

Detailed Flood Risk Report Watchmoor Reserve

06 January 2021



SURREY

Detailed Flood Risk Report

Purpose of Report

This document has been prepared for the purpose of providing flood risk information for a specific site; either to aid in the development of a planning application or for flood risk management. The information provided is that which is available to Surrey County Council at the time and may include specific guidance for Planners and Developers about Sustainable Drainage. Surrey County Council gives no guarantee that any flood risk information provided is 100% accurate, or exhaustive; it is solely the information we currently hold.

The applicant is advised that there will need to be additional discussions with the County Council as Highway Authority in respect of any drainage proposals for proposed highway works under Section 278 or proposed adoption of new roads under Section 38 of the 1980 Highway Act. Consenting for the discharge of surface water to Ordinary Watercourses should also be directed to the County Council under the Land Drainage Act (1991).

Document History

This report relates to the following enquiry/pre-application request/planning application as:

SCC Application ID	Other ref if applicable	Version	Originator	Date	Reviewer	Date
VLLFA-PAA-SU-20-024	0	0.1	AD	23/12/2020	LJ	29/12/2020

Glossary

The table below defines some of the frequently used terminology for your general information.

Acronym/Term	Definition
Annual Probability	Flood events are defined according to their likelihood of occurrence. The term 'annual probability of flooding' is used, meaning the chance of a particular flood occurring in any one year. This can be expressed as a percentage. For example, a flood with an annual probability of 1 in 100 can also be referred to as a flood with a 1% annual probability. This means that every year there is a 1% chance that this magnitude flood could occur.
Flood Zone 1	Area with a low probability of flooding from rivers (< 1 in 1,000 annual chance of flooding).
Flood Zone 2	Area with a medium probability of flooding from rivers (1 in 100 – 1 in 1,000 annual chance of flooding).
Flood Zone 3	Area with a high probability of flooding from rivers (> 1 in 100 annual chance of flooding).
Fluvial flooding	Exceedance of the flow capacity of river channels (whether this is a Main River or an Ordinary Watercourse), leading to overtopping of the river banks and inundation of the surrounding land. Climate change is expected to increase the risk of fluvial flooding in the future.
Infiltration SuDS	These are sustainable drainage systems which facilitate the infiltration of surface water into the ground. Once in the ground, the water percolates through the subsurface to the groundwater.
Groundwater flooding	Emergence of groundwater at the surface (and subsequent overland flows) or into subsurface voids as a result of abnormally high groundwater flows, the introduction of an obstruction to groundwater flow and / or the rebound of previously depressed groundwater levels.
Main River	Main rivers are usually larger streams and rivers, but some of them are smaller watercourses of local significance. Main Rivers indicate those watercourses for which the Environment Agency is the relevant risk management authority.

Ordinary Watercourse	Ordinary Watercourses are displayed in the mapping as the detailed river network. An ordinary watercourse is any watercourse (excluding public sewers) that is not a Main River, and the Lead Local Flood Authority or Internal Drainage Board are the relevant risk management authority.
Other sources of flood risk	Flooding from canals, reservoirs (breach or overtopping) and failure of flood defences.
Sewer flooding	Flooding from sewers is caused by exceedance of sewer capacity and / or a blockage in the sewer network. In areas with a combined sewer network system there is a risk that land and infrastructure could be flooded with contaminated water. In cases where a separate sewer network is in place, sites are not sensitive to flooding from the foul sewer system.
SFRA	Strategic Flood Risk Assessment
SWMP	Surface Water Management Plan
SuDS	Sustainable Drainage Systems
Surface water flooding	Intense rainfall exceeds the available infiltration capacity and / or the drainage capacity leading to overland flows and surface water flooding. Climate change is expected to increase the risk of surface water flooding in the future. This source is also referred to as pluvial flooding.
Tidal flooding	Propagation of high tides and storm surges up tidal river channels, leading to overtopping of the river banks and inundation of the surrounding land.
RoFSW	Risk of Flooding from Surface Water. The data shows areas at risk of flooding from surface water, for three flooding return periods (1 in 30, 1 in 100 and 1 in 1000), and the depth, velocity, hazard and flow direction associated with that flooding. It also includes; data on the models used to develop the maps and information that describes the suitable uses of the data.

