Factor * 10m³/ha Storage	0.000
		Inlet Coefficient	0.800
		Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	7	Number of Real Time Controls	0

Synthetic Rainfall Details			
Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 521750 121900 TQ 21750 21900	Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)	300.0	DTS Status	OFF
Analysis Timestep	Fine	DVD Status	ON
		Inertia Status	ON

Profile(s)		Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880,	
		4320, 5760
Return Period(s) (years)		2, 10, 30, 100
Climate Change (%)		0, 40, 40, 45

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Overflow Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)
1.000		1 15 minute 10 year Summer I+40%	15	25.700	25.338	0.000	0.000		0.147	0.000
1.001	PP1 + Orifice	60 minute 10 year Summer I+40%	60	25.700	25.420	0.100	0.000		4.820	11.200
1.002		3 60 minute 10 year Summer I+40%	60	25.600	24.593	-0.107	0.000		0.043	11.198
2.000		4 15 minute 10 year Summer I+40%	15	25.320	24.539	0.000	0.000		0.113	-0.028
2.001	PP2 + Orifice	120 minute 10 year Summer I+40%	120	24.900	24.633	0.113	0.000		12.196	21.985
1.003		6 60 minute 10 year Summer I+40%	60	24.890	23.892	-0.098	0.000		0.060	26.062
3.000		7 15 minute 10 year Summer I+40%	15	24.000	23.640	0.000	0.000		0.122	-0.017
3.001	PP3 + Orifice	120 minute 10 year Summer I+40%	120	24.000	23.730	0.110	0.000		8.868	18.493
4.000		16 720 minute 10 year Summer I+40%	720	24.100	23.752	0.000	0.000		0.120	0.000
4.001	PP6 + Orifice	180 minute 10 year Summer I+40%	180	24.100	23.839	0.119	0.000		23.051	37.750
1.004		9 120 minute 10 year Summer I+40%	120	23.850	22.834	-0.116	0.000		0.119	85.990
5.000		10 120 minute 10 year Winter I+40%	120	23.700	23.342	0.000	0.000		0.118	0.000
5.001	PP4 + Orifice	120 minute 10 year Summer I+40%	120	23.700	23.379	0.059	0.000		8.156	15.544
1.005		12 120 minute 10 year Summer I+40%	120	23.600	22.679	-0.163	0.000		0.131	101.527
6.000		13 15 minute 10 year Summer I+40%	15	22.700	22.344	0.000	0.000		0.134	0.000
6.001	PP5 + Orifice	60 minute 10 year Summer I+40%	60	22.700	22.413	0.093	0.000		6.451	14.468
1.006		15 60 minute 10 year Summer I+40%	60	22.600	21.604	-0.146	0.000		0.091	81.715
1.007		19 60 minute 10 year Summer I+40%	60	20.730	19.690	-0.140	0.000		0.103	81.643
1.008		20 60 minute 10 year Summer I+40%	60	19.520	18.567	-0.139	0.000		0.107	81.570
1.009	SuDS Basin + Hydrobrake	360 minute 10 year Summer I+40%	360	18.180	17.738	0.408	0.000		127.597	150.110

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		1	0.2	SURCHARGED*
1.001	PP1 + Orifice	22	5.6	FLOOD RISK
1.002		3	5.6	OK
2.000		4	0.1	SURCHARGED*
2.001	PP2 + Orifice	56	4.1	FLOOD RISK
1.003		6	9.4	OK
3.000		7	0.1	SURCHARGED*
3.001	PP3 + Orifice	48	4.0	FLOOD RISK
4.000		16	0.0	SURCHARGED*
4.001	PP6 + Orifice	93	4.1	FLOOD RISK
1.004		9	17.0	OK
5.000		10	0.0	SURCHARGED*
5.001	PP4 + Orifice	56	3.4	SURCHARGED
1.005		12	20.4	OK
6.000		13	0.2	SURCHARGED*
6.001	PP5 + Orifice	22	7.6	FLOOD RISK
1.006		15	27.7	OK
1.007		19	27.7	OK
1.008		20	27.7	OK
1.009	SuDS Basin + Hydrobrake		4.4	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	7	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 521750 121900 TQ 21750 21900	Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)	300.0	DTS Status	OFF
Analysis Timestep	Fine	DVD Status	ON
Inertia Status	ON		

Profile(s)		Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760	
Return Period(s) (years)		2, 10, 30, 100
Climate Change (%)		0, 40, 40, 45

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Overflow Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)
1.000		1 15 minute 30 year Summer I+40%	15	25.700	25.338	0.000	0.000		0.206	-0.001
1.001	PP1 + Orifice	60 minute 30 year Summer I+40%	60	25.700	25.493	0.173	0.000		6.577	15.020
1.002		3 60 minute 30 year Summer I+40%	60	25.600	24.597	-0.103	0.000		0.048	15.017
2.000		4 15 minute 30 year Summer I+40%	15	25.320	24.539	0.000	0.000		0.162	-0.045
2.001	PP2 + Orifice	120 minute 30 year Summer I+40%	120	24.900	24.700	0.180	0.000		16.049	28.552
1.003		6 60 minute 30 year Summer I+40%	60	24.890	23.897	-0.093	0.000		0.067	34.801
3.000		7 15 minute 30 year Summer I+40%	15	24.000	23.640	0.000	0.000		0.173	-0.029
3.001	PP3 + Orifice	60 minute 30 year Summer I+40%	60	24.000	23.797	0.177	0.000		11.720	17.656
4.000		16 15 minute 30 year Summer I+40%	15	24.100	23.752	0.000	0.000		0.127	-0.058
4.001	PP6 + Orifice	180 minute 30 year Summer I+40%	180	24.100	23.904	0.184	0.000		29.872	48.375
1.004		9 60 minute 30 year Summer I+40%	60	23.850	22.847	-0.103	0.000		0.137	74.461
5.000		10 15 minute 30 year Summer I+40%	15	23.700	23.342	0.000	0.000		0.115	-0.022
5.001	PP4 + Orifice	120 minute 30 year Summer I+40%	120	23.700	23.428	0.108	0.000		10.670	20.277
1.005		12 60 minute 30 year Summer I+40%	60	23.600	22.686	-0.156	0.000		0.145	88.866
6.000		13 15 minute 30 year Summer I+40%	15	22.700	22.344	0.000	0.000		0.189	0.000
6.001	PP5 + Orifice	60 minute 30 year Summer I+40%	60	22.700	22.480	0.160	0.000		8.673	19.452
1.006		15 60 minute 30 year Summer I+40%	60	22.600	21.613	-0.137	0.000		0.102	108.222
1.007		19 60 minute 30 year Summer I+40%	60	20.730	19.699	-0.131	0.000		0.115	108.120
1.008		20 60 minute 30 year Summer I+40%	60	19.520	18.576	-0.130	0.000		0.119	108.015
1.009	SuDS Basin + Hydrobrake	480 minute 30 year Summer I+40%	480	18.180	17.905	0.575	0.000		175.922	193.437

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		1	0.2	SURCHARGED*
1.001	PP1 + Orifice	22	6.7	FLOOD RISK
1.002		3	6.7	OK
2.000		4	0.1	SURCHARGED*
2.001	PP2 + Orifice	64	4.8	FLOOD RISK
1.003		6	11.3	OK
3.000		7	0.1	SURCHARGED*
3.001	PP3 + Orifice	40	4.8	FLOOD RISK
4.000		16	0.0	SURCHARGED*
4.001	PP6 + Orifice	102	4.8	FLOOD RISK
1.004		9	20.5	OK
5.000		10	0.1	SURCHARGED*
5.001	PP4 + Orifice	52	4.0	FLOOD RISK
1.005		12	24.5	OK
6.000		13	0.2	SURCHARGED*
6.001	PP5 + Orifice	20	9.2	FLOOD RISK
1.006		15	33.4	OK
1.007		19	33.4	OK
1.008		20	33.4	OK
1.009	SuDS Basin + Hydrobrake		4.4	FLOOD RISK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	7	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 521750 121900 TQ 21750 21900	Cv (Winter)	1.000
Margin for Flood Risk Warning (mm)	300.0	DTS Status	OFF
Analysis Timestep	Fine	DVD Status	ON
Inertia Status	ON		

Profile(s)		Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760	
Return Period(s) (years)		2, 10, 30, 100
Climate Change (%)		0, 40, 40, 45