Data Sources

The following sources of data have been used in preparing this report and its associated mapping:

- Geology- Bedrock and Superficial Deposits (British Geological Survey- 50,000 scale digital)
- Soilscales (Cranfield University- <http://www.landis.org.uk/soilscales/>)
- SuDS Suitability (British Geological Survey)
- Surface Water Flood Risk
 - Risk of Flooding from Surface Water (RoFSW) (Environment Agency)
- Groundwater
 - Susceptibility to Groundwater Flooding (British Geological Survey)
- Historic Flood Evidence
 - Historic Flood Map (Environment Agency)
 - Wetspots (Surrey County Council)
 - Property Flooding Database (Surrey County Council)
 - Historic Flooding Incidents Database (Surrey County Council)

Site Flood Risk Information

Groundwater

Risk & Evidence

The area of interest is located within an area which is classed as having a limited potential for groundwater flooding to occur. This is based on a conceptual understanding of the regional geology and hydrogeology and is therefore only an indication of where geological conditions could enable groundwater flooding to occur. It does not indicate hazard or risk and it does not provide any information on the depth to which groundwater flooding may occur or the likelihood of the occurrence of an event of a particular magnitude. This information should not be used on its own to make planning decisions at any scale, particularly site scale, or to indicate the risk of groundwater flooding.

Implications/Considerations for Planning

It is considered that there are no significant implications for surface water management on the site, relating to the site's susceptibility to groundwater flooding. However this dataset is based on a conceptual understanding at a regional level. It is suggested that appropriate scale site based investigations are conducted to understand the groundwater regime on site.

Surface Water

Risk & Evidence

The area of interest is shown to be at risk of surface water flooding in the following return period events; 1 in 100 & 1 in 1000. The surface water flood extents are not appropriate to be used in assessing flood risk at an individual property level. In addition, the methods used to derive the flood extents are based on modelled design rainfall (i.e. not observed patterns of rainfall) and consequently this information cannot definitively show that an area of land or property is, or is not, at risk of flooding.

The RoFSW have been created from the Environment Agency's nationally produced surface water flood mapping, and appropriate locally produced mapping from Lead Local Flood Authorities such as Surrey County Council. This means that in different areas, the flood extents have varying levels of suitability scales for viewing or assessing. This area's information is only suitable for assessing flood risk at a 'county to town' scale. This scale is suitable for identifying which parts of counties or towns are at risk, or which counties or towns have the most risk. It is unlikely to be reliable for assessing risk in a more localised area.

Implications/Considerations for Planning

In areas at risk of surface water flooding, the following sections outline considerations for the appropriate management of surface water, based on the information provided to Surrey County Council.

Historical Flooding

Risk & Evidence

The area of interest is within the extent of the Environment Agency's Historic Flood Map. This gives an indication that the area has previously been flooded by rivers, groundwater or a combination of these sources.

Wetspots indicate the approximate location of known previous flooding on the highway. There is a wetspot near to the area of interest and this highlights that there has been historic flooding in the vicinity. If you would like to find out more about these local wetspots, please visit the Surrey County Council Wetspots Interactive Map: <http://new.surreycc.gov.uk/maps/surrey-interactive-map>. You can find the wetspots under the 'Roads and Transport' drop down to the right hand side of the map.

According to Surrey County Council's Property Flooding Database, there have been previous instances of property flooding nearby, either internally or externally. The instances of property flooding occurred in Autumn 1993 & Summer 2007. Property flooding is sensitive information and this is why more specific details on the location of flooding cannot be provided. Whilst this dataset is the most comprehensive record of property flooding in Surrey, there may be instances of property flooding which were not reported and therefore are not recorded in this dataset. Surrey County Council's Historic Flooding Incident Database highlights all reported, non point location specific, flooding incidents e.g. example road was flooded. The data indicates that there is a nearby location which has previously reported flooding.

Implications/Considerations for Planning

In areas which have been previously affected by flooding, the following should be considered:

- Is there a safe access/egress route demonstrated?
- Is there an evacuation plan in place?
- Have resilience/resistance measures been considered in the design?

SuDS Suitability

The selection of SuDS should be considered in the early stages of design. The selection criteria, as set out by The SuDS manual (CIRIA C697, 2007), provides a good framework for doing this.

Potential for Infiltration SuDS

Surrey County Council is licensed to use the Infiltration SuDS Data produced by the British Geological Survey. This data was produced after the Pitt Review (2007) and aims to encourage the appropriate use of SuDS. By utilising SuDS, the reliance on traditional piped systems is reduced, and the sustainable management of water is encouraged.