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Overflow Vol (m ³)	Maximum Vol (m ³)	Discharge Vol (m ³)
1.000		1 15 minute 100 year Summer I+45%	15	25.700	25.338	0.000	0.000		0.283	-0.005
1.001	PP1 + Orifice	60 minute 100 year Summer I+45%	60	25.700	25.597	0.277	0.000		9.074	20.099
1.002		3 60 minute 100 year Summer I+45%	60	25.600	24.602	-0.098	0.000		0.053	20.097
2.000		4 15 minute 100 year Summer I+45%	15	25.320	24.539	0.000	0.000		0.224	-0.074
2.001	PP2 + Orifice	120 minute 100 year Summer I+45%	120	24.900	24.794	0.274	0.000		21.441	37.383
1.003		6 60 minute 100 year Summer I+45%	60	24.890	23.903	-0.087	0.000		0.075	45.571
3.000		7 15 minute 100 year Summer I+45%	15	24.000	23.640	0.000	0.000		0.240	-0.049
3.001	PP3 + Orifice	60 minute 100 year Summer I+45%	60	24.000	23.899	0.279	0.000		16.026	23.388
4.000		16 15 minute 100 year Summer I+45%	15	24.100	23.752	0.000	0.000		0.182	-0.097
4.001	PP6 + Orifice	180 minute 100 year Summer I+45%	180	24.100	23.996	0.276	0.000		39.596	62.796
1.004		9 60 minute 100 year Summer I+45%	60	23.850	22.861	-0.089	0.000		0.158	96.087
5.000		10 15 minute 100 year Summer I+45%	15	23.700	23.342	0.000	0.000		0.163	-0.036
5.001	PP4 + Orifice	60 minute 100 year Summer I+45%	60	23.700	23.498	0.178	0.000		14.285	19.417
1.005		12 60 minute 100 year Summer I+45%	60	23.600	22.692	-0.150	0.000		0.160	115.335
6.000		13 15 minute 100 year Summer I+45%	15	22.700	22.344	0.000	0.000		0.262	-0.002
6.001	PP5 + Orifice	60 minute 100 year Summer I+45%	60	22.700	22.577	0.257	0.000		11.893	26.082
1.006		15 60 minute 100 year Summer I+45%	60	22.600	21.622	-0.128	0.000		0.114	141.277
1.007		19 60 minute 100 year Summer I+45%	60	20.730	19.709	-0.121	0.000		0.129	141.131
1.008		20 60 minute 100 year Summer I+45%	60	19.520	18.587	-0.119	0.000		0.133	140.983
1.009	SuDS Basin + Hydrobrake	600 minute 100 year Winter I+45%	600	18.180	18.113	0.783	0.000		243.667	254.729

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		1	0.3	SURCHARGED*
1.001	PP1 + Orifice	24	8.1	FLOOD RISK
1.002		3	8.1	OK
2.000		4	0.1	SURCHARGED*
2.001	PP2 + Orifice	68	5.6	FLOOD RISK
1.003		6	13.6	OK
3.000		7	0.1	SURCHARGED*
3.001	PP3 + Orifice	44	5.7	FLOOD RISK
4.000		16	0.0	SURCHARGED*
4.001	PP6 + Orifice	108	5.6	FLOOD RISK
1.004		9	24.5	OK
5.000		10	0.1	SURCHARGED*
5.001	PP4 + Orifice	46	4.8	FLOOD RISK
1.005		12	29.2	OK
6.000		13	0.2	SURCHARGED*
6.001	PP5 + Orifice	24	11.1	FLOOD RISK
1.006		15	40.1	OK
1.007		19	40.1	OK
1.008		20	40.1	OK
1.009	SuDS Basin + Hydrobrake		4.4	FLOOD RISK

Appendix L

Drainage Management and Maintenance Plan



Eastlands Lane, Cowfold

Drainage Management and Maintenance
Plan

For

Eastlands Farm Ltd

Document Control Sheet

Eastlands Lane, Cowfold

Eastlands Farm Ltd

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
10 th February 2026	Final	Laura Jagiela	Phil Allen MCIWEM C.WEM



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1.0 Introduction

- 1.1 This document sets out the principles for the long-term management and maintenance of the proposed surface water drainage system on the development proposed at Eastlands Lane, Cowfold.
- 1.2 The purpose of this document is to ensure that the site management company or their agents have a robust inspection and maintenance plan going forwards. This ensures the optimum operation of the surface water drainage system and that it will be continually maintained for the lifetime of the development. This will contribute to reducing the risk of surface water flooding both on- and off-site.
- 1.3 All those responsible for maintenance should follow relevant health and safety legislation for all activities listed within this report (including lone working, if relevant). Method statements and risk assessments should always be undertaken and made available, if requested.
- 1.4 This document has been produced by Motion on behalf of their client, Eastlands Farm Ltd. This document describes the typical management and maintenance tasks that are known at the design stage (maintenance frequencies and typical tasks, for example). These have been drawn from industry guidance such as CIRIA C753 - The SuDS Manual – and manufacturer's own guidance.
- 1.5 Maintenance is considered as a construction activity under the CDM Regulations 2015. Under the CDM Regulations, it is a requirement that a competent person be appointed to carry out a required role. CDM defines a competent person as an individual with sufficient knowledge of the specific tasks to be undertaken, as well as sufficient experience and ability to carry out their duties in relation to the task in a way that secures health and safety on site.
- 1.6 In recognition of the requirements of the CDM Regulations 2015, this surface water management and maintenance plan expects that the maintenance work will be carried out by a competent person who must have prior knowledge of the drainage components and SuDS systems on site.
- 1.7 There are limitations on what this document can prescribe at this time. At this stage this document cannot name the specific individuals who will carry out the maintenance and what equipment is to be used. Related to this, this document is unable to provide method statements for exactly how maintenance practices will be carried out. These can only be determined at the time of the maintenance being carried out, the exact maintenance need and the methods of working prescribed by those carrying out the maintenance (in their RAMS, for example). Therefore, this is to be the responsibility of the site management company and/or the individuals carrying out the work. We urge those who are carrying out the maintenance to record this information and make it available to the Local Planning Authority (LPA), if required to do so. This drainage management and maintenance plan needs to be a living document that is owned and maintained by the adopting site management company.

2.0 Maintenance Categories

2.1 There are three categories of maintenance activities referred to in this report. These are:

Regular maintenance (including inspections and monitoring)

- „ Regular maintenance consists of basic tasks done on a frequent and predictable schedule, including inspections, vegetation management, and litter, silt and debris removal.

Occasional maintenance

- „ Occasional maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).

Remedial maintenance

- „ Remedial maintenance comprises of intermittent tasks that may be required to rectify faults associated with the system. The likelihood of faults can be minimised by correct installation, regular inspection and timely maintenance. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events and, as such, timings are difficult to predict.
- „ This document should be read in conjunction with the design drawings of the drainage system, so that the location and type of each feature can be recognised and understood.

3.0 The Drainage System Components

Surface water

- 3.1 The proposed surface water drainage system is made up of a number of components. These include:
- " Water Butts
 - " Pipes
 - " Manholes
 - " Catchpit manholes/silt traps
 - " Permeable Pavements
 - " SuDS Basin
 - " Hydrobrakes
 - " Orifice Plates
- 3.2 All components should be installed in accordance with the manufacturer's instructions and to the levels/arrangement as defined on the designer's drawings. Not doing so will invalidate any warranty provided by the manufacturer.
- 3.3 All maintenance and cleaning must be carried out in accordance with manufacturer's recommendations and by competent and suitably qualified staff, as defined in the CDM regulations 2015.

4.0 General Maintenance Principles

- 4.1 All surface water drainage systems, whether piped gravity systems, Sustainable Drainage Systems (SuDS), or flow control devices, require regular maintenance to keep them working at optimum efficiency and capacity. The maintenance of the surface water drainage system on the development at Eastlands Lane should be carried out alongside other regular maintenance tasks on site.
- 4.2 Timely and adequate maintenance will increase the lifespan of all the drainage components. Inadequate maintenance will do the reverse. Therefore, the projected lifespan and anticipated replacement date of each drainage component cannot be forecast at the time of this document being produced.
- 4.3 The site management company and/or their agents are responsible for the maintenance of the surface water drainage system.
- 4.4 Construction activities can create and discharge significant quantities of sediment that will quickly clog the surface water drainage system. Therefore, construction-stage sediment removal is required immediately post-construction. This may require several cleans of the system during the first year after installation. The construction site manager should assess this and carry out cleaning as necessary.
- 4.5 Catchpit manholes/silt traps will be specified upstream of the permeable paving. They will remove gross solids and the majority of silts. It is important that any debris build-up in the catchpit manholes/silt traps is removed at regular intervals. This will reduce the risk of the permeable paving becoming silted up. It will maintain its design capacity and function.
- 4.6 Cleaning should also take place after large storms when there have been increased surface water flows and visible entrainment and deposition of debris.
- 4.7 An increased frequency of inspection and maintenance should be programmed into the autumn and winter months in acknowledgement that:
 - „ Leaf fall from deciduous trees in autumn will result in an increased amount of leaf litter and an elevated blockage risk of drainage infrastructure.
 - „ Increased rainfall during winter months will result in greater quantities of water moving through the drainage system and a greater input of silt and other debris.
- 4.8 Table 4.1, on the next page, gives an overview of typical maintenance tasks and the frequency with which they need to be undertaken. Section 5 – Inspection and Maintenance Frequency of Components – will assign typical maintenance frequencies and tasks to the specific components used within the surface water drainage system on the proposed development.

Table 4.1: Typical maintenance tasks and frequencies

Activity	Indicative Frequency	Typical Tasks
Routine/regular maintenance	Monthly to annually	” Litter picking ” Silt removal ” Inspection of all inlets, outlets and control structures ” Weed removal and invasive plant control
Occasional maintenance	Annually up to 25 years	” Silt control around components ” Vegetation management around components ” Sweeping of pavement areas to remove surface silt ” Silt removal from catchpits, cellular storage structures
Remedial maintenance	As required	” Inlet/outlet repairs ” Erosion repairs ” Reinstatement of edgings ” Reinstatement following pollution ” Removal of silt build-up and leaf litter after storms ” Repair of vandalism ” Replacement of any blocked filter membranes/materials

5.0 Inspection and Maintenance Frequency of Components

- 5.1 Table 5.1 below lists each of the components used within the development's surface water drainage system. It suggests an indicative maintenance frequency for each component and ascribes typical maintenance tasks to them.
- 5.2 This list is not exhaustive, nor is it prescriptive. As mentioned in Section 3, additional, unscheduled maintenance may be required following adverse weather conditions or after autumn leaf falls. Additional maintenance tasks may be required to adequately clean and maintain individual components.
- 5.3 The list of components should be cross-referenced with the designer's drawings so that the location of each component can be identified.
- 5.4 It is the responsibility of the site management company and/or their agents to ensure that all necessary maintenance activities are carried out in a timely manner and that the design performance of each drainage component is preserved.
- 5.5 If there is any uncertainty regarding the correct and safe methods of cleaning, or what equipment should be used, the manufacturer should be consulted.

Table 5.1: Maintenance Frequency and Task for Drainage Components

Activity	Indicative Frequency	Anticipated Tasks
Pipes	As required	- Identify any pipes that may not be operating properly and employ a competent, qualified contractor to inspect using CCTV. - If the pipe is blocked with silt or debris, the pipe should be jetted clean from an upstream access point. All silt and debris should be captured and removed at a downstream access point. - Inspect once clean. - If any other defects are encountered (cracks, displaced joints, root ingress), appropriate solutions should be discussed with a competent and qualified contractor. These services are usually provided by the same companies that offer CCTV surveys and pipe jetting services.
Manholes	Annually	- Inspect/identify any damage or areas that are not operating correctly - Remove silt, litter, leaves and other detritus. - Inspect once clean.
Catchpit Manholes/Silt Traps	Twice a year, before and after autumn/winter	- Inspect/identify any damage or areas that are not operating correctly - Remove silt, litter, leaves and other detritus. - Inspect once clean.
Hydrobrake chambers	Every three months for the first year, then annually thereafter	- Contact manufacturer for instruction on approved and safe inspection and maintenance practices. - Inspect Hydrobrake and check functionality. - Remove any detritus as required. - Inspect once clean.

Orifice Plates	Inspections at regular intervals (every 3 – 6 months).	Orifice plates have no moving parts to fail and quality units are made of stainless steel to resist scour, degradation and chemical attack. The orifice plates in this scheme are to be downstream of the permeable pavements, so all contributing flows should be heavily filtered and free of any debris. Debris and silt should be removed if present Check wear on orifice to ensure no enlargement is taking place. Any visible fixing bolts should be checked. If there is a suspected blockage, the housing chamber can be inspected internally, the blockage cleared and the orifice returned to its working position.
Water Butts	Annually in Autumn to Winter	Remove falling leaves and seeds from guttering or those that have found their way into the water butt. Water may stagnate slightly. If so, use a water butt cleaning disc into the tank. In autumn and winter, drain water off every 10 days (or less) to make sure that water butts don't overflow and that water is kept moving. This will stop larvae and flies from using the water butt. Use safe products such as vinegar to clean the outside of the tank and the inside of the lid and be careful not to contaminate water with chemicals. At least once a year, completely empty the water butt and scrub it out with warm soapy water and then rinse thoroughly. This is best done at a time when the water butt is already nearly empty (end of summer) or when it can readily refill (winter).
Permeable paving	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations.	Agitate surface by means of mechanical sweeping or vacuuming to ensure no vegetation or moss is allowed to establish and grow in the joints. Mechanical sweeping of pavements and refilling of joints with the correct aggregate need only be carried out at intervals of 5 years or so Remove weeds from the surface through the application of glyphosate-based weed killers Stabilise and mow contributing and adjacent areas. Inspect once clean. See Table 20.15 of CIRIA C753 for more information. Permeable paving has a nominal 25-year lifespan, if correctly and regularly maintained.

		When subjected to low level oil drips permeable pavements can continue to biodegrade hydrocarbons indefinitely. Major oil spills have the potential to contaminate the surface and the underlying crushed stone. In the event of a major oil spill, the area of block pavements and crushed stone that is affected should be removed, cleaned and reinstalled.
SuDS Basin	Monthly in Summer, as required in Winter	Responsibility should be with landscape contractors. Maintenance tasks are not that different from standard public open space. Adequate access needs to be provided to the area. Regular mowing should take place across maintenance access routes, amenity areas, across embankments and the main storage area. Remaining areas can remain as 'meadow'. Mowed grass lengths of 75 – 100mm are appropriate. Grass clippings should be disposed of off-site. Any dead growth should be cleared before the start of the growing season. Any permanently wet areas with emergent aquatic vegetation should be managed as ponds or wetlands. Remove any sediment build-up as required. Check any inlets and outlets for blockages and clear as required. Check any flow control devices, if present.

5.6 Upon completion of maintenance activities, a record should be kept of the work carried out. This should be retained, and an annual maintenance report should be compiled, which should include the following:

- Observations resulting from inspections
- Maintenance and operation activities undertaken during the year
- Recommendations for inspections and maintenance programmes for the following year

5.7 On the last page of this document is a table with suggested information that should be recorded and included with the maintenance plan. As mentioned in the introduction to this document, this should be a living document and regularly updated, as required.

Date	Component requiring maintenance	Issues prompting maintenance	Scheduled maintenance (Y/N)	Maintenance carried out	Additional works required (Y/N). If yes, please detail	Next scheduled date of inspection and maintenance

Appendix M

Exceedance Plan



1. This Drainage Strategy Plan is for planning purposes and does not constitute detailed designs and should not be used for construction purposes
2. All levels and dimensions are to be checked on site before any works commences. All dimensions are in metres unless stated otherwise.
3. This drawing has been based upon survey supplied information and Motion cannot guarantee the accuracy of the data provided.
4. The drainage levels are based on existing levels, but also proposed levels where existing site features present unusual changes in gradient.
5. Any discrepancies should be reported to the engineer immediately, so that clarification can be sought prior to the commencement of works.
6. This drawing should be read in conjunction with all other relevant engineering details, drawings and specification.
7. 350mm minimum cover is to be provided for private pipes laid in soft/paved areas, 750mm minimum cover to be provided for private pipes laid beneath roads, footpaths or public areas. Where unclassified, shallow pipe drains may require protection using concrete surround or paving slabs bridging the trench. Refer to the NRS website for further requirements.
8. Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.
9. All foul/sewage to have levels confirmed once detailed design commences and all foul/ffs are finalised.

	Site Boundary
	Permeable Pavours
	Surface Water Gravity Pipe
	Surface Water Manhole
	Orifice Flow Control
	Hydrobrake Flow Control
	Proposed Headwall
	Foul Water Inspection Chamber (600mmØ)
	Foul Water Manhole (1200mmØ)
	Foul Gravity Pipe
	Foul Rising Main
	Existing Public Foul Gravity Sewer
	Existing Public Foul Inspection Chamber / Manhole

Drawing Status:

Client:
Lee Goossens

Title:
Drainage Strategy Layout

Drawing: 2510088-0500 Revision: P02