The Infiltration SuDS data is used to make a preliminary assessment of the suitability of the subsurface for infiltration SuDS. This data is not a replacement for a soakaway test or site investigation.

The suitability of utilising infiltration SuDS techniques has been summarised for the application site below.

Constraints to Infiltration

There are very significant constraints indicated at the site for the use of infiltration SuDS and a significant potential for one or more geohazards associated with facilitating infiltration. A full appraisal of ground conditions is necessary and the site investigation should consider whether the potential for or the consequences of infiltration are significant.

Drainage Potential

The subsurface is potentially suitable for infiltration SuDS although the design will be influenced by the ground conditions. It is recommended to quantify the infiltration rate via an infiltration/soakaway test and consider whether infiltration can be used as a SuDS technique alongside water storage (in ponds/chambers) and re-use.

Stability of Ground

Ground instability problems are probably present. Increased infiltration may result in ground instability. Before installing infiltration, SuDS consider the potential for or the consequences of infiltration on ground stability.

Groundwater Vulnerability

The groundwater is not expected to be especially vulnerable to contamination. Where surface water is being infiltrated into the ground, this water should be free of contaminants. There are no known constraints regarding the susceptibility of the groundwater to contaminants, however it is recommended to check the previous land use to understand whether the ground is contaminated.

Made ground is present at the surface at the SE part of the site. Infiltration may increase the possibility of remobilising pollutants. Only install infiltration SuDS if the potential for contaminant leaching are considered not to be significant.

Superficial Deposit Permeability

Superficial deposits are likely to be free-draining. It is recommended that the infiltration rate is quantified via an infiltration/soakaway test.

Bedrock Permeability

The bedrock permeability is spatially variable, but likely to permit moderate infiltration. It is recommended that the infiltration rate is quantified via an infiltration/soakaway test.

Proposed Approach

Drainage and Discharge Methods

Some areas of the site may be suitable for infiltration based SuDS techniques however ground conditions and groundwater levels should be fully investigated through intrusive ground investigations and should be provided to support any Planning Application made in respect of the site.

A hierarchical approach should be taken to the discharge of surface water from the site.

- Option 1 - to ground;
- Option 2 - attenuation and discharge to adjacent watercourse;
- Option 3 - attenuation and discharge to surface water sewer.

Any surface water discharged from the site should be restricted to the existing greenfield run-off rate applied to the impermeable area of the site only. Qbar is considered acceptable (applied to the proposed impermeable area only) or a staged discharge approach with greenfield run-off rates applied to the 1 in 1 year, 1 in 30 year and 1 in 100 year events accordingly.

On site attenuation should be provided for the 1 in 100 year + climate change rainfall event. 40% should be applied for climate change for residential development. A lower % for climate change may be considered acceptable for commercial property dependent upon the life span of the development, however sensitivity testing will be required up to the + 40% event. Where appropriate, a 10% allowance for urban creep should be included in the drainage designs.

If proposed site works affect an Ordinary Watercourse, Surrey County Council as the Lead Local Flood Authority should be contacted to obtain prior written Consent. More details are available on our website. Our records indicate that one or more Ordinary Watercourses maybe located within the site boundary, these watercourse should be accommodated within the site layout. Watercourses should not be culverted with the exception of where access is required (such works will require consent), the site layout should allow for access to any watercourse for maintenance and generally they should be located within publicly accessible areas.

SuDS Components

Many schemes deliver the management of water quantity but do not fulfil the four pillars of SuDS design as defined by the SuDS Manual. The manual seeks to encourage schemes that manage the quantity and quality of surface water runoff, provide an amenity that integrates surface water as an attractive part of public space and also enhance biodiversity. Schemes based around the management of quantity alone are purely drainage schemes not SuDS.

The following proposals for SuDS have been put forward as part of the drainage design:

Infiltration should be considered in the first instance however due to the likelihood of a high water table adjacent to the Ordinary Watercourses infiltration may not be suitable. Intrusive ground investigations should be completed to determine ground conditions and assess groundwater levels. All SuDS principles could be affected if groundwater levels are high, and therefore this information should be gathered to inform the drainage strategy.

If soakaways are unsuitable, above ground attenuation of surface water should be considered in the first instance before below ground storage is proposed. If above ground attenuation of surface water is not considered feasible full justification should be provided.

The Applicant should consider the management and maintenance of the proposed SuDS elements and this information should be presented as part of any Planning Application.

Site Development Details: Cross-check

The table below cross-checks the information provided with the planning application, with information easily available to Surrey County Council and provides recommendations on the suitability of the proposed drainage.

Site Details	Description
Bedrock	Sand, Silt and Clay (Windlesham Formation)
Superficial Deposits	Clay, Silt, Sand and Gravel (Alluvium)
Soils	<p>"Soilscapes conveys a summary of the broad regional differences in the soil landscapes of England and Wales. Soilscapes is not intended as a means for supporting detailed assessments, such as land planning applications or site investigations; nor should it be used to support commercial activities. For such applications, a parallel service Soils Site Reporter provides comprehensive reporting for specific locations. Ground investigations should also be evidenced when considering infiltration SuDS. "</p> <p>Unclassified for the majority of the site. Loamy soils with naturally high groundwater for the west part of site.</p>
Depth to Water Table (m)	<p>Groundwater is likely to be less than 3 m below the ground surface for at least part of the year. It is recommended that the seasonal variation in groundwater levels are determined. The scale of site specific assessments and evidence of groundwater levels should be appropriate to the size and nature of the proposed development site. This site may not be suitable for infiltration SuDS if the groundwater level reaches <1m below the ground surface.</p>

<p>Discharge method- Sewer (if applicable)</p>	<p>The nearest watercourse is less than 50m from the proposed development. This indicates that discharging to the watercourse may be appropriate. Consideration should be given to the downstream flood risk and water quality of the watercourse. When discharging to watercourses, there should be a minimum of an 8m buffer from any building for access and maintenance. The nearest sewer is less than 50m from the proposed development. This indicates that discharging to the sewer may be feasible. Infiltration SuDs are mandatory unless where evidenced that they are not appropriate (e.g. contaminated land, high ground water levels or land subsidence). If SuDS are not appropriate, then consent from the water utility company should be sought for the connection and evidenced.</p>
<p>Discharge method- Watercourse (if applicable)</p>	<p>The nearest watercourse is less than 50m from the proposed development. This indicates that discharging to the watercourse may be appropriate. Consideration should be given to the downstream flood risk and water quality of the watercourse. When discharging to watercourses, there should be a minimum of an 8m buffer from any building for access and maintenance.</p>

Recommendations and Summary

Any surface water discharged from the site should be limited to the existing greenfield run-off rate applied to the proposed impermeable area of the site only.

Evidence must be provided to establish the greenfield runoff rate for the site. For previously developed sites, evidence must be provided where the greenfield runoff rate cannot be reasonably practicably achieved.

On site attenuation should be provided for the 1 in 100 year + climate change rainfall event, with a sensitivity check up to the 1 in 100 year (+40% climate change) event if not used already.

SCC Surface water drainage pro-forma should be completed to accompany any future Planning Applications with supporting evidence provided.

If proposed site works affect an Ordinary Watercourse, Surrey County Council as the Lead Local Flood Authority should be contacted to obtain prior written Consent. More details are available on our website.

If proposed works result in infiltration of surface water to ground within a Source Protection Zone the Environment Agency will require proof of surface water treatment to achieve water quality standards.

Good Practice Guidance

For all areas within Flood Zone 1 and where the application site is less than 1ha the following guidance should be followed (in addition to that set out above) when considering surface water management and SuDS.

Flood Risk

Please refer to the Environment Agency's Standing Guidance for Flood Risk.

SuDS Suitability and Methods

Please refer to the [SuDS advice note](#) and the [Evidence Required note](#) on Surrey County Council's website to assist in directing developers and designers to the most appropriate guidance and technical standards.

A non-exhaustive list of references is provided at the end of this document to further assist Planners in informing the planning decision.

References

BRE365. Soakaway Design

Cambridge City Council. 2009. SuDS Design and Adoption Guide.

<https://www.cambridge.gov.uk/sites/www.cambridge.gov.uk/files/docs/SUDS-Design-and-Adoption-Guide.pdf>

CIRIA. 2015. The SuDS Manual (C753).

CIRIA. 2006. Designing for exceedence in urban drainage-good practice (C635).

CIRIA.1996. Infiltration Drainage: Manual of Good Practice (C156)

Defra. 2015. Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf