

Flood Risk Assessment and Drainage Strategy

Logicor Park Reading, Rose Kiln Court, Rose
Kiln Lane, Reading, RG2 0BY

Presented to: **Redwood (Light Industrial) Propco
Sarl**

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Reference of Terms

Canal Failure

Canal failure can include a breach or overtopping of a canal system due to the effects of a high intensity rainfall event or structural failure that is not associated with a rainfall event. Such failure can be very dangerous as it can involve the rapid release of large volumes of water at high velocity, however, it is typically limited to reaches of canal that are raised above the surrounding ground level on one or both side and where watercourses or other structures pass beneath the canal. The size and nature of canals themselves can also have a hydraulic control on the mechanisms of flooding associated with a failure, resulting in a rapid peak in flow followed by a gradual reduction as the flow becomes restricted by the capacity of the canal itself to rapidly pass flow to the breach or failure point.

Fluvial Flooding

Fluvial flooding typically occurs when a river's capacity is exceeded, and the excess water overtops the river banks. It can also occur when the watercourse has a high level downstream, perhaps due to structures or blockage, thus limiting conveyance. This creates a back-up of water which can overtop the banks. Typical flooding issues occur when the natural floodplain has been urbanised and the river has been confined.

Groundwater Flooding

Groundwater flooding is caused by the emergence of water from beneath the ground at either point or diffuse locations when the natural level of the water table rises above ground level. This can result in deep and long-lasting flooding of low-lying or below-ground infrastructure such as underpasses and basements. Groundwater flooding can cause significant damage to property, especially in urban areas, and can pose further risks to the environment and ground stability.

Reservoir Failure

Reservoir failure can be a particularly dangerous form of flooding as it results in the sudden release of large volumes of water that can travel at high velocity. This can result in deep and widespread flooding, potentially resulting in significant damage. Under the Reservoirs Act 1975, a large raised reservoir is defined as one that holds over 25,000 cubic metres of water above the level of the surrounding land. The EA's online reservoir inundation map illustrates the maximum flood extents that could potentially occur in the event of a reservoir failure.

Sewer Flooding

Flooding from sewers primarily occurs when flow entering a system exceeds available capacity or if the network capacity has been reduced through blockage or collapse. In the case of surface water sewers that discharge to watercourses, the same effect can be caused as a result of high water levels in the receiving watercourse. As a result, water can begin to surcharge the sewer network, emerging at ground level through gullies and manholes and potentially causing flooding to highways and properties. If this occurs flooding can represent a significant hazard to human health due to the potential for contaminants in flood water.

Surface Water Runoff

Surface water runoff is defined as water flowing over the ground that has not yet entered a drainage channel or similar. It usually occurs as a result of an intense period of rainfall which exceeds the infiltration capacity of the ground. Typically, runoff occurs on sloping land or where the ground surface is relatively impermeable. The ground can be impermeable either naturally due to the soil type or geology, or due to development which places impervious material over the ground surface (e.g. paving and roads).

Tidal Flooding

Tidal flooding is caused by high tides coinciding with a low-pressure storm system which raises sea and tidal water levels, overwhelming coastal and river defences. This may be made worse by gale force winds blowing the raised body of water up tidal river basins some distance from the coast, due to floodwater being forced up the tidal reaches of rivers and estuaries. Such flooding may become more frequent in future years due to rising sea levels.

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1.0 Introduction

1.1 Appointment

- 1.1.1 Delta-Simons Limited ("Delta-Simons") was instructed by Savills on behalf of Redwood (Light Industrial) Propco Sarl (the "Client") to carry out a Flood Risk Assessment (FRA) and Drainage Strategy (DS) of Logisor Park Reading, Rose Kiln Court, Rose Kiln Lane, Reading, RG2 0BY (the "Site") to inform a planning application for the demolition of the existing Class E(g)(i) (Office) building and the construction of three buildings for Class E(g)(iii) (Light Industrial)/Class B2 (General Industrial)/Class B8 (Storage or Distribution) uses, including the provision of a new substation, parking, landscaping, and associated works.
- 1.1.2 The assessment considers potential flood risks from all sources and provides options for managing any Site-specific flood risks identified.

1.2 Project Understanding

- 1.2.1 On the Environment Agency (EA) Flood Map for Planning, the Site is shown to be wholly within Flood Zone 1 (Low Probability) however, given the proximity to a Main River and Flood Zones 2 and 3, the client has requested an FRA to determine the level of risk from all sources, along with suitable mitigation measures. As the proposed application will be considered a 'major application', a DS is also required.
- 1.2.2 The aim of this report is to assess the potential flood risk to the Site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified risk. This report has been prepared in accordance with the guidance contained in the National Planning Policy Framework (NPPF) revised in July 2021, and the National Planning Practice Guidance (NPPG) Flood Risk and Coastal Change.
- 1.2.3 Reading Borough Council as Lead Local Flood Authority (LLFA) is a statutory consultee for major planning applications in relation to surface water drainage, requiring that all planning applications are accompanied by a Sustainable Drainage Strategy. The aim of the Sustainable Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment.

1.3 Scope of Works

- 1.3.1 The scope of works has been as follows for this FRA:
- Assess flood risk from all sources using best available information including review of EA data and mapping, topography and historical records;
 - Assess previous relevant studies, local authority plans or strategies;
 - Advise on flood mitigation measures and residual risks;
 - Assess evacuation routes;
 - Advise on availability of flood warnings;
 - Identify the requirement for a Sequential Test; and
 - Prepare FRA report.
- 1.3.2 The scope of works for the DS has been as follows:
- Review existing conditions including sewer plans, British Geological Survey information and topographical information;
 - Review Lead Local Flood Authority (LLFA) drainage policies;

- Submit developer enquiry to LLFA and Sewage Provider;
- Analyses existing and proposed impermeable areas;
- Calculate existing runoff rates (excluding existing drainage system modelling);
- Assess method of surface water runoff disposal (soakaway/watercourse/sewer);
- Establish surface water discharge rate in consultation with the LLFA/sewerage provider;
- Estimate required attenuation volume using MicroDrainage or similar;
- Assess and advise on suitable forms of SuDS;
- Advise on drainage system maintenance measures;
- Advise on surface water treatment methods;
- Establish method of foul water drainage; and
- Prepare concept drainage sketch.

1.3.3 This report takes into account the following national and local policies:

- National Planning Policy Framework (NPPF) (2021)¹;
- National Planning Practice Guidance (NPPG) (2014)²;
- CIRIA Guidance: The SuDS Manual (C753) (2017)³; and
- Reading Borough Council Local Development and Planning Policies.

1.4 Sources of Information

1.4.1 The following sources of information have been reviewed and assessed for the purpose of this FRA:

- EA Online Flood Maps⁴;
- British Geological Society (BGS) Interactive Map⁵;
- MAGIC Interactive Map⁶;
- Thames Catchment Flood Management Plan (2009 CFMP);
- Reading Borough Council Preliminary Flood Risk Assessment (2011 PFRA);
- Reading Borough Council Section 19 Flood Report Winter 2013-14 (2013-14 Flood Report);
- Reading Borough Council Local Flood Risk Management Strategy (2015 LFRMS); and
- Reading Borough Council Strategic Flood Risk Assessment (2017 SFRA).

1.5 Project Limitations

1.5.1 The wider Delta-Simons limitations are contained within Appendix A. The wider Delta-Simons limitations are contained within Appendix A.

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf

2 <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

3 https://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

4 <https://flood-map-for-planning.service.gov.uk/>

5 <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

6 <http://www.magic.gov.uk/>

2.0 Site Description

2.1.1 The aim of this section of the report is to outline key environmental information associated with the baseline environment.

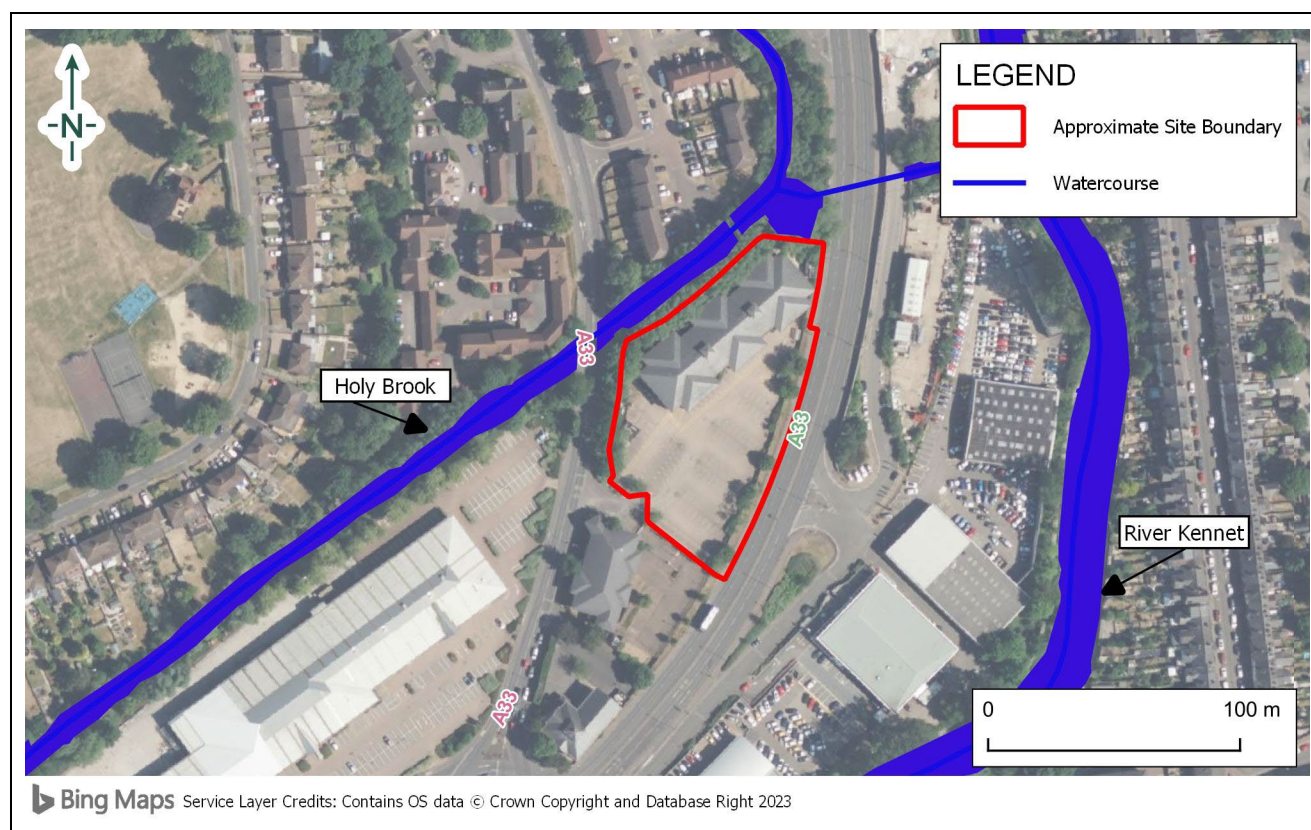


Figure 1: Site Location Plan

Co-ordinates	Centred approximately at National Grid Reference (NGR) 471315, 172360.	Area (approx.)	0.69Ha
Site Location	The Site is located on Rose Kiln Lane, approximately 1 km south of Reading Town Centre and 1.4 km south of Reading Train Station.		
Existing Site Conditions	Online mapping (including Google Maps imagery, accessed January 2023) shows that the Site comprises of a two-storey office building in the northwest, with associated car parking in the south and east. Several generators and an electricity substation are located in the west of the Site. Limited areas of soft landscaping are present along the Site boundaries. The Site is bordered by trees, Holy Brook and a weir to the north, the A33 to the east, an existing office development to the south and Rose Kiln Lane to the west. Hardstanding areas on Site currently occupy 6,351 m² or 92.1% of the total Site area. The remaining permeable, soft landscaped areas occupy 546 m² or 7.9% of the total Site area. Values have been calculated using a Topographical Survey undertaken by Greenhatch in May 2021 (Appendix B). Access to the Site is provided from Rose Kiln Lane to the west.		
Topography	A topographical, utility and CCTV drainage survey has been undertaken by Midland Survey Ltd. in February 2023 and is included in Appendix B. The topographical survey		

	shows that the Site is relatively flat at approximately 38.8 meters Above Ordnance Datum (AOD). The centre of the site, currently occupied by parking areas slopes down in localised areas to approximately 38.6 m AOD. The northern boundary of the site, bordered by Holy Brook, is indicated to slope down to 38.7 m AOD. The public footpath between the Site and Holy Brook is at approximately 39 m AOD. Topographic levels to metres Above Ordnance Datum (m AOD) have also been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A LiDAR extract is included in Appendix C.
Hydrology	The nearest watercourse is Holy Brook, a Main River, which is located approximately 5 m north-west of the Site and flows in a generally north-easterly direction. Holy Brook is also hydraulically connected to the River Kennet via a weir and secondary channel directly to the north of the Site beneath the A33. The River Kennet is located approximately 90 m to the north-east of the Site, to the closest point, and flows in a north-easterly direction towards the River Thames approximately 2.3 km to the north-east. Other watercourses within the area include a series of watercourses located within Coley Water Meadows and that are hydraulically connected to either Holy Brook or the River Kennet, from approximately 200 m southwest of the Site onwards. Holy Brook, the River Kennet and the watercourses within Coley Water Meadows are classified as Main Rivers and are therefore under the jurisdiction of the EA to maintain. The River Kennet in this area is also part of the Kennet and Avon Canal and therefore the Canal & River Trust are also responsible for maintenance.
Geology	Reference to the BGS online mapping (1:50,000 scale) indicates the Site is underlain by superficial deposits of Alluvium comprising clay, silt, sand and gravel. The superficial deposits are identified as being underlain by the Seaford Chalk Formation and Newhaven Chalk Formation consisting of chalk. The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a Site-specific basis. There are three BGS borehole records (BGS Ref: SU77SW776 (BH1); SU77SW777 (BH2) and SU77SW780 (BH5)), dated 1985 and 1989, located at the Site. The ground conditions encountered comprised the following generalised sequence: • Made Ground comprising concrete over loose ash and clayey/sandy fill up to between 0.9 m and 2.4 m bgl; • Soft grey silty chalky clay/gravelly silty clay up to between 2.8 and 3.8 m within BH1 and BH2 (centre and south of Site); or Soft brown sandy peaty clay with some flint gravel up to 3.4 m bgl within BH5 (north of Site); • Medium dense chalky gravel/loose sandy gravel or gravelly sand up to between 12.6 and 13.5 m bgl; • Lumps of intact chalk/remoulded chalk with some flint (Grade 4 to 5) up to between 16.0 and 17.0 m bgl; over • Medium hard rubbly or blocky chalk (Grade 2 to 3) to the base of the boreholes (20.0 m bgl).
Hydrogeology	According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mapping [accessed 18/01/2023], the superficial deposit is classified as a Secondary A Aquifer. Secondary A Aquifers are 'permeable layers capable of supporting water

	supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'. The underlying bedrock deposit is described as a Principal Aquifer. Principal Aquifers are 'layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale'. The EA's 'Source Protection Zones' data, obtained from MAGIC Map's online mapping [accessed 18/01/2023], indicates that the Site is not located within a Groundwater Source Protection Zone. The Soilsmap mapping obtained from MAGIC Map's online mapping [accessed 18/01/2023] shows the Site to be located in 'loamy and clayey floodplain soils with naturally high groundwater'. The available BGS borehole information recorded water strikes of between 2.7 m and 3.8 m bgl, with standing water levels of between 2.5 and 3.1 m bgl.
Local Drainage	Public sewer records have been obtained from Thames Water and are included in Appendix D. The sewer records find that there are no public sewers within the on-Site or adjacent. The records show a private pumping station in the west of the Site, adjacent to Rose Kiln Lane, however the onward connectivity of the pumping station is not detailed. The topographical, utility and CCTV drainage survey (Appendix B) details that there are private surface water sewers and foul sewers which serve the existing Site, as detailed below: • The first private surface water sewer flows into the southern boundary of the Site as a 225 mm sewer and then becomes a 600 mm sewer at Manhole 12. Manhole 12 is identified as having an invert level of 37.86 m AOD and a cover level of 38.88 m AOD. The surface water sewer then becomes a 675 mm sewer at Manhole 04, which has an invert level of 37.49 m AOD, and a cover level of 38.67 m AOD. The surface water sewer generally runs in a north-easterly and northerly direction from south to north of the Site where it discharges into Holy Brook via a 675 mm pipe, which has an invert level of 37.37 m AOD. • The second private surface water sewer originates adjacent to the south-eastern corner of the existing building with a 100 mm diameter. The sewer flows in a north-easterly direction adjacent to the south-eastern boundary of the existing building, enlarging to 150 mm at Manhole 08, and to 300 mm at Manhole 02. Manholes 08 and 02 have invert levels of 38.09 m AOD and 37.85 m AOD respectively and cover levels of 38.72 m AOD and 38.73 m AOD respectively. The surface water sewer is identified to end at Manhole bmh02 at the northern boundary of the Site, for which invert or cover levels couldn't be surveyed. • The 100 mm private foul water sewer collects building foul drainage runs at Manhole 22 to the north-west of the existing building and flows in a south-westerly direction adjacent to the existing building on-Site. Invert and cover levels were not available for Manhole 22. The foul sewer then increases size to 150 mm at Manhole 20, which has an invert level of 37.26 and a cover level of 38.78. The foul sewer then discharges into a foul pumping chamber in the west of the Site which is identified as Manhole 16. The pumping chamber has a cover level of 38.89 m AOD, a water level of 35.67 m AOD and a base level of 35.31 m AOD. The onward flow from the pumping station was not established.

	• There is a second private foul water sewer, of 150 mm in size, which flows into the south-eastern boundary of the Site and flows in a north-westerly direction where it also discharges into the above mentioned foul pumping chamber. • There is also a third private foul water sewer, of 100 mm in size which flows into the southern boundary of the Site and runs in a northerly direction where it joins the above 150 mm private foul sewer at Manhole 10. Manhole 10 has an invert level of 37.1 m AOD and a cover level of 38.82 m AOD.
Proposed Site Conditions	The proposed development is for the demolition of the existing Class E(g)(i) (Office) building and the construction of three buildings for Class E(g)(iii) (Light Industrial)/Class B2 (General Industrial)/Class B8 (Storage or Distribution) uses, including the provision of a new substation, parking, landscaping, and associated works. Proposed development plans are included in Appendix E. The proposed development will result in a decrease in hardstanding areas. Hardstanding will comprise 5,210 m² or 75.5% of the total Site area. The remaining permeable, soft landscaped areas will occupy 1687 m² or 24.5% of the total Site area. Values have been calculated on AutoCAD using a DWG of the proposed development plan (Ref: 8758-WGA-EX-XX-DR-A-002) and the Landscape Plan (Ref: D342.L.001-EXT-A) provided by client.

3.0 Relevant Planning Policy and Guidance

3.1 Introduction

- 3.1.1 The aim of this section of the report is to discuss the main aspects of the local and national planning policies that are relevant to any proposed development on the Site and relevant guidance and legislation.

3.2 Assessment of Flood Risk

- 3.2.1 The flood risk from fluvial (Main Rivers) and coastal flooding is assessed through the use of the EA Flood Map for Planning. This map defines three zones of different flood risk, the third of which is subdivided into two categories:

- Zone 1 “Low probability of flooding” – This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Zone 2 “Medium probability of flooding” – This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year;
- Zone 3a “High probability of flooding” – This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year; and
- Zone 3b “Functional floodplain” – A sub-part of Zone 3, this zone comprises land where water has to flow or be stored in times of flood. This zone is not normally included within the national Flood Map for Planning and is calculated where necessary using detailed hydraulic modelling.

3.3 National Planning Policy Framework

- 3.3.1 Flood risk in England is normally considered through the planning process in the NPPF (2021), produced by Ministry of Housing, Communities and Local Government.

- 3.3.2 The principal aim of the NPPF assessment of flood risk is that:

“Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere”.

- 3.3.3 The NPPF requires an FRA to be produced where development Sites are:

- Greater than one hectare in size;
- All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3;
- Or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the EA);
- Identified in a Strategic Flood Risk Assessment as being at increased risk in the future; and
- Where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

- 3.3.4 The NPPF requires that developers consider not just the flood risk to the development but also the impact that the development might have on flood risk elsewhere. As well as Main Rivers and the sea, it is also necessary to consider flood risk from other sources, including surface water, groundwater, Ordinary Watercourses, artificial drainage systems, canals and reservoirs.

Sequential Test

- 3.3.5 A key part of the NPPF is that a proposed development must first pass a “Sequential Test” to demonstrate that the overall development proposal is appropriate in terms of flood risk. It ensures that a sequential approach is followed to guide new development to areas with the lowest probability of flooding.

Vulnerability Classification

- 3.3.6 In accordance with Table 3 ‘Flood Risk Vulnerability and Flood Zone Compatibility’ (reproduced as Table 1 below), industrial developments are considered to be **‘less vulnerable’**. Table 1 states that **‘less vulnerable’** development is considered appropriate within Flood Zones 1, 2 and 3.

Table 1: Flood Risk Vulnerability Classification

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	✗	✗	✗	✓

✓ development is permitted

✗ development is not permitted

- 3.3.7 The Site is located wholly within Flood Zone, however the latest NPPF guidance now requires that all sources of flood risk pass the Sequential Test depending on the level of risk. This will be broadly assessed as part of the formal assessment below.

Exception Test

- 3.3.8 The Exception Test determines whether the benefits of the proposed development will outweigh the potential flood risk. Within the NPPF, the Exception Test states that:

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared; and
- A Site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

- 3.3.9 Further consideration of the requirements of the Sequential and Exception Test is provided in Section 6 in consideration of the assessment of the sources of flooding described in Section 4.

3.4 Local Policy

- 3.4.1 The Reading Borough Local Plan (adopted November 2019) contains the following policies relating to flood risk and drainage:

Policy CC3: Adaptation to Climate Change

'All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change'.

Policy EN11: Waterspaces

'Reading's waterspaces will be protected and enhanced, so that they can continue to contribute to local and regional biodiversity and ecology, flood mitigation, local character, heritage and visual amenity, the provision of accessible leisure and recreational opportunities and, where appropriate, navigation. There will be no adverse impact on the functions and setting of any watercourse and its associated corridor.'

Where development in the vicinity of watercourses is acceptable, it will:-

- Provide appropriate, attractive uses and buildings that enhance the relationship of buildings, spaces and routes to the watercourse, including through creating or enhancing views of the watercourse, and create a high quality public realm;*
- Make positive contributions to the distinct character, appearance, historic significance, landscape and amenity of the watercourses;*
- Provide a strengthened role for watercourses as important landscape features, wildlife corridors, historic features and recreation opportunities;*
- Wherever practical and consistent with its biodiversity role, provide good, level access to and along the waterside for all those who want to use it;*
- Be set at least ten metres back from the watercourse wherever practicable and appropriate to protect its biodiversity significance;*
- Improve the quality of watercourse environment through protecting and enhancing habitats and ensuring that habitat creation is balanced with access and urban uses; and*
- Pursue opportunities for deculverting of watercourses.'*

Policy EN18: Flooding and Sustainable Drainage Systems

'Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change. It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever possible, development should be designed to reduce flood risk, both on- and off-site.'

All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards. Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS'.

3.5 Climate Change

- 3.5.1 The EA 'Flood Risk Assessments: Climate Change Allowances' Guidance states that less vulnerable developments should utilise the central allowance.
- 3.5.2 The EA's Online Peak River Flow Map⁷ indicates that within the Thames River Basin District, the Kennet and tributaries Management Catchment Management Catchment's Central Allowance equates to 21% for the 2080s epoch.

3.6 Consultation

- 3.6.1 A product data request was submitted to the EA in January 2023. A response was received on the 6/2/23 and included Product 5, 6 and 7 of the Kennet (Tyle Mill to Thames Confluence) 2018 Model. The data has been included within Appendix F and is discussed further within this report.
- 3.6.2 A consultation request was submitted to the LLFA in February 2023. A response was received on the 3/3/23 and is included within Appendix G.
- 3.6.3 A sewer flooding history enquiry was submitted to Thames Water and a response was received stating, that *"Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers"*. This is included in Appendix D.
- 3.6.4 The Site is not located within an Internal Drainage Board (IDB) District.

⁷ <https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow?mgmtcatid=3044>

4.0 Assessment of Flood Risk

4.1 Tidal Flood Risk

- 4.1.1 The Site is situated at a minimum of approximately 38.6 m AOD and is significantly above sea level. Therefore, there is **Negligible** risk from tidal flooding.

4.2 Fluvial Flood Risk

- 4.2.1 The nearest watercourses are Holy Brook which is located approximately 5 m north-west of the Site, a secondary channel directly north of the Site which connects Holy Brook with the River Kennet, approximately 90 m to the north-west.
- 4.2.2 According to the EA's Flood Map for Planning (Figure 2), the Site is situated wholly within Flood Zone 1, whereby the annual probability of fluvial flooding is less than 1 in 1,000.

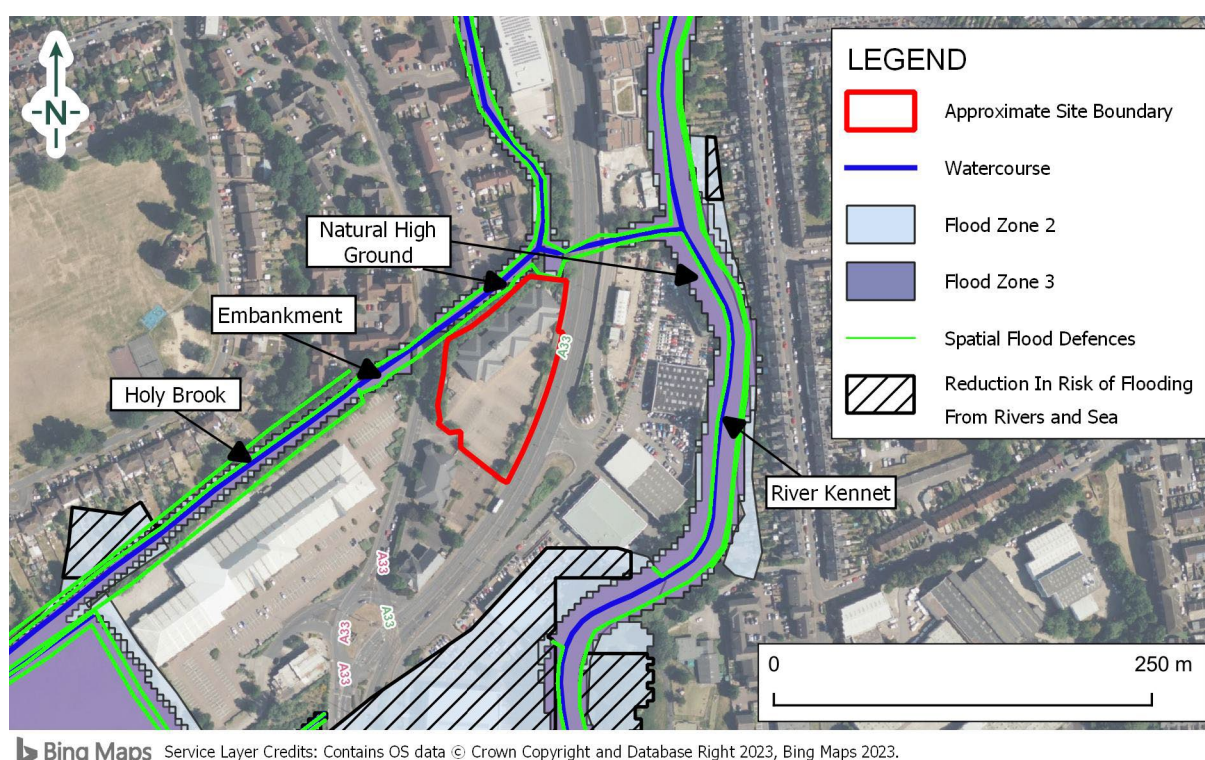


Figure 2: EA's Flood Map for Planning

- 4.2.3 The EA's Spatial Flood Defences dataset finds that Embankments and Natural High Ground defences are located along the banks of Holy Brook and the River Kennet, however no Standard of Protection or crest levels were provided. It is likely that these defences relate to the river channels themselves rather than formal, raised flood defences.
- 4.2.4 The EA 'Historical Flood Map' (Appendix H) indicates that the site has not historically flooded. However, the Reading Borough Council Section 19 Report for Winter 2013 - 2014 records flooding from the River Kennet and Holy Brook, including 7 properties on Rose Kiln Lane, however it did not state whether the Site was one of the impacted properties.
- 4.2.5 A Site Visit was undertaken by Delta-Simons on the 19/01/23 and photographs are included in Appendix I. The Site visit determined that there is a storm water drain that runs beneath the Site and discharges into Holy Brook in the north.

EA Estimated Flood Levels

- 4.2.6 Estimated flood levels for Holy Brook have been obtained from the EA in February 2022 and are included in Appendix F. The flood levels are taken from the EA Kennet (Tyle Mill to Thames Confluence) 2018 model. A summary of the flood levels for the node point closest to the Site is provided in Table 2 below. The node locations are shown on mapping in Appendix F.

Table 2: EA Estimated Flood Levels

Node reference	Grid reference	Maximum Water Level (m AOD)					
		5% AEP*	1% AEP	1% AEP + 25% CC**	1% AEP + 35% CC	1% AEP + 70% CC	0.1% AEP
HOLY3_0095.1	471344, 172415	37.96	38.17	38.5	38.64	39.12	38.72
HOLY1_0022.2	471321, 172401	38.45	38.45	38.58	38.69	39.14	38.77
HOLY1_0022.1	471270, 172359	38.48	38.48	38.62	38.74	39.17	38.81
HOLY1_0060.2	471225, 172328	38.49	38.49	38.63	38.75	39.2	38.82

*Annual Exceedance Probability

** Climate Change

- 4.2.7 As shown in Table 2 the maximum water level at Holy Brook during the 5% AEP event is 38.5 m AOD. The Site, which is situated at approximately 38.8 m AOD, is not at risk during the 5% AEP event and is outside of Flood Zone 3b, the functional floodplain.
- 4.2.8 Flood extents of the above are included in Appendix F and demonstrate that the Site is flood free in the 1% AEP and the 0.1% AEP scenarios, as well as the 1% AEP plus 25% and 35% CC events.
- 4.2.9 The EA Product Data also included floodplain Node points for areas across the Site, which are included in Appendix F and summarised in Table 3 below. Flood level data is only available for the 0.1% AEP event and the climate change scenarios of 1% AEP + 35% and higher.

Table 3: EA Estimated On-Site Flood Levels

Flood Point	Grid reference	Flood Levels (m AOD)			
		1% AEP + 25% CC	1% AEP + 35% CC	1% AEP + 70% CC	0.1% AEP
1	471256, 172252	No data	No data	39.15	No data
2	471306, 172263	No data	No data	39.12	No data
3	471314, 172340	No data	No data	39.12	No data
4	471325, 172394	No data	38.69	39.14	38.76
5	471353, 172397	No data	No data	39.12	No data

- 4.2.10 Flood Point 1 (south-western boundary), Flood Point 2 (South-eastern boundary), Flood Point 3 (centre of Site) and Flood Point 5 (north-eastern boundary) are all shown to experience depths on Site during the 1% AEP + 70% CC event. When comparing the Site's topography at each point, Point 1 can expect depths up to 260 mm, Point 2 up to 340 mm, Point 3 up to 330 mm and Point 5 up to 340 mm.
- 4.2.11 Only Flood Point 4 is shown to expect depths on-Site during the 1% AEP + 35% CC event. Flood Point 4 is located at the northern boundary adjacent to Holy Brook and when comparing the Site's topography shows that flood depths would not encroach onto the Site as ground levels are at a minimum of 38.70 m AOD in that area.
- 4.2.12 However, the 1% AEP + 35% CC or the 1% AEP + 70% CC scenarios are not representative of the climate change risk at the Site. This is described further below.

Climate Change

- 4.2.13 The EA 'Flood Risk Assessments: Climate Change Allowances' guidance states that Less Vulnerable developments within Flood Zone 1 should utilise the central Allowance.
- 4.2.14 The EA's Online Peak River Flow Map⁸ indicates that within the Thames River Basin District, the Kennet and tributaries Management Catchment Management Catchment's Central Allowance equates to a 21% for the 2080s epoch.
- 4.2.15 Based on the above, the 1% AEP+ 25% CC maximum water level in Table 2 is the best representation of climate change at the Site and is overly conservative of the impacts of this event. During the 1% AEP plus 25% CC event, the maximum water level at Holy Brook is 38.65 m AOD. At 38.8 m, Site levels around the northern and western peripheries are above the 1% AEP plus CC flood level. The Site is therefore flood free during this event.
- 4.2.16 Consideration of greater climate change allowances is not required, in line with the EA's 2021 climate change allowances guidance update.
- 4.2.17 As shown on the EA Hazard map for the 1% AEP plus 35% CC scenario, the Site is not considered to be at a fluvial flood hazard, however there is a 'Danger to All' rating along Holy Brook, however this risk is shown be wholly within the watercourse channel and does not extend onto the Site. The surrounding areas to the Site are also not considered to be within a flood hazard area. Based on the hazard mapping, access and egress would be considered achievable via Rose Kiln Lane to the north or south in the 35% CC event which means that safe access is available in the design 1% AEP + 25% CC event.
- 4.2.18 On the basis of the EA's mapped flood extents and the comparison of flood levels with Site levels, as the Site is outside of the 1% AEP plus 25% CC extent, the proposed development is considered to be at **Low** risk of fluvial flooding.

4.3 Surface Water Flood Risk

- 4.3.1 The EA 'Flood Risk from Surface Water' map (Figure 3) indicates that the northern extents of the Site, where the existing building is situated are at Very Low risk (less than 0.1% annual probability) of surface water flooding. The risk is shown to increase to Low risk (between 1% and 0.1% annual probability) of surface water flooding, within the southern extents of the Site, as well as along the Site's boundary. The risk is then shown to increase to a Medium risk (between 3.3% and 1% annual probability) of surface water flooding in the central areas of the Site.

⁸ <https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=363522b846b842a4a905829a8d8b3d0c>

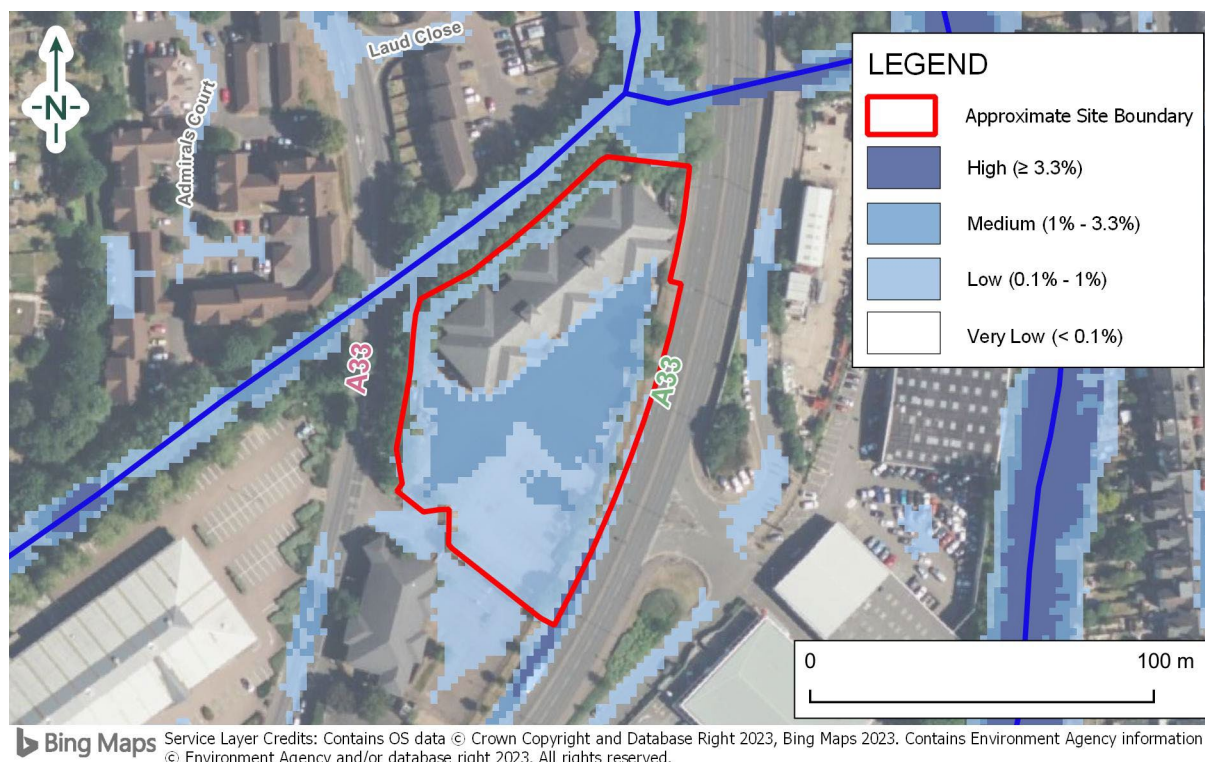


Figure 3: EA's Long-Term Flood Risk Map (Flood Risk from Surface Water)

- 4.3.2 The Site is shown to be free from surface water flooding during the 1 in 30 year (3.33%) event.
- 4.3.3 During the 1% AEP event, flooding would occur to the south of the building. Flood depths are expected to remain below 300 mm across the Site during this scenario, which is considered passable by people and vehicles.
- 4.3.4 During the 0.1% AEP scenario, depths surrounding the building and in the southern and westernmost parts of the Site would remain below 300 mm. Depths within the central Site area are expected to exceed 300 mm but remain below 450 mm. It must be noted that the EA Flood Map does not accurately take into account local drainage and is likely to be overestimating the surface water risk. It is noted that the Site is not part of a significant off-Site flow route and therefore the contributing catchment to ponding at the Site is very limited. Furthermore, once the on-Site attenuation system is incorporated as part of the development, surface water ponding should be significantly reduced - if not entirely alleviated - during the 0.1% AEP event (which can be taken as a conservative proxy for the 1% AEP + CC event). On this basis, it is considered that an elevation of ground floor levels by 150 mm would afford the units a degree of protection against the ingress of residual ponded surface water.
- 4.3.5 Third party reports indicate no records of historical flooding at the Site.
- 4.3.6 Whilst there will be an increase in building footprint at the Site, the incorporation of attenuation to store the 1 in 100 year plus CC rainfall event will more than offset any loss of above ground floodplain storage.
- 4.3.7 On the basis that flood depths on-Site would remain below 300 mm in the 1% AEP event, safe access and egress would be achievable.
- 4.3.8 Following the installation of an on-Site drainage system post-development, surface water ponding will be significantly reduced during the 0.1% AEP (/ 1% AEP + CC) event and as such, safe access and egress is likely to be available.
- 4.3.9 It can therefore be concluded that the proposed development would be at **Low** risk of surface water flooding. The impact of the development on surface water risk is covered in Section 5.0 to ensure that surface water risk is not exacerbated through appropriate SuDS measures.

4.4 Groundwater Flood Risk

- 4.4.1 A description of geology underlying the Site has been provided in Section 2.0. The available BGS borehole information indicated that groundwater was encountered at 2.7 m bgl and 3.8 m bgl, with standing water levels of between 2.5 and 3.1 m bgl.
- 4.4.2 Groundwater levels correspond with river levels. As such groundwater flooding could occur in the Reading area during periods of prolonged high water levels in Holy Brook. However, the Site itself is located above the modelled fluvial flood levels and therefore the groundwater hydraulic connectivity with Holy Brook is likely to be reduced.
- 4.4.3 According to BGS mapping, as provided within an Envirocheck® Report, the Site is illustrated to have 'potential for groundwater flooding to occur at surface'. The SFRA 2017 states that the Site has a 25% - 50% probability of groundwater flooding. A review of relevant third-party reports did not identify any historical records of groundwater flooding within the Site.
- 4.4.4 The Site will be predominantly hardstanding, limiting the vertical migration of groundwater. Furthermore, no basement levels are identified on plans and the proposed elevation of ground floor levels by at least 150 mm will provide an additional degree of mitigation against groundwater emergence.
- 4.4.5 It can therefore be concluded that the risk to the proposed development of groundwater flooding is **Low**.

4.5 Artificial Sources Flood Risk

Sewer Flooding

- 4.5.1 Based on the Utility Survey included as Appendix B and the Thames Water Sewer Plans included within Appendix D, it is inferred that the Site is served by a private sewer system as no public sewers are located adjacent to the Site.
- 4.5.2 The Thames Water DG5 Register, included within the 2017 SFRA indicates 51-100 incidences of sewer flooding in the RG2 0 postcode. This includes internal and external flooding from surface water and foul sewers. However, it is unknown whether the Site was impacted during any of the historic incidents within the area.
- 4.5.3 A sewer flooding history enquiry with Thames Water states that *Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers*. This is included in Appendix D.
- 4.5.4 In the unlikely event of sewer surcharging, the proposed units are to be elevated 150 mm above ground levels which would afford a degree of protection against water ingress.
- 4.5.5 It can therefore be concluded that the risk of sewer flooding is **Low**.

Reservoir and Canal Flooding

- 4.5.6 The EA 'Flood Risk from Reservoirs' map shows that the Site is not at risk of flooding from reservoirs. The River Kennet is partially canalised, however, similar to reservoirs, flooding within artificial water bodies is considered to be a residual risk, as water levels managed by a series of lock gates and sluices. Therefore, there is a **Low** risk from flooding from artificial sources.

4.6 Summary of Flood Risk

- 4.6.1 In order to address the residual risk of surface water flooding once an attenuation system is installed, it is recommended that ground floor levels are elevated 150 mm above surrounding ground levels. This is also in accordance with Building Regulations. The final design of the scheme should give due consideration to BS 8533: 2017.

4.6.2 It can then be concluded that the proposed development is at low risk of flooding.

4.7 Residual Risks

- 4.7.1 A residual risk is an exceedance event, such as beyond the 1 in 1000 year ($> 0.1\%$ AEP) flood event that would overtop Holy Brook or the River Kennet, however, the Site is not indicated to be affected by such an event. The Site could be impacted by a 1 in 1000 year rainfall event, however, as the probability of a greater than a 1 in 1000 year flood event occurring is $>0.1\%$ in any given year, the probability is low and, therefore, no further mitigation beyond what is proposed is required.
- 4.7.2 In the event of an exceedance event occurring, the residual risk to people working within the Site can be managed through the implementation of an appropriate Site management plan, which recognises the residual risks and details what action is to be taken by staff in the event of a flood to put occupants in a place of safety.

4.8 Impact on Flood Risk Elsewhere

- 4.8.1 The proposed development is for the demolition of the existing Class E(g)(i) (Office) building and the construction of three buildings for Class E(g)(iii) (Light Industrial)/Class B2 (General Industrial)/Class B8 (Storage or Distribution) uses, including the provision of a new substation, parking, landscaping, and associated works. All buildings will be located outside of the 1 % AEP plus CC fluvial flood extent. Whilst there will be an increase in building footprint, the incorporation of surface water attenuation to store the 1 in 100 year plus CC rainfall event will offset any loss of above ground floodplain storage. The development will therefore not remove flood storage space from the floodplain.
- 4.8.2 The potential for the inclusion of SuDS is outlined in Section 5.0 below.

5.0 Drainage Strategy

5.1 Introduction

- 5.1.1 The Site currently comprises a two-storey office building with associated car parking. The proposed development is for the construction of three buildings for Class E(g)(iii) (Light Industrial)/Class B2 (General Industrial)/Class B8 (Storage or Distribution) uses, including the provision of a new substation, parking, landscaping, and associated works which will result in 5,210 m² (or 75.5%) of hardstanding areas. The proposed development therefore results in a decrease in hardstanding areas.
- 5.1.2 To create a betterment to the existing situation, surface water discharge from the Site will be controlled.
- 5.1.3 Consultation with Reading Borough Council (RBC) in its role as LLFA has been undertaken (included as Appendix G) which detailed that any proposed development within RBC should incorporate a 10% allowance for urban creep. This considers the potential for future increases in impermeable areas within the Site (i.e. the paving cover of soft landscaped garden areas). For the purposes of this assessment, including the 10% allowance for urban creep, an overall hardstanding area of 5,731 m² has been considered.
- 5.1.4 In line with the EA's 2022 climate change allowances update for rainfall, given the proposed development is light industrial and as such has a 70 year anticipated lifespan, the central allowance for the 2070s epoch will be used. This is a 25% allowance for the 1 in 30 year event and 35% for the 1 in 100 year event.

5.2 Existing Surface Water Discharge

- 5.2.1 The existing brownfield runoff rates have been estimated using the Modified Rational Method which is set out as follows:

$$2.78 \times \text{Rainfall Intensity (mm)} \times \text{Impermeable Drainage Area (ha)}$$

- 5.2.2 The brownfield runoff rates for the existing hardstanding area (0.6351 Ha) are summarised in Table 4 below. Rainfall data has been obtained from the FEH website based on a 6 hour storm duration for the respective return period.

Table 4: Brownfield Runoff Rates

Return Period (Years)	Rainfall Intensity (mm)	Runoff Rate (l/s)
1 in 1	20.48	36.2
1 in 2	26.93	47.5
1 in 10	42.67	75.3
1 in 30	54.02	95.4
1 in 100	67.86	119.8
1 in 1000	102.59	181.1

5.3 Proposed Discharge Rate

- 5.3.1 Given the existing brownfield nature of the Site, the absence of a restricted discharge rate at present, the constraints posed by the existing sewers (which will need diversion), as well as noting the commercial nature of the proposed development, it is proposed to restrict surface water runoff generated by the proposed development to the existing 1 in 2 year brownfield runoff rate, including a 30% betterment, during all events up to and including the 1 in 100 year plus 35% climate change event. It is thereby proposed to restrict surface water runoff to 33.28 l/s. This also provides a betterment on the existing 1 in 1 year brownfield rate.
- 5.3.2 This accords with the consultation with the LLFA whereby if achieving greenfield runoff rates is not appropriate, attenuation should not exceed the runoff rate prior to development.

5.4 Attenuation Storage

- 5.4.1 In order to achieve a discharge rate of 33.28 l/s, attenuation storage will be required. Storage estimates have been provided using MicroDrainage and are included in Table 5 below and Appendix J. The storage estimates are based on a flow rate of 33.28 l/s, storage within a tank or pond structure, an impermeable drainage area of 0.5731 ha (which includes a 10% allowance for urban creep), a design head of 1 m and a Hydrobrake flow control. In accordance with the LLFA's guidance, the 1 in 1 year volume has also been provided within Table 5 and Appendix J, however this has been calculated using FSR rainfall data, whereas the remaining volumes have been calculated using FEH data.

Table 5: Attenuation Storage Volume Requirements

Storm Event	Attenuation Volume (m ³)
1 in 1 year	4.8 - 27
1 in 30 year	65 - 115
1 in 30 year plus 25% CC	92 - 158
1 in 100 year plus 35% CC	155 - 240

- 5.4.2 The attenuation volumes are provided for indicative purposes only and should be verified at the detailed design stage.

5.5 Drainage Hierarchy

- 5.5.1 The recommended surface water drainage hierarchy (Paragraph 080 of the NPPG: Flood Risk and Coastal Change) is to utilise soakaway systems or infiltration as the preferred option, followed by discharging to an appropriate watercourse. If this is not feasible, the final option is to discharge to an existing public sewer.

Surface Water Discharge to Soakaway

- 5.5.2 The first consideration for the disposal of surface water is infiltration (soakaways and permeable surfaces). As described above the Site is underlain by superficial deposits of Alluvium (clay, silt, sand and gravel) which is underlain by the Seaford Chalk Formation and Newhaven Chalk Formation. The on-Site BGS borehole also indicates that there has been recorded water strikes at 2.7 m bgl and 3.8 m bgl, with standing water levels of between 2.5 and 3.1 m bgl. Soils mapping also describes the Site as 'naturally wet'.
- 5.5.3 Whilst geological conditions indicate that soakaways may be suitable for the discharge of surface water runoff, the Preliminary Geo-Environmental Risk Assessment (Delta-Simons, February 2023, ref. 91193.557185) identifies a Low to Moderate potential for contamination to be present beneath the Site and therefore the use of infiltration has been eliminated at this stage. Alternative surface water discharge locations have been considered to provide a viable surface water solution in the event that infiltration is unsuitable within the Site.

Surface Water Discharge to Watercourse

- 5.5.4 Where soakaways are not suitable a connection to watercourse is the next consideration.
- 5.5.5 The nearest watercourse is Holy Brook which is located approximately 5 m north-west of the Site. Discharge to Holy Brook, at a limited discharge rate of 33.28 l/s, appears feasible. The existing connection to Holy Brook could be utilised or replicated to discharge surface water runoff from the proposed development. The existing private surface water sewer that serves the Site is identified to discharge to Holy Brook via a 675 mm pipe, with an invert level of 37.37 m AOD, as detailed within the drainage survey (Appendix B). Subject to the agreement of the EA, it is assumed that the existing connection to the watercourse can continue to be used. It is noted that this outfall is below the 1% AEP plus 25% CC flood level, therefore additional on-Site storage may be required to mitigate the outfall becoming submerged.

Surface Water Discharge to Sewer

- 5.5.6 As described above, a connection to Holy Brook to the north of the Site is considered feasible and therefore a connection to a surface water sewer, highway drain or another drainage system is not required.

5.6 Sustainable Drainage Systems

- 5.6.1 Attenuation storage should be provided in the form of Sustainable Drainage Systems (SuDS) where practical. The following SuDS options have been considered:

Soakaways

- 5.6.2 As described above, the use of soakaways is unlikely to be feasible.

Swales, Detention Basins and Ponds

- 5.6.3 The Site will be occupied by buildings, an access road and parking and there is limited space to accommodate above ground storage features such as ponds and basins.

Rainwater Harvesting

- 5.6.4 The attenuation benefits provided through the use of rainwater harvesting are considered to be limited and would only be realised when the tanks were not full. However, rainwater harvesting techniques such as water butts could be incorporated within the final design for landscape irrigation.

Green Roofs

- 5.6.5 Green roofs are not proposed. Given the nature of the proposed development, the significant additional cost involved in installing and maintaining green roofs and the additional works required to allow for the additional loading on the building, green roofs are not considered a practical option. The benefits achieved through installing a green roof would be disproportionate to the significant ongoing maintenance and construction costs involved.

Porous/Permeable Paving

- 5.6.6 Permeable paving could potentially be incorporated within the proposed parking areas on Site. Storage would be provided within the sub-grade material prior to connectivity into a storage crate and controlled release to the receiving watercourse. The amount of storage offered by permeable paving is subject to sub-grade depth and Site gradient. The use of permeable paving should be considered at the detailed design stage.

Underground Attenuation Tanks

- 5.6.7 Storage could be provided within underground attenuation tanks or within oversized pipes. Sufficient space for an underground tank is available beneath external hardstanding areas.

5.7 Preferred Drainage Scheme

- 5.7.1 As described in Section 5.3, it is proposed to restrict surface water generated by the development to 33.28 l/s during all events up to and including the 1 in 100 year plus 35 % climate change event.
- 5.7.2 Surface water runoff up to the 1 in 100 year plus 35% climate change allowance event will be attenuated on Site. A total attenuation volume of 186.1 m³ will be required to achieve the discharge rate and will be provided in the form of geocellular storage crates. Appendix K details the MicroDrainage Calculations of geocellular storage tanks for the 1 in 100 year + 35% CC. Based on a length of 17.5 m, a width of 14 m (totalling a surface area of 245 m²), a depth of 0.8 m and a void ratio of 95%, geocellular storage could provide up to 186.2 m³ of attenuation.
- 5.7.3 As requested by the LLFA, drainage calculations have also been run for the 1 in 1 and 1 in 30 year events, demonstrating the attenuation volume requirements for these events. These are also included in Appendix K.
- 5.7.4 A conceptual drainage sketch detailing the above is included in Appendix L.
- 5.7.5 Surface water runoff will be discharged ultimately to Holy Brook located to the north-west of the Site, subject to the consent of the EA. Discharge from the crate system will be at a rate of 33.28 l/s, controlled via a Hydrobrake or similar flow control device, into the existing surface water sewer. If the existing outfall is to be re-used then additional attenuation storage may be required to help prevent surcharging on-Site if the outfall is submerged. It is considered that additional storage could be provided in above-ground controlled flooding of parking areas, in events greater than the 1 in 30 year event, if required.
- 5.7.6 The proposed surface water drainage scheme will create a significant betterment over the existing drainage situation.

5.8 Event Exceedance

- 5.8.1 Storage will be provided for the 1 in 100 year plus 35% CC event. Storm events in excess of the 1 in 100 year plus 35% CC event should be permitted to produce temporary shallow depth flooding within the car park, access road or landscaped areas. Finished floor levels will be set at a minimum of 150 mm above surrounding ground levels thereby reducing the potential for exceedance flooding to affect the buildings.

5.9 Surface Water Treatment

- 5.9.1 In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), 'other roofs' and 'low traffic roads' have a 'low' pollution hazard level. Table 6 below shows the pollution hazard indices for each land use.

Table 6: Pollution Hazard Indices*

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other Roofs (typically commercial/industrial roofs)	Low	0.5	0.2**	0.4
Low Traffic Roads	Low	0.5	0.4	0.4

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

** up to 0.8 where there is potential for metals to leach from the roof

- 5.9.2 Water treatment will need to be provided by a suitably sized separator. Mitigation indices are not provided for separators in the SuDS Manual, however, it is considered that they will be able to provide sufficient treatment. The design of the separator should be considered further at the detailed drainage design stage.

5.10 Maintenance

- 5.10.1 Maintenance of communal drainage features such as an attenuation tank or shared surface water drainage systems can be arranged through appointment of a Site management company.
- 5.10.2 Maintenance schedules for an attenuation tank is included in Appendix M. Maintenance of any separator proposed will be as per the manufacturer's guidance.

5.11 Foul Water Discharge

- 5.11.1 It is proposed that foul flows are discharged as per the existing situation, which is via a private foul water sewer system and into the existing foul pump chamber in the west of the Site (as detailed within Appendix B).

5.12 Other Considerations

- 5.12.1 Maintenance access to Holy Brook should be retained. Maintenance access can be ensured by providing an 8 m built development free buffer from the watercourse.
- 5.12.2 The existing private surface water and foul sewers which serve offsite areas will likely need to be diverted around the proposed building layout.

6.0 Sequential and Exception Test

6.1 Sequential Test

- 6.1.1 The NPPF requires the Local Planning Authority to apply the Sequential Test when considering new development. The aim is to steer development to areas at the lowest probability of flooding.
- 6.1.2 It is acknowledged that whilst the Site is in fluvial and tidal Flood Zone 1, EA surface water flood risk mapping identifies a potential surface water flood risk. This FRA has demonstrated that once the on-Site attenuation system is incorporated as part of the development, surface water ponding should be significantly reduced - if not entirely alleviated - during the 0.1% AEP event (which can be taken as a conservative proxy for the 1% AEP + CC event). Additionally, it is recommended that ground levels are raised by 150 mm, to protect the Site from the ingress of residual ponded surface water. All these measures reduce the risk to an acceptable level for the nature of the proposed development.
- 6.1.3 Furthermore, the proposed development comprises of a demolition and redevelopment of a brownfield site which will provide a betterment of the existing situation. No significant flood risks have been identified from any of the other sources assessed.
- 6.1.4 On this basis it is considered that the Sequential Test has been passed.

6.2 Exception Test

- 6.2.1 Table 3 of the NPPG (reproduced in Table 1, Section 3), states that 'less vulnerable' development is considered appropriate within Flood Zone 1. As such, application of the Exception Test is not required.

7.0 Conclusions and Recommendations

7.1 Conclusions

- 7.1.1 The proposed development is for the demolition of the existing Class E(g)(i) (Office) building and the construction of three buildings for Class E(g)(iii) (Light Industrial)/Class B2 (General Industrial)/Class B8 (Storage or Distribution) uses, including the provision of a new substation, parking, landscaping, and associated works.
- 7.1.2 The EA 'Flood Map for Planning' shows that the Site is located wholly within Flood Zone 1 and EA data confirmed that the Site is expected to be free from flooding during the 1% AEP event +25 % CC. The proposed development is therefore not considered to be at risk of fluvial flooding.
- 7.1.3 Whilst the EA's surface water flood map identifies areas of ponding on-Site during the 1% AEP event, mapped flood depths would remain below 300 mm. Given that a surface water drainage system is proposed to store rainfall up to and including the 1 in 100 year plus 35% climate change event, no significant ponding of surface water is anticipated on the Site post-development. Notwithstanding this, it is recommended that ground floor levels are elevated 150 mm above external ground levels to provide a degree of protection against residual ponding, should it occur.
- 7.1.4 Considering the proposed mitigation, the risk of flooding from all sources has been assessed and the flood risk to the proposed development is considered to be **Low and Acceptable**.
- 7.1.5 The proposed development results in a decrease in hardstanding areas. To create a betterment to the existing situation, surface water discharge from the Site will be controlled to a rate 30% lower than the existing brownfield 1 in 2 year rate. Attenuation provided on Site will accommodate storm events up to and including the 1 in 100 year plus 35% climate change event.
- 7.1.6 All methods of surface water discharge have been assessed. Discharge of surface water to Holy Brook at a rate of 33.28 l/s appears to be the most practical option. This must be agreed with the EA in due course. If the existing outfall is to be re-used, consideration will be given to a scenario where the outfall is submerged during the climate change event.
- 7.1.7 Attenuation storage will be required on Site in order to restrict surface water discharge to 33.28 l/s. Attenuation can be provided within geocellular storage crates.
- 7.1.8 It is proposed that foul flows are discharged as per the existing situation via a private sewer system.

7.2 Recommendations

Flood Risk

- Finished floor levels should be set at a minimum of 150 mm above surrounding ground levels.

Drainage Strategy

- Verify the attenuation volumes included in this report when undertaking detailed drainage design.
- Make provision for sustainable drainage features throughout the Site.

Other

- Maintenance access to Holy Brook should be retained. Maintenance access can be ensured by providing an 8 m buffer either side of the watercourse.
- Diversion may be required of the existing private surface water and foul sewers which serve off-Site areas upstream.

Appendix A - Limitations

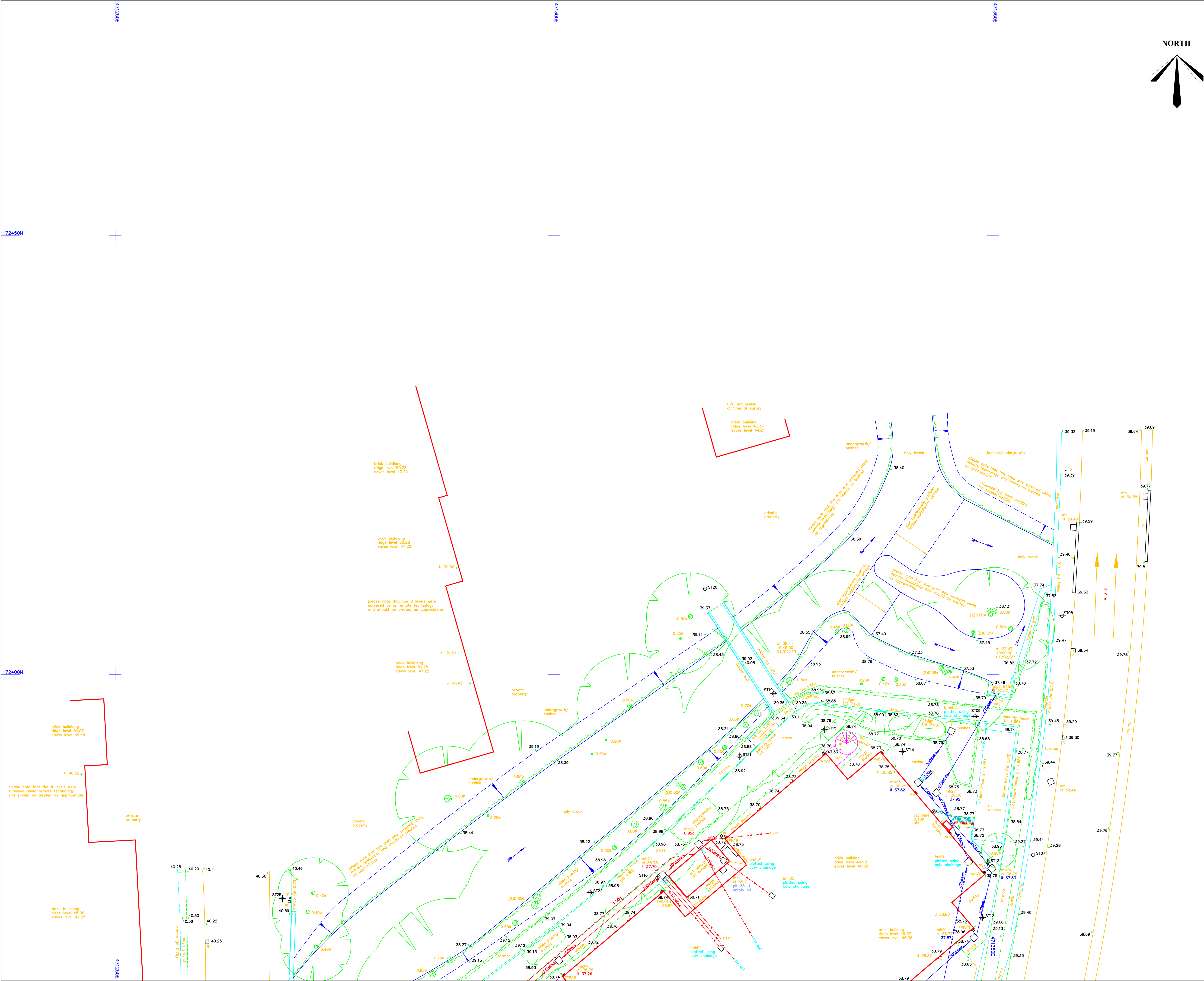
Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Appendix B – Topographic Survey



NOTES

GENERAL NOTES :-

ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.
GRID COORDINATES ARE ORDNANCE SURVEY NATIONAL GRID, DERIVED FROM GPS TRANSFORMATION.
GPS COORDINATES AND LEVELS SET AT 500 (NO SCALE FACTOR APPLIED)

THIS DRAWING HAS BEEN PRODUCED WITH A PLOT SCALE ACCURACY OF 1:200

SERVICE COVERS INDICATED WHERE VISIBLE, PIPE INVERTS / DETAILS SURVEYED FROM SURFACE, INSPECTION ONLY, GENERALLY DAMAGED COVERS AND COVERS WITHIN HIGHWAYS WILL NOT BE LIFTED

TREE SPECIES SHOULD BE CONFIRMED BY TREE SPECIALIST IF CRITICAL

OVERHEAD CABLES ARE INDICATED USING REMOTE SURVEY METHODS AND ARE SUBJECT TO SEASONAL VARIATION, AND SHOULD BE TREATED AS APPROXIMATE

SERVICE COVERS LOCATED UNDER PARKED VEHICLES/MOBILE STRUCTURES MAYBE OMITTED.

BURIED SERVICE COVERS WILL NOT BE INDICATED.

TOPOGRAPHICAL SURVEY/UTILITY KEY :-

(ht) = height	of = off set
Ø = diameter	osm = ordnance survey bench mark
● = peg trap	p & r fence = post & rail fence
a/g = above ground	pd = pit depth
av = air valve	pr = pipe riser
bs = bellish beacon	ptg = pipe to ground
bd = back drop	pta = pipe to surface
bl = bed level	re = retarding eye
bol = bollard	ret wall = retaining wall
bs = bottom of shaft	rs = road sign
bt = telecom	rw = rain water pipe
c/b fence = closeboard fence	s/b = safety paving
c/box = control box	sap = sapling
cl = cover level	sec fence = security fence
con = conifer	sfc = soil filled chamber
cr = cable riser	sl = stop light
cws = combined water sewer	sp = stop pipe
d/chon = drainage channel	st = stop top
elc = electric	sv = stop valve
elb = electric junction box	sw = storm water sewer
esp = end of trace	TBM = temporary bench mark
ep = electric pole	tfr = taken from records
er = earth rod	tl = trench
f/bed = flower bed	tl = trench
fb = fire hydrant	tl = trench
fl = floor level	tl = trench
fs = fire switch	tl = trench
fw = foul water sewer	tl = trench
g = gully	tl = trench
g/run = gully run	tl = trench
gr = gas riser	tl = trench
h/chestnut = horse chestnut	tl = trench
h/thorn = hawthorn	tl = trench
ic = inspection cover	tl = trench
il = illuminated	tl = trench
int = interceptor	tl = trench
lp = lamp post	tl = trench
mh = manhole cover	tl = trench
mty = marker	tl = trench
o/h = over head	tl = trench

SURVEY CONTROL :-			SURVEY CONTROL :-				
STATION	EASTINGS	NORTHINGS	LEVEL	STATION	EASTINGS	NORTHINGS	LEVEL
ST01	471249.576	172294.682	39.357	ST15	471330.819	172363.697	38.790
ST02	471303.485	172304.702	38.819	ST16	471311.761	172376.795	38.774
ST03	471271.750	172294.123	38.885	ST17	471296.160	172364.377	38.737
ST04	471256.071	172325.915	40.022	ST18	471281.024	172351.009	38.760
ST05	471307.364	172250.860	38.930	ST19	471325.028	172397.832	39.562
ST06	471333.925	172304.202	38.988	ST20	471317.198	172409.736	39.229
ST07	471354.557	172379.432	39.410	ST21	471321.137	172390.681	38.893
ST08	471357.867	172406.666	39.465	ST22	471304.115	172375.161	38.970
ST09	471347.962	172395.204	38.754	ST23	471284.416	172361.708	39.047
ST10	471278.321	172338.949	38.811	ST24	471275.265	172356.644	38.855
ST11	471335.811	172347.591	38.606	ST25	471269.061	172374.460	40.527
ST12	471348.782	172372.317	38.719				
ST13	471349.378	172378.589	38.744				
ST14	471339.689	172391.219	38.737				

UTILITY SURVEY KEY :-

DISCLAIMER :-

Electromagnetic techniques have been used in the location of underground services. The results are not infallible and trial excavations should be carried out to confirm service identification, positions and particularly depths, where these are critical. The completeness of the underground services information cannot be guaranteed.

This method of survey does not differentiate between live and dead services, and as such all services should be treated as live. This drawing may not include the location of all public services that may cross the site, therefore the relevant service drawings should be obtained from the appropriate utility company and used in conjunction with this drawing.

Private service pipes and cables in highways are not shown, but their presence should be anticipated.

Additional below ground structures or obstructions not shown on this drawing may be present. Reference should be made to historical plans and on-site drawings. Excavations in the vicinity of services should be carried out with due diligence ref: HS47 document avoiding dangers from underground services

Please note that factors such as ground conditions, proximity of other utilities, material and method of construction have an influence on the quality of the data collected on site.

ISA Standards - "A utility mapping survey can be considered a 100% accurate depiction of the sub-surface environment, and the use of these drawings does not remove the requirement for the use of safe digging techniques at all times, in line with requirements of HS47 and current CDM regulations"

UTILITY NOTES

NO SIGNAL ON GAS WITHIN SITE BOUNDARY AS PIPE IS 4"PE. ROUTE HAS BEEN ADDED TO DRAWING AS ASSUMED. THIS IS INDICATIVE ONLY. A HAND DUG TRIAL PIT IS RECOMMENDED TO CONFIRM ROUTE/DEPTH.

UNABLE TO LOCATE WATER AS FORMER MAIN IS BELIEVED TO BE CUT. TEMPORARY WATER POSSIBLY IN PLACE - NOT LOCATED AT TIME OF SURVEY. POSSIBLE 2"PE REDUNDANT WATER STILL PRESENT.

CUT CABLES/PIPE ACROSS SITE - NO/POOR SIGNAL. POSSIBLE REDUNDANT PIPES/CABLES STILL PRESENT.

0 2 4 8 12 16 20

MIDLAND SURVEY LTD

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Tel: 01926 810811 Fax: 01926 810812
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www.midlandsurvey.co.uk

Client DELTA-SIMONS LTD

Project ROSE KILN COURT, READING, RG2 0BK

Title TOPOGRAPHICAL, UTILITY AND CCTV DRAINAGE SURVEY

Date FEBRUARY 2023	Revisions
Scale 1:200@A1	
Dwg No U09090 - 1	
Surveyor L.L.G./L.W./A.B	
Checked M.G./L.K.B./R.P	

**TOPOGRAPHICAL (LAND) SURVEYORS / UTILITY SURVEYORS
BUILDING MEASUREMENT SURVEYORS / 3D LASER SCANNING**

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GENERAL NOTES :-

GENERAL NOTES -

ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.
GRID COORDINATES ARE ORCHARD SURVEY NATIONAL GRID DERIVED FROM GPS TRANSFORMATION.
GPS COORDINATES AND LEVELS SET AT 5101 (NO SCALE FACTOR APPLIED)

THIS DRAWING HAS BEEN PRODUCED WITH A PLOT SCALE ACCURACY OF 1:200

SERVICE COVERS INDICATED WHERE VISIBLE, PIPE INVERTS / DETAILS DERIVED FROM SURFACE INSPECTION ONLY. GENERALLY SAGGED COVERS AND COVERS WITH HINDWINGS WILL NOT BE LIFTED

THIS SPECIES SHOULD BE CONFIRMED BY THIS SPECIALIST IF CRITICAL.

OVERHEAD CABLES ARE INDICATED USING REMOTE SURVEY METHODS AND ARE SUBJECT TO SEASONAL VARIATION, AND SHOULD BE TREATED AS APPROPRIATE.

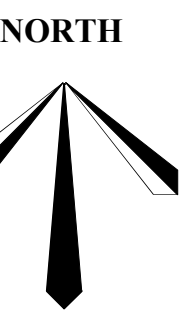
THE SURVEYOR WILL NOT BE RESPONSIBLE FOR THE OMISSION OF DETAILS OBSERVED DURING SITE SURVEY

RICS PROFESSIONAL STANDARDS 3RD EDITION RULE 1.19 APPLIES TO THIS SURVEY.

(ht) = height (cl) = off let

[illegible]

SURVEY CONTROL				SHEET LAYOUT	
STATION	EASTING	NORTH	LEVEL	ANGLE	
ST01	97248.576	122294.682	36.507		
ST02	97352.485	123204.738	36.819		
ST03	971271.750	122944.123	36.885		
ST04	97258.071	123205.915	40.022		
ST05	97587.504	122950.860	36.988		
ST06	97344.623	123204.402	36.988		
ST07	97354.562	123279.432	36.410		
ST08	97335.867	122456.666	36.445		
ST09	97344.962	122936.254	36.790		
ST10	97278.321	123348.949	36.811		
ST11	97338.811	123233.981	36.606		
ST12	97348.762	122972.317	36.719		
ST13	97260.738	123278.956	36.719		
ST14	97368.667	123291.215	36.737		
ST15	97348.762	123263.697	36.790		
ST16	97331.761	122378.795	36.562		
ST17	97386.162	123564.277	36.737		
ST18	97281.024	123501.009	36.760		
ST19	97325.028	122972.813	36.529		
ST20	97311.198	122498.738	36.292		
ST21	97321.127	122960.651	36.870		
ST22	97328.416	122761.706	36.247		
ST23	97328.416	122761.706	36.247		
ST24	97275.285	122566.044	36.927		



ELECTRIC CABLE
 WATER PIPE

	HATCHED AREA		WATER PIT		FULL SEWER
	BOREHOLE		STORM SEWER		CABLE TELEVISION
	OPT		COMMUNICATION CABLE		TELEPHONE CABLE
	TRIAL PIT		GAS PIPE		UNDERGROUND SERVICE
	HAND PIT		OTHER		TRAFFIC LIGHT
	WINDOW SAMPLE		VENT		OFFSET FILL
			FUEL PIPE		GAUGE LINES
			PAPER		ASSIGNED ROUTE
			TAKES FROM RECORDS		

Electromagnetic techniques have been used in the location of underground

carried out to confirm survey identification, patterns and particularly depths. The nature and extent of the effectiveness of the underground services information cannot be guaranteed.

This method of survey does not differentiate between live and dead services, and as a result, the survey should be treated as a guide only. It is not intended to be used as a basis for any design or construction work, and the presence of any live or dead public services that may cross the site, therefore the relevant service drawings should be consulted to confirm the location of the services.

Private services, such as pipes and cables in highways are not shown, but their presence should be anticipated.

Obstructions, such as ground structures or obstructions not shown on the drawing may be present. Reference should be made to historical plans and on-site drawings.

Reference to the utility drawings should not be taken as a guarantee of the absence of any other underground services, and the presence of any other services is a danger not covered by the drawings.

Present: Record of existing underground services.

These notes that factors such as ground conditions, proximity of other utilities, material and the nature of the construction work to be carried out.

It is the utility mapping survey can be considered a 100% accurate depiction of the on-site underground services, and the use of these drawings does not remove the requirement for the use of existing techniques at all times, in line with requirements of the current CEN regulations.

ALL INTERNAL DRAINAGE HAS BEEN PLOTTED ON USING CCTV CHAINAGE, THEREFORE POSITIONS

ALL INTERNAL DRAINAGE HAS BEEN PLOTTED ON USING CCTV CHAINAGE. THEREFORE POSITIONS SHOULD BE TREATED AS GUESS ONLY.

ALL BURIED MANHOLES HAVE BEEN PLOTTED ON USING CCTV CHAINAGE. THEREFORE POSITIONS SHOULD BE TREATED AS GUESS ONLY.

WHERE CCTV WORKS HAVE NOT BEEN POSSIBLE ASSUME ROUTES HAVE BEEN USED. THEREFORE THESE LITTING WORKS BE TREATED AS GUESS ONLY.

EXTENSIVE RETTING WORKS ARE RECOMMENDED TO ALLOW FURTHER SURVEY WORKS TO BE CARRIED OUT.

NO SIGNAL ON GAS WITHIN SITE BOUNDARY AS PIPE IS AT 4" DEPTH. ROUTE HAS BEEN ADDED TO DRAWING AS ASSUMED. THIS IS INDICATIVE ONLY. A HAND DUG TRENCH PIT IS RECOMMENDED TO LOCATE GAS AT 4" DEPTH.

UNABLE TO LOCATE WATER AS FORMER MAN IS BELIEVED TO BE CUT. TEMPORARY WATER PUMPING IN PLACE. NOT LOCATED AT TIME OF SURVEY. POSSIBLE 2" PIPE REINTEGRANT WATER PIPE.

CUT CABLES/PIPE ADDRESS SITE. NO/POOR SIGNAL. POSSIBLE REDUNDANT PIPES/CABLES STILL IN PLACE.



HEAD OFFICE

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Tel: 01926 810811 Fax 01926 810812
E-Mail: msi@midlandsurvey.co.uk
www.midlandsurvey.co.uk

Client DELTA-SIMONS LTD

Project	ROSE KILN COURT, READING, RG2 CBX
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Title TOPOGRAPHICAL UTILITY AND CCTV DRAINAGE SURVEY

Date	FEBRUARY 2023	Revisions
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Scale 1:200@A0

Dwg No U09090 - 2

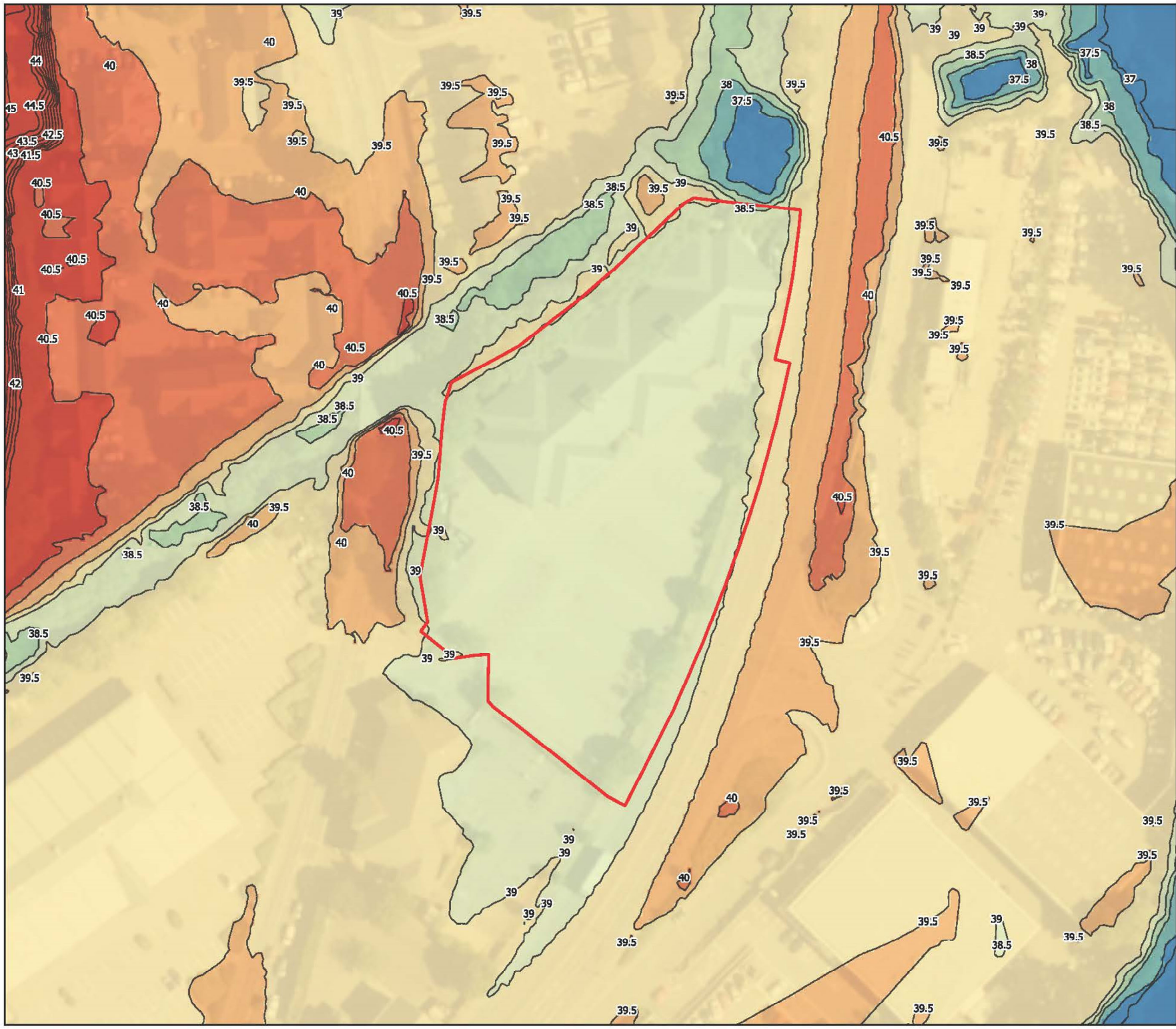
Surveyor LLG/JW/AB

Checked M.G./L.X.B./R.P.

**TOPOGRAPHICAL (LAND) SURVEYORS / UTILITY SURVEYORS
BUILDING MEASUREMENT SURVEYORS (3D LASER SCANNING)**



Appendix C - LiDAR Plan



Legend

Approximate Site Boundary

Elevation (m AOD)

- <= 37.5
- 37.5 - 38.0
- 38.0 - 38.5
- 38.5 - 39.0
- 39.0 - 39.5
- 39.5 - 40.0
- 40.0 - 40.5
- > 40.5

0 10 20 30 40 m

N

Figure: LIDAR Plan

Job: Logicor Park Reading, Rose Kiln Court

Client: Redwood (Light Industrial) Propco Sarl

Appendix: C	Revision: 2	Date: 28 March 2023
Drawn by: LA	Checked by: RS	Scale: 1:800

Job No.: 91193.557191 / 22-1640.07

Bing Maps

DeltaSimons

Site Plan Provided by Client.

Appendix D - Sewer Plans

Asset location search



Property Searches

Your reference	rose kiln court delta
Our reference	ALS/ALS Standard/2023_4775176
Search date	20 January 2023

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Search address supplied: Thames Water, Rose Kiln Court, Rose Kiln Ln, Reading, RG2 0BY

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

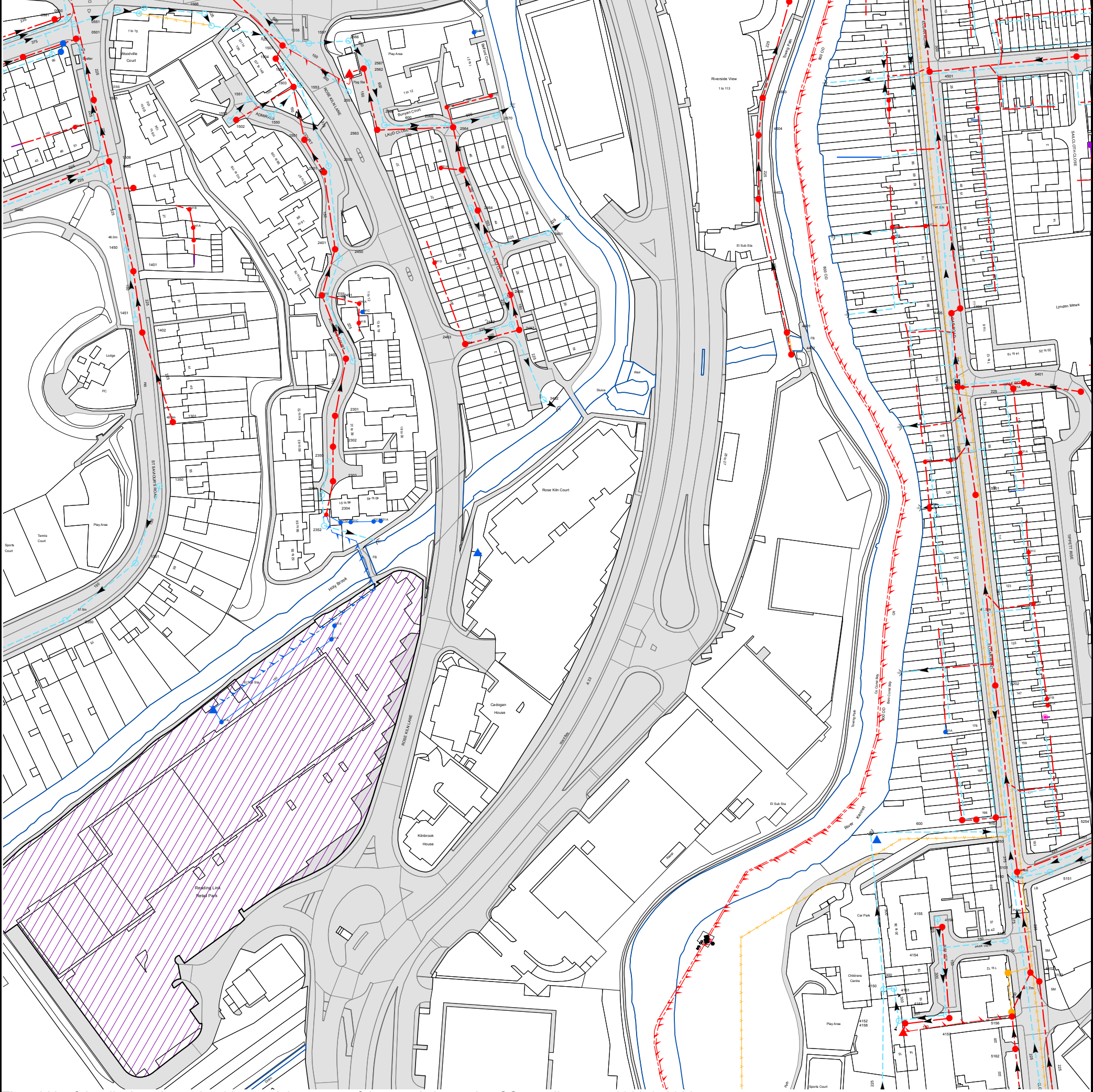
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2023 4775176



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 471309,172339
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5155	41.26	39.87
5250	41.32	38.77
5156	n/a	39.99
5150	41.36	39.09
5162	n/a	n/a
5101	41.41	39.36
5152	41.5	39.73
531C	n/a	n/a
5102	41.58	39.6
531D	n/a	n/a
5103	41.72	39.65
521B	n/a	n/a
521A	n/a	n/a
5151	41.5	39.67
5254	43.41	42
5251	43.06	41.93
5301	41.87	38.55
551A	n/a	n/a
541A	n/a	n/a
531A	n/a	n/a
5401	43.61	40.4
5402	45.5	42.93
551D	n/a	n/a
551E	n/a	n/a
541C	n/a	n/a
431C	n/a	n/a
431D	n/a	n/a
431A	n/a	n/a
431B	n/a	n/a
4406	42.02	38.32
4402	38.91	37.9
4401	38.52	37.79
4405	42	38.08
4404	n/a	n/a
441B	n/a	n/a
441A	n/a	n/a
441C	n/a	n/a
4403	n/a	n/a
4504	n/a	n/a
451A	n/a	n/a
451B	n/a	n/a
4503	n/a	n/a
4150	39.66	37.04
4151	39.4	38.02
4152	39.75	38.08
4158	39.8	37.81
4155	39.93	38.58
4154	40.09	38.4
4156	39.81	38.24
421A	n/a	n/a
4153	40.55	38.21
4157	40.45	37.95
4252	n/a	n/a
5256	n/a	n/a
5202	41.68	38.98
5257	n/a	n/a
2403	39.74	38.91
231C	n/a	n/a
2452	39.73	38.26
241B	n/a	n/a
241A	n/a	n/a
241C	n/a	n/a
231B	n/a	n/a
231A	n/a	n/a
241D	n/a	n/a
2458	39.2	37.7
2463	39.18	38.05
2461	39.14	38.02
2456	39.2	37.42
2462	39.3	37.94
2457	39.3	37.54
3402	39.33	37.69
2460	39	37.72
3401	39.19	37.55
2464	38.98	37.16
2459	38.97	37.84
2565	39.1	37.03
251A	n/a	n/a
2550	39.12	37.6
2563	39.5	36.69
2564	39.38	36.91
2569	39.5	38.01
2568	39.5	38.04
1502	39.45	38.31
1552	39.55	37.91
1550	39.19	37.66
2570	39.54	37.98
251C	n/a	n/a
1551	39.26	37.83
251C	n/a	n/a
2551	39.13	37.15

Manhole Reference	Manhole Cover Level	Manhole Invert Level
1503	39.66	38.04
1553	39.62	37.43
2562	39.6	36.49
1554	39.81	37.4
2567	39.65	38.07
2352	40.25	38.43
231D	n/a	n/a
2304	40.26	39.52
2351	40.26	38.52
1350	48.27	46.97
2303	40.09	39.27
2350	40.11	38.59
2302	39.99	39.16
1301	48.64	43.75
2301	39.89	39.08
1402	48.27	43.58
1451	47.81	46.31
2451	39.52	38.13
2402	39.57	38.71
1401	46.47	n/a
2450	39.37	37.89
0350	47.33	45.95
1351	47.75	46.39
121A	39.4	37.2
221A	39.15	38.36
231E	39.58	38.8
4502	n/a	n/a
4501	41.78	37.48
551B	n/a	n/a
5502	46.93	43.22
551C	n/a	n/a
2401	39.45	38.56
2501	39.19	38.31
1501	39.09	38.19
1504	39.78	37.91
1558	40.03	36.98
1507	39.87	37.85
1557	40.27	38.03
2566	39.2	38.09
251B	n/a	n/a
1567	39.8	38.24
1559	39.86	36.96
1450	45.84	44.22
141C	n/a	n/a
141A	n/a	n/a
141B	n/a	n/a
15ZQ	n/a	n/a
1556	43.25	41.36
1506	43.05	40.27
051B	n/a	n/a
1505	41.15	38.45
05MD	n/a	n/a
05ME	n/a	n/a
05LN	n/a	n/a
0552	39.91	38.78
05LM	n/a	n/a
0501	39.79	38.47
0551	39.57	n/a
0561	n/a	n/a
0550	39.62	37.56
151A	39.5	38.42
1566	39.45	38.3
1555	39.52	38.49
1565	39.27	38.34
05MF	n/a	n/a
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

	Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Storm Sewer
	Sludge Sewer
	Foul Trunk Sewer
	Surface Trunk Sewer
	Combined Trunk Sewer
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Vacuum
	Thames Water Proposed
	Vent Pipe
	Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

	Sewer
	Culverted Watercourse
	Proposed
	Decommissioned Sewer
	Content of this drainage network is currently unknown
	Ownership of this drainage network is currently unknown

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plan are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve		Meter
	Dam Chase		Vent
	Fitting		

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Ancillary		Drop Pipe
	Control Valve		Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Inlet		Outfall
	Undefined End		

Other Symbols

Symbols used on maps which do not fall under other general categories.

	Change of Characteristic Indicator		Public / Private Pumping Station
	Invert Level		Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Chamber
	Operational Site

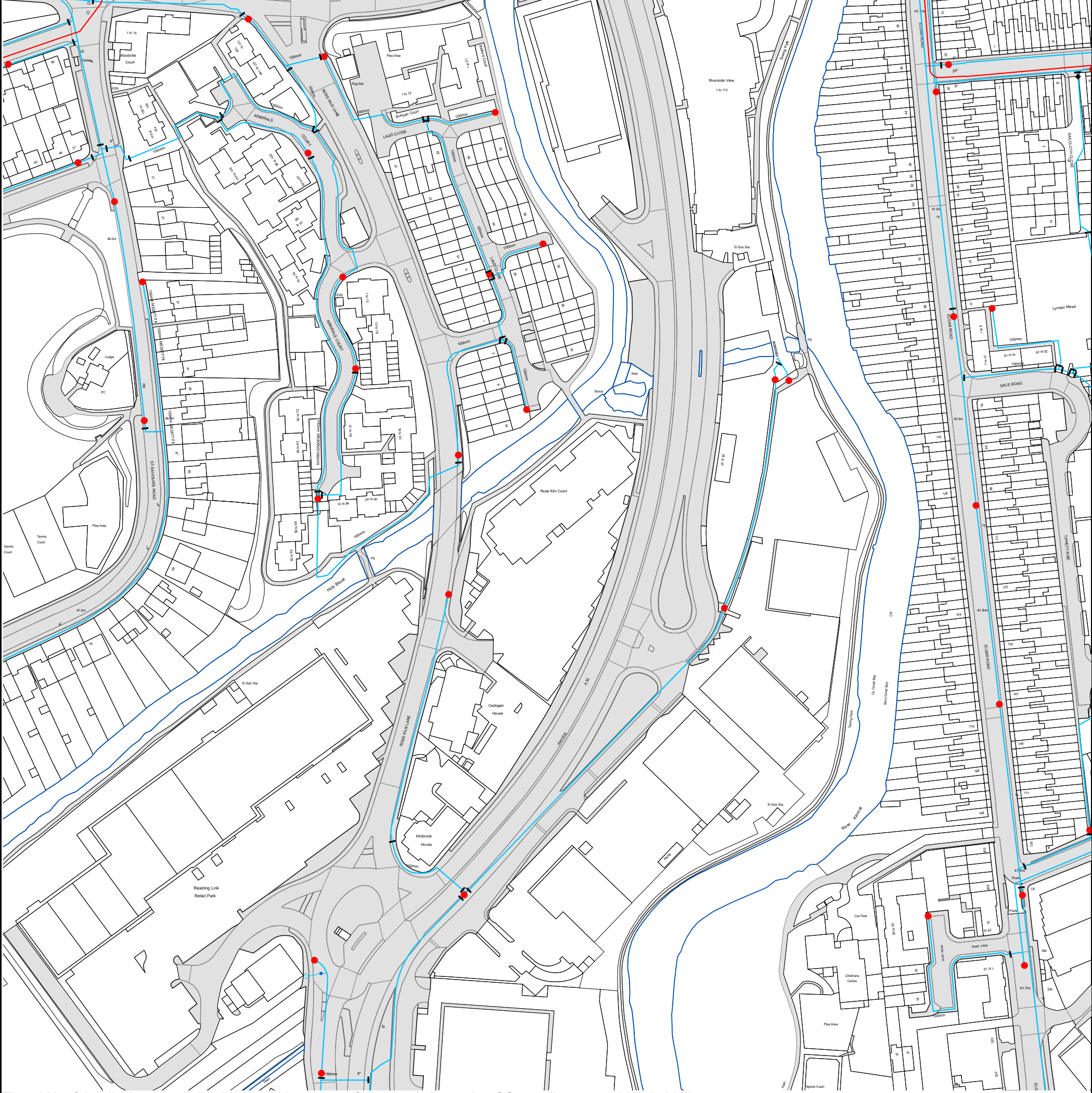
Ducts or Crossings

	Casement	Ducts may contain high voltage cables. Please check with Thames Water.
	Conduit Bridge	
	Subway	
	Tunnel	

5) 'na' or '0' on a manhole indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2023 4775176



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 471309, 172339.
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.



Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

- Distribution Main:** The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
- Trunk Main:** A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
- Supply Main:** A supply main indicates that the water main is used as a supply for a single property or group of properties.
- Fire Main:** Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
- Metered Pipe:** A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
- Transmission Tunnel:** A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
- Proposed Main:** A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger
- Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

Other Water Pipes (Not Operated or Maintained by Thames Water)

- Other Water Company Main:** Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
- Private Main:** Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL's terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
Call 0800 009 4540 quoting your invoice number starting CBA or ADS / OSS	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk	By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number	Made payable to ' Thames Water Utilities Ltd ' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Sewer Flooding

History Enquiry



Property
Searches

Delta Simons

Search address supplied

Rose Kiln Court
Rose Kiln Lane
Reading
RG2 0SN

Your reference

91193.557191

Our reference

SFH/SFH Standard/2023_4803792

Received date

23 March 2023

Search date

23 March 2023



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Search address supplied: Rose Kiln Court,Rose Kiln Lane,Reading,RG2 0SN

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

- (i) any negligent or incorrect entry in the records searched;
- (ii) any negligent or incorrect interpretation of the records searched;
- (iii) and any negligent or incorrect recording of that interpretation in the search report
- (iv) compensation payments



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DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is “overloaded” when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- “Internal flooding” from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- “At Risk” properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company’s reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Appendix E – Proposed Site Plan



Block A

- A1 Unit 279sqm / 3,000sqft GIA
inc. 70sqm / 750sqft mezz office 25% office content
- A2 Unit 264sqm / 2,850sqft GIA
inc. 70sqm / 750sqft mezz office 26% office content
- A2 Unit 325sqm / 3,500sqft GIA
inc. 74sqm / 800sqft mezz office 23% office content

TOTAL UNIT 868 sqm / 9,350sqft

Block B

- B1 Unit 697sqm / 7,500sqft GIA
inc. 139sqm / 1,500sqft mezz office 21% office content

TOTAL UNIT 697sqm / 7,500sqft

Block C

- C1 Unit 437sqm / 4,700sqft GIA
inc. 93sqm / 1,000sqft mezz office 21% office content
- C2 Unit 321sqm / 3,450sqft GIA
inc. 74sqm / 800sqft mezz office 23% office content
- C3 Unit 321sqm / 3,450sqft GIA
inc. 74sqm / 800sqft mezz office 23% office content
- C4 Unit 437sqm / 4,700sqft GIA
inc. 93sqm / 1,000sqft mezz office 21% office content

TOTAL UNIT 1,516sqm / 16,300sqft

TOTAL 3,081sqm / 33,150sqft GIA

33 car parking spaces
All units 7.5m u/s of haunch

- Tree removed
- Tree retained green

SCHEDULE OF MATERIALS
EXTERNAL WORKS

- 1 - CONCRETE BLOCK PAVING
- LAID IN HERRINGBONE PATTERN
- COLOUR - BRINDLE
- 2 - CONCRETE SURFACING
- COLOUR - LIGHT GREY SELF COLOUR
- 3 - RAILING FENCING 2.4M HIGH ON
SQUARE SECTION POSTS
- POLYESTER POWDER COATED FINISH
- COLOUR - BLACK
- 4 - STRUCTURED LANDSCAPING
- (PLEASE REFER TO SEPARATE
DRAWING BY LANDSCAPER)
- 5 - NO DIG PATH WAY SYSTEM WITH
- GRAVEL INFILL TO PROTECT TREE
- ROOTS

ADOPTED HIGHWAY WITH
LOGICOR OWNERSHIP

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ALL PROPOSALS ARE SUBJECT TO CONFIRMATION FOLLOWING DETAILED TOPOGRAPHICAL
SURVEY AND GROUND INVESTIGATION WORK.

IT HAS BEEN ASSUMED THAT OTHER THAN WHERE SHOWN THE SITE IS ESSENTIALLY FLAT
WITH NO EASEMENTS TO ABOVE OR BELOW GROUND SERVICES.

ALL PROPOSALS ARE SUBJECT TO CONFIRMATION FOLLOWING LIAISONS WITH RELEVANT
LOCAL AUTHORITIES.

PRELIMINARY INDICATIVE DRAWINGS MAY BE BASED UPON INFORMATION FROM VARIOUS
SOURCES, THE ACCURACY OF WHICH CANNOT BE GUARANTEED.

WHERE BOUNDARIES ARE SHOWN THESE ARE AS ADVISED BY THE CLIENT AND ARE FOR
GENERAL GUIDANCE ONLY, WHILST PLOTTED WITH REFERENCE TO LAND REGISTRY DATA
WHERE AVAILABLE AND INTERPOLATED AS PHYSICAL FEATURES ON SITE WHERE POSSIBLE,
THEY ARE NOT INTENDED TO REPRESENT DEFINITIVE SITE EXTENTS OR LEGAL OWNERSHIP.

ALL DIMENSIONS AND SETTING OUT COORDINATES TO BE CHECKED ON THE PROJECT SITE
BEFORE WORK IS COMMENCED OR MAKING ANY SHOP DRAWINGS.

IF THIS DRAWING HAS BEEN RECEIVED ELECTRONICALLY IT IS THE RECIPIENTS
RESPONSIBILITY TO PRINT THE DOCUMENT TO THE CORRECT SCALE.
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE IT IS
RECOMMENDED THAT INFORMATION IS NOT SCALED OFF THIS DRAWING.
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT
DRAWINGS AND SPECIFICATIONS.

Client:



Project:

Logicor Park Reading
Rose Kiln Court
Reading

Drawing Title:
SITE LAYOUT PLAN

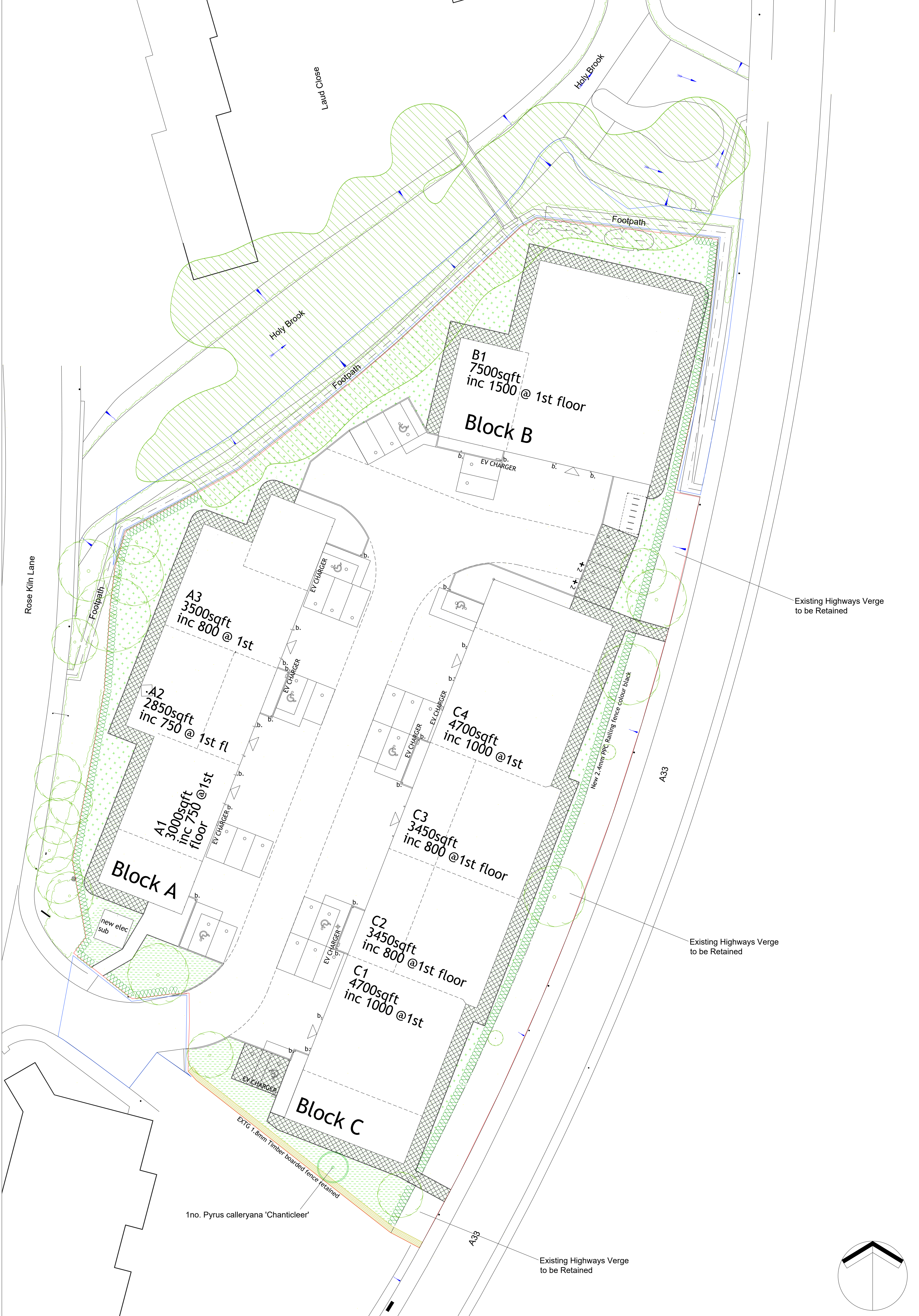
Webb Gray Ltd
Chartered Architects
75-77 Colmore Row
Birmingham B3 2AP

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e: architecture@webbgray.co.uk
w: www.webbgray.co.uk

Scale @ A1: 1:500 Date: MARCH 23 Drafted: DLD Checked: LA

Job No: 8758 Origin: WGA Vol: EX Level: XX Type: DR Role: A No: 002 Status: P Revision:

PLANNING



KEY

- EXISTING TREES TO BE RETAINED
- EXISTING HEDGE TO BE RETAINED
- PROPOSED EXTRA HEAVY STANDARD TREE PLANTING
- PROPOSED WILDFLOWER GRASSLAND EL1 FLOWERING LAWN MIX - 195m²
- PROPOSED WILDFLOWER GRASSLAND EH1 HEDGEROW MIX - 680m²
- PROPOSED A22 AMENITY GRASS MIX IN ECOBLOCK SYSTEM (NO DIG CONSTRUCTION) - 565m²
- PROPOSED NATIVE HEDGE MIX - 215lin m

NOTES:

PLANTING OPERATIONS SPECIFICATION

TOPSOIL
Imported topsoil for tree pits and hedge shall comply with BS 3882 and shall be good quality, medium topsoil loam, acid or slight acid (pH not less than 5.0), stones not greater than 50mm in any dimension, perennial weeds and any other foreign matter, free from chemical or other polluted subsoil, weeds, straw, sticks, stones, clay lumps and other deleterious material. Topsoil containing a significant proportion of subsoil or other foreign matter will not be accepted on the site. On no account shall topsoil be brought on the site in excessively wet conditions or in a water logged state. It shall be from an approved source, shall be fertile with a humus and fibre content and shall have a good crumb structure with medium texture.

All areas of wildflower grass seeding shall be made up of low nutrient sub-soil to assist establishment and maintenance of the meadow grasslands.

TREE PLANTING
Extra Heavy Standard tree pits shall be 1m x 1m x 0.75m.
The bottom 150mm of each tree pit to be broken up to assist drainage.
Compacted ground to be broken up. Backfill shall be excavated material with 50:50 mixed with peat free tree planting compost (Sample to be approved) for the top 300mm and excavated sub soil for the bottom 450mm. 4No Sierrablen gro tabs to be incorporated into each planting pit.

All EHSid trees shall be short double staked, 300mm to be driven into the ground and 600mm maximum above ground. A flexible webbing cross bar within 25mm of the top of the stake shall be used and fixed to the trunk with expandable ties. Each tree shall have a 50mm diameter perforated plastic irrigation pipe, with plastic cap, wrapped in a circle above and around the sides of the rootball.

NATIVE HEDGE PLANTING
Whip planting areas shall be cultivated to the full depth of the topsoil and bare root stock planted to accommodate the full depth of the roots. Planting density shall be as set out in the accompanying schedules and the layout shall be random, in groups of no less than 3 or more than 7 of the same species, ensuring that no three plants are aligned in any one direction. Each whip shall be protected with a biodegradable spiral tree guard, 0.6m high x 130mm diameter, supported by a single timber stake placed to prevent the natural movement of the tree being impeded or restrict growth.

WILDFLOWER SEEDING
Over seeding to occur during August / September. Any areas of failure to be re-seeded. Grass seed mix shall be Emorsgate (or similar approved by the LPA)
EL1 Flowering Lawn Mix, 195m² and Emorsgate (or similar approved by the LPA)
EH1 Hedgerow Mix, 680m², sown at a rate of 5g/m².

First Year Management:
Mow newly sown flowering lawn regularly (every 7 -10 days during growing season) throughout the first year of establishment. Cut to a height of 40-60mm, removing cuttings if dense. This will gradually develop a good sward structure, help maintain balance between faster growing grasses and slower developing wild flowers, and control annual weeds.
Dig out any residual perennial weeds such as docks.

Management Once Established:
Mow regularly as a lawn to between 25-40mm. To permit flowering, mowing can be relaxed from late June. Cut again when the sward gets untidy (after 4-8 weeks). Mowing may be suspended earlier in the year to allow cowslips to flower. Heavy quantities of cuttings should be collected and removed from site.

EL1 Flowering Lawn Mix		
%	Species	Common name
Wild Flowers		
4	Galium verum	Lady's Bedstraw
0.5	Leontodon hispidus	Rough Hawkbit
1	Leucanthemum vulgare	Oxeye Daisy - (Moon Daisy)
3.7	Lotus corniculatus	Birdsfoot Trefoil
3	Primula veris	Cowslip
4	Prunella vulgaris	Selfheal
3.5	Ranunculus acris	Meadow Buttercup
0.3	Trifolium pratense	Wild Red Clover
20		
Grasses		
8	Agrostis capillaris	Common Bent
40	Cynosurus cristatus	Crested Dogstail
28	Festuca rubra	Red Fescue
4	Phleum bertolonii	Smaller Cat's-tail
80		
EH1 (Hedgerow Mix)		
Wild Flowers		
%	Latin name	Common name
0.5	Achillea millefolium	Yarrow
1.2	Agrimonia eupatoria	Agrimony
1.5	Alliaria petiolata	Garlic Mustard
0.4	Arctium minus	Lesser Burdock
0.5	Betonica officinalis	Betony
1.5	Centaurea nigra	Common Knapweed
0.4	Chaerophyllum temulum	Rough Chervil
2	Galium album	Hedge Bedstraw
1	Galium verum	Lady's Bedstraw
0.3	Geranium pyrenaicum	Hedgerow Crane's-bill
0.6	Hypericum perforatum	Perforate St John's Wort
0.3	Lathyrus sylvestris	Narrow-leaved Everlasting-pea
0.8	Leucanthemum vulgare	Oxeye Daisy - (Moon Daisy)
0.5	Origanum vulgare	Wild Marjoram
0.7	Plantago lanceolata	Ribwort Plantain
1	Primula veris	Cowslip
2.5	Silene dioica	Red Campion
0.5	Silene latifolia	White Campion
2	Torilis japonica	Upright Hedge-parsley
0.5	Verbascum thapsus	Great Mullein
0.5	Vicia cracca	Tufted Vetch
0.8	Vicia sativa ssp. segetalis	Common Vetch
Grasses		
%	Latin name	Common name
10	Agrostis capillaris	Common Bent
2	Anthoxanthum odoratum	Sweet Vernal-grass (w)
7	Brachypodium sylvaticum	False Brome (w)
20	Cynosurus cristatus	Crested Dogstail
1	Deschampsia cespitosa	Tufted Hair-grass (w)
28	Festuca rubra	Slender-creeping Red-fescue
12	Poa nemoralis	Wood Meadow-grass

EXTRA HEAVY STANDARD TREE PLANTING

Name	Girth	Height	Root Condition	Number
Pyrus calleryana 'Chanticleer'	14-16cm	425-600cm	Containerised	1

NATIVE HEDGE MIX 215 lin m

Name	% of Mix	Height	Root Condition	Number
Acer campestre	10	60-90cm	BR	105
Corylus avellana	15	60-90cm	BR	160
Crataegus monogyna	35	60-90cm	BR	375
Ligustrum vulgare	10	60-90cm	BR	105
Ilex aquifolium	10	60-90cm	RB	105
Prunus spinosa	5	60-90cm	BR	55
Rosa arvensis	5	60-90cm	BR	55
Sambucus nigra	5	60-90cm	BR	55
Viburnum opulus	5	60-90cm	BR	55

Double Staggered Row @400mm ctrs in groups of 3, 5, or 7

Rev A 30.03.23 Layout amended DR AG

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65 Westgate Road, Newcastle-upon-Tyne,
NE1 1SG, Tel: 0191 383 9955
andrew.gardner@tgp.uk.com/www.tgp.uk.com
Also in Glasgow & Edinburgh

Project	LOGICOR PARK: READING ROSE KILN COURT		
Title	LANDSCAPE PROPOSALS		
Date	Scale	Drawn	Checked
15.03.23	1:250 @ A1	DR	AG
Job	Suitability	No.	Issue
D342	-	D342.L.001	EXT
LI WORKSTAGE:	0/1	2	3
	☐	☐	☒
		4	5
		☐	☐

DISCLAIMER:
Do not scale from this drawing.
All dimensions to be verified on site prior to commencement of works.
Drawing to be read in conjunction with related TGP drawings, consultants drawings and any other relevant information.
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Appendix F - EA Product Data



Legend

- Approximate Site Boundary
- Watercourse
- Node Point

0

10

20

30

40 m

↑

N

↓

Figure

EA Node Point Map

Job

Rose Kiln Court, Rose Kiln Lane, Reading, RG2 0BY

Client

Redwood (Light Industrial) Propco Sarl

Appendix:	Revision	Date
F	1	14 March 2023

Drawn by	Checked by	Scale
LA	RS	1:800

Job No.

91193.557191 / 22-1640.07

Bing Maps

DeltaSimons

Site Plan Provided by Client.

Product 4 (Detailed Flood Risk) for RG2 0BY

Our Ref: THM294761

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:

- i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and
- ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;

Statutory (Sealed) Main River (where available within map extents);

A table showing:

- i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
- ii) Flood defence locations unique identifiers and attributes; (supplied separately)
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

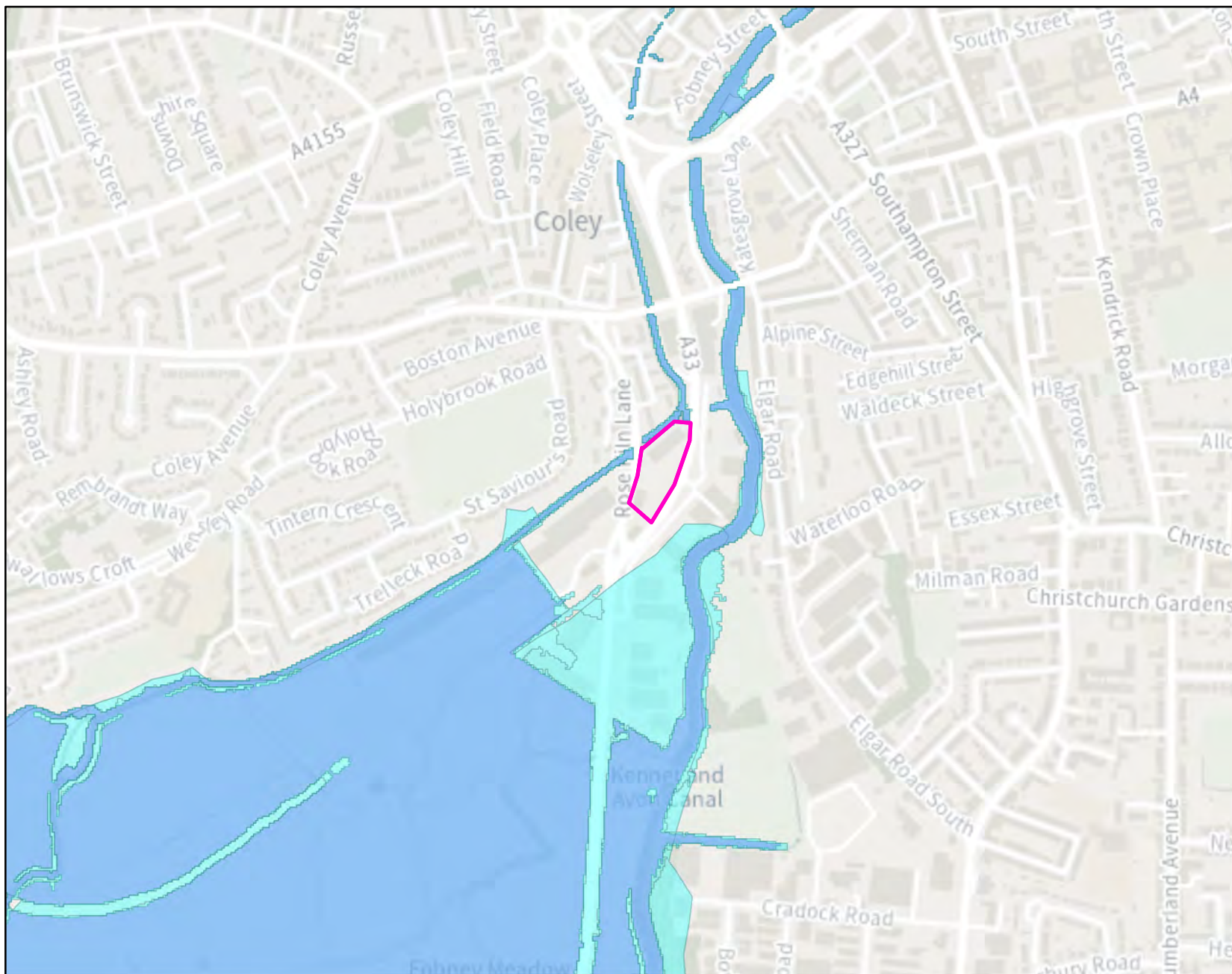
<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

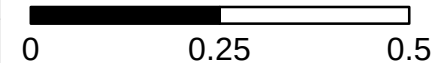
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Flood Map for Planning centred on RG2 0BY

Created on 31/01/2023 REF: THM294761



Kilometres



Legend

- Site
- Flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Defence information

Defence Location: No defences on Main River

Description: This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.

Model information

THM294761

Model: Kennet (Tyle Mill to Thames Confluence) 2018

Description: The information provided is taken from the Kennet (Tyle Mill to Thames confluence) 2018. The study was carried out using 1D-2D modelling software (Flood modeller-Tuflow).

Model design runs:

1 in 2/ 50% AEP; 1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 30/ 3.3% AEP; 1 in 75 / 1.3% AEP; 1 in 100 / 1% AEP; 1 in 100+15% / 1% + 15% AEP with climate change; 1 in 100+25% / 1% + 25% AEP with climate change; 1 in 100+35% / 1% + 35% AEP with climate change; 1 in 100+70% / 1% + 70% AEP with climate change; and 1 in 1000 / 0.1% AEP.

Mapped Outputs:

1 in 2/ 50% AEP; 1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 30/ 3.3% AEP; 1 in 75 / 1.3% AEP; 1 in 100 / 1% AEP; 1 in 100+15% / 1% + 15% AEP with climate change; 1 in 100+25% / 1% + 25% AEP with climate change; 1 in 100+35% / 1% + 35% AEP with climate change; 1 in 100+70% / 1% + 70% AEP with climate change; and 1 in 1000 / 0.1% AEP.

Modelled in-channel flood flows and levels

THM294761

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

				Flood Levels (mAOD)							
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_22_2018_001HOLY1_0147.1	Kennet (Tyle Mill to Thames Confluence) 2018	471154	172278	38.57	38.57	38.57	n/a	38.73	38.86	39.33	38.93
061_22_2018_001HOLY1_0147.2	Kennet (Tyle Mill to Thames Confluence) 2018	471225	172328	38.51	38.52	38.52	n/a	38.66	38.79	39.28	38.86
061_22_2018_001HOLY1_0060.1	Kennet (Tyle Mill to Thames Confluence) 2018	471228	172330	38.50	38.51	38.51	n/a	38.65	38.78	39.22	38.85
061_22_2018_001HOLY1_0060.2	Kennet (Tyle Mill to Thames Confluence) 2018	471256	172348	38.48	38.49	38.49	n/a	38.63	38.75	39.20	38.82
061_22_2018_001HOLY1_0022.1	Kennet (Tyle Mill to Thames Confluence) 2018	471270	172359	38.48	38.48	38.48	n/a	38.62	38.74	39.17	38.81
061_22_2018_001HOLY1_0022.2	Kennet (Tyle Mill to Thames Confluence) 2018	471321	172401	38.44	38.45	38.45	n/a	38.58	38.69	39.14	38.77
061_22_2018_001HOLY3_0095.1	Kennet (Tyle Mill to Thames Confluence) 2018	471344	172415	37.74	37.96	38.17	n/a	38.50	38.64	39.12	38.72
061_22_2018_001KENN3_2928.1	Kennet (Tyle Mill to Thames Confluence) 2018	471434	172203	37.76	38.01	38.24	n/a	38.54	38.60	38.91	38.65

				Flood Flows (m3/s)							
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_22_2018_001HOLY1_0147.1	Kennet (Tyle Mill to Thames Confluence) 2018	471154	172278	8.56	8.60	8.60	n/a	11.84	14.45	19.09	15.59
061_22_2018_001HOLY1_0147.2	Kennet (Tyle Mill to Thames Confluence) 2018	471225	172328	8.57	8.61	8.60	n/a	11.84	14.45	19.09	15.59
061_22_2018_001HOLY1_0060.1	Kennet (Tyle Mill to Thames Confluence) 2018	471228	172330	8.56	8.60	8.60	n/a	11.84	14.45	19.09	15.59
061_22_2018_001HOLY1_0060.2	Kennet (Tyle Mill to Thames Confluence) 2018	471256	172348	8.57	8.61	8.60	n/a	11.84	14.45	19.09	15.59
061_22_2018_001HOLY1_0022.1	Kennet (Tyle Mill to Thames Confluence) 2018	471270	172359	8.56	8.60	8.60	n/a	11.84	14.45	19.09	15.59
061_22_2018_001HOLY1_0022.2	Kennet (Tyle Mill to Thames Confluence) 2018	471321	172401	8.56	8.60	8.60	n/a	11.84	14.45	19.09	15.59
061_22_2018_001HOLY3_0095.1	Kennet (Tyle Mill to Thames Confluence) 2018	471344	172415	4.65	4.74	4.81	n/a	7.64	9.75	12.92	10.66
061_22_2018_001KENN3_2928.1	Kennet (Tyle Mill to Thames Confluence) 2018	471434	172203	45.83	60.35	75.26	n/a	94.13	97.58	118.48	100.51

Note:

Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Modelled floodplain flood levels

THM294761

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Northing	flood levels (mAOD)							
				20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
Flood Point 1	Kennet (Tyle Mill to Thames Confluence) 2018	471,256	172,252	No data	No Data	No Data		No Data	No Data	39.15	No Data
Flood Point 2	Kennet (Tyle Mill to Thames Confluence) 2018	471,306	172,263	No data	No Data	No Data		No Data	No Data	39.12	No Data
Flood Point 3	Kennet (Tyle Mill to Thames Confluence) 2018	471,314	172,340	No data	No Data	No Data		No Data	No Data	39.12	No Data
Flood Point 4	Kennet (Tyle Mill to Thames Confluence) 2018	471,325	172,394	No data	No Data	No Data		No Data	38.69	39.14	38.76
Flood Point 5	Kennet (Tyle Mill to Thames Confluence) 2018	471,353	172,397	No data	No Data	No Data		No Data	No Data	39.12	No Data

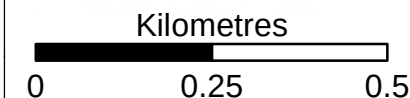
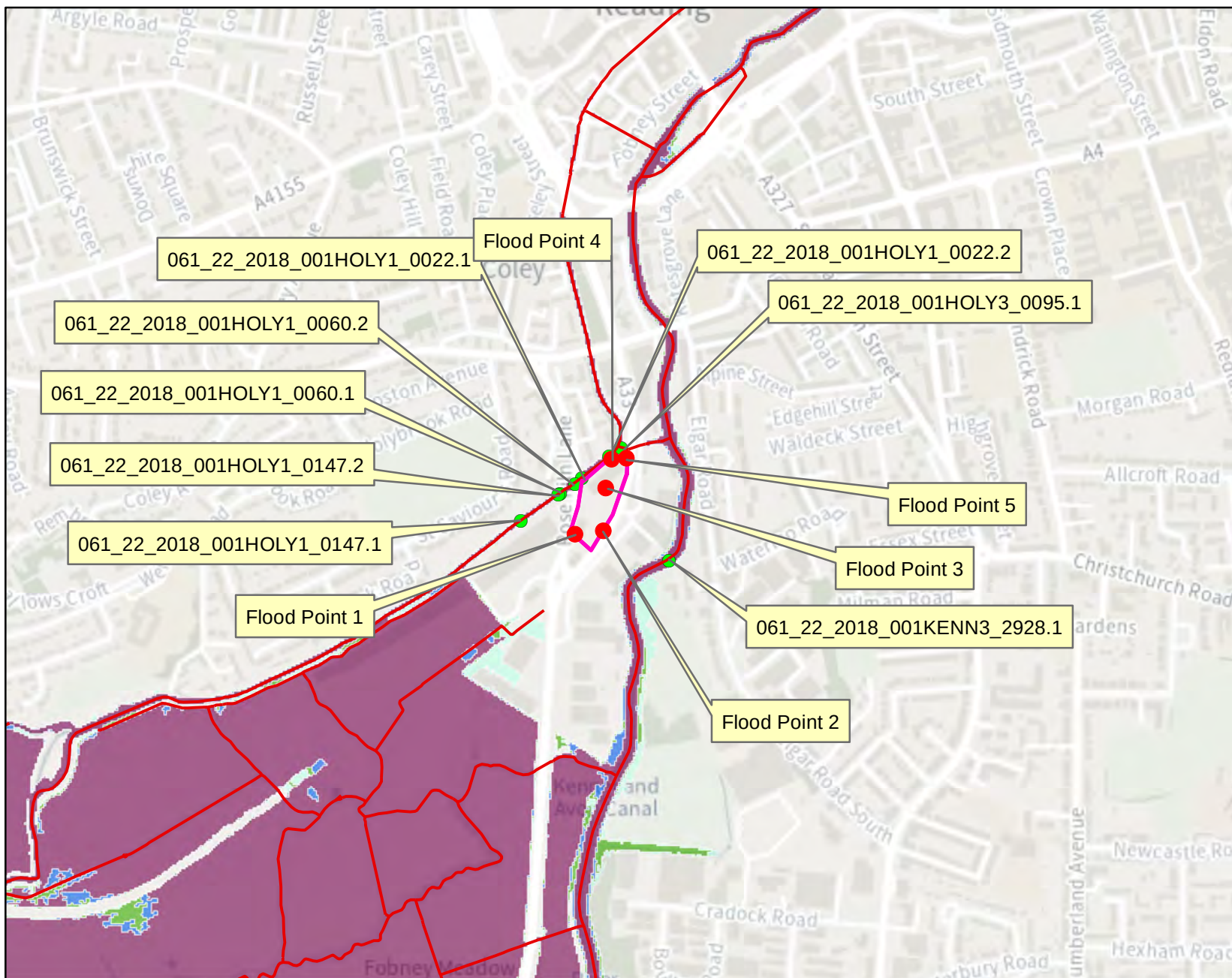
This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

Note:
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Detailed FRA map centred on RG2 0BY

Created on 31/01/2023 REF: THM294761



Legend

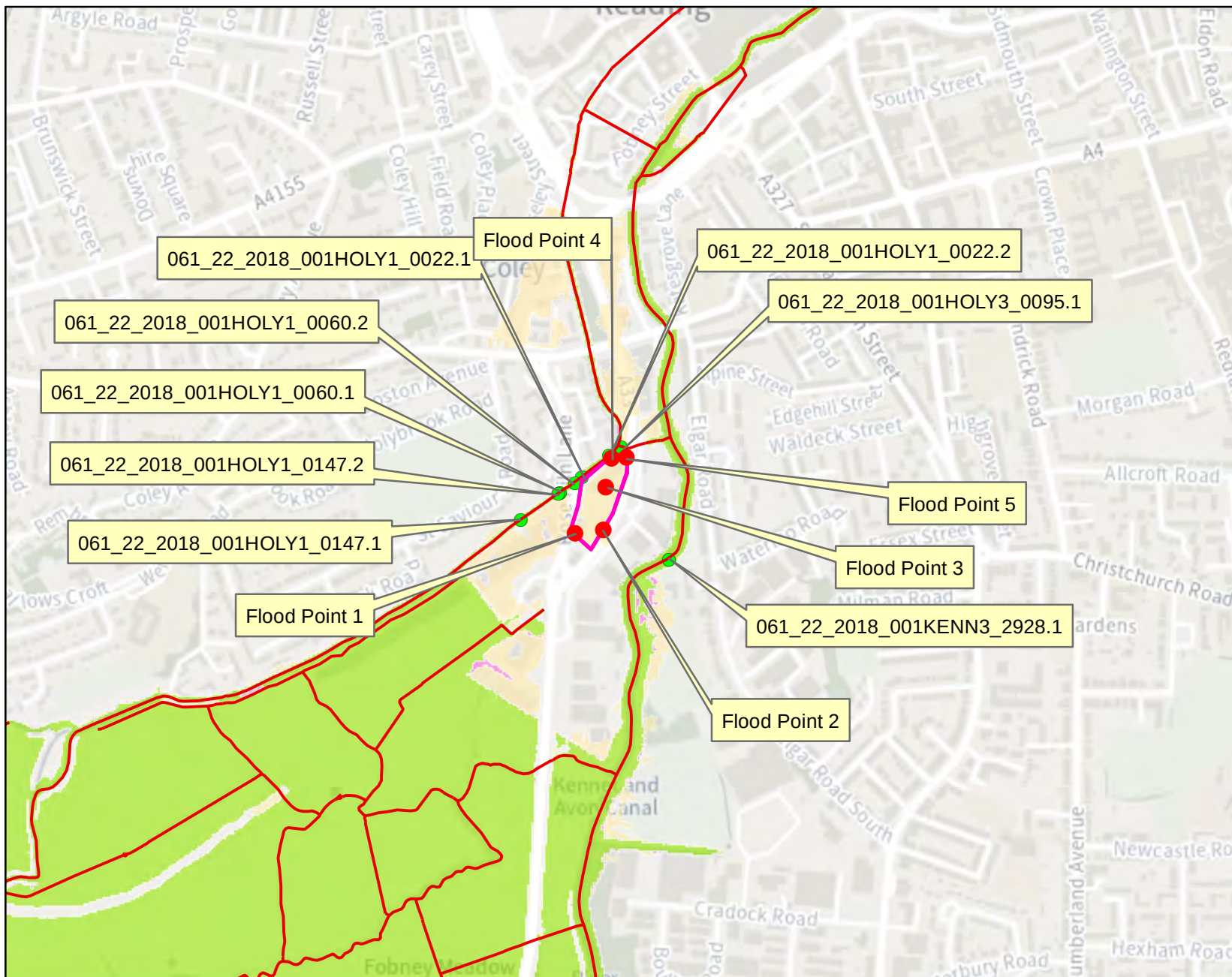
- Main River
- Site
- Node
- 20% AEP Flood Outline
- 5% AEP Flood Outline
- 1% AEP Flood Outline
- 0.1% AEP Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

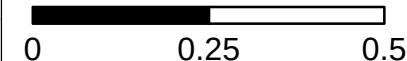
Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Detailed FRA map centred on RG2 0BY

Created on 31/01/2023 REF: THM294761



Kilometres



Legend

- Main River
- Site
- Node
- 1%+25% CC AEP Flood Outline
- 1%+35% CC AEP Flood Outline
- 1%+70% CC AEP Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Historic flood data

THM294761

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

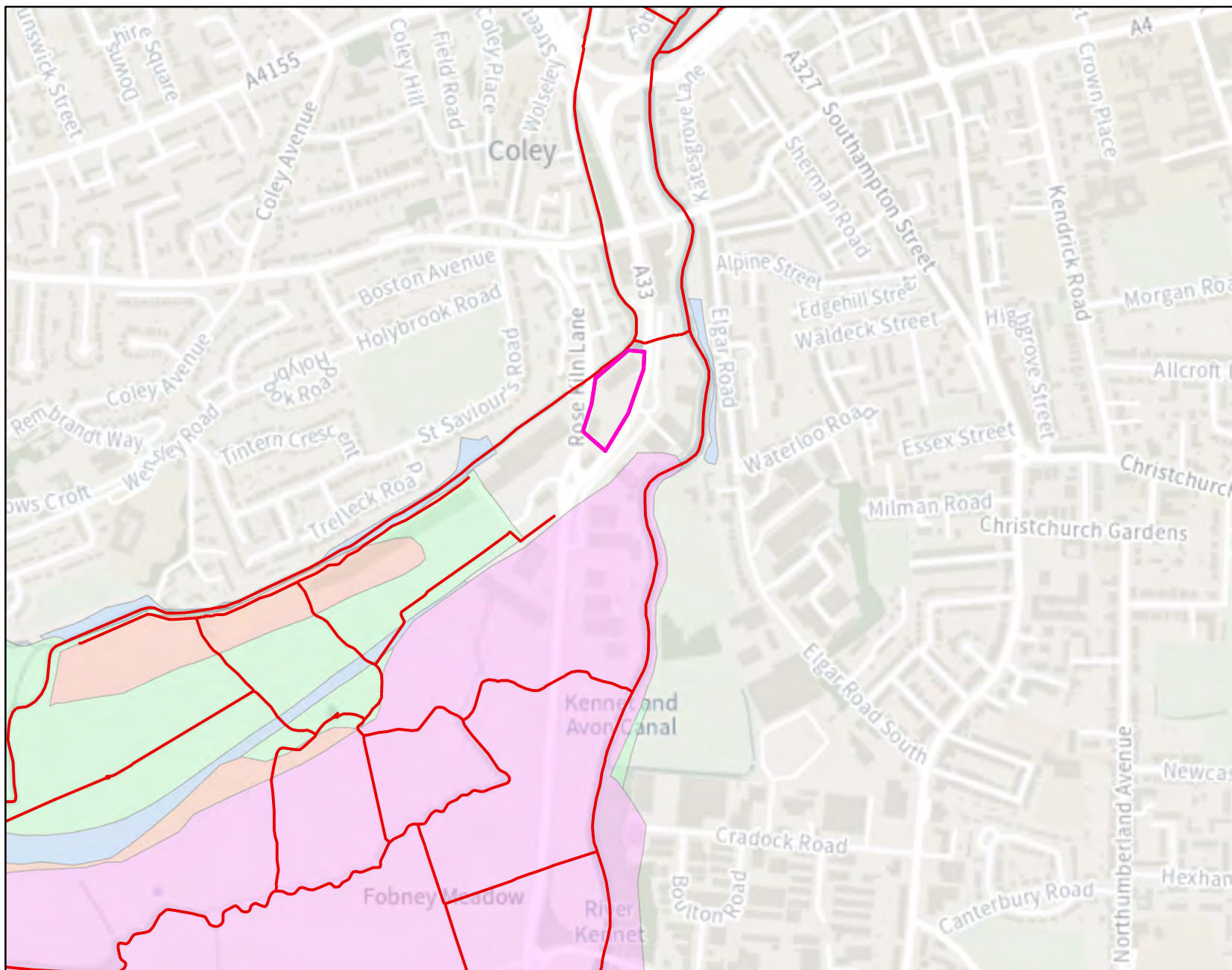
Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
No Historic Data available					

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

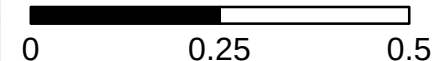
Start and End Dates shown above may represent a wider range where the exact dates are not available.

Historic Flood map centred on RG2 0BY

Created on 31/01/2023 REF: THM294761



Kilometres



Legend

- Main River
- Site
- 1971
- 1992
- 1993
- 2002/3

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Hazard Mapping (for the 1%+35% climate change scenario) THM294761

Hazard Mapping methodology:

To calculate flood hazard with the debris factor we have used the supplementary note to Flood Risk to People Methodology (see below).

The following calculation is used:

$$HR = d \times (v+0.5) + DF$$

Where HR = flood hazard rating

d = depth of flooding (m)

v = velocity of floodwaters (m/sec)

DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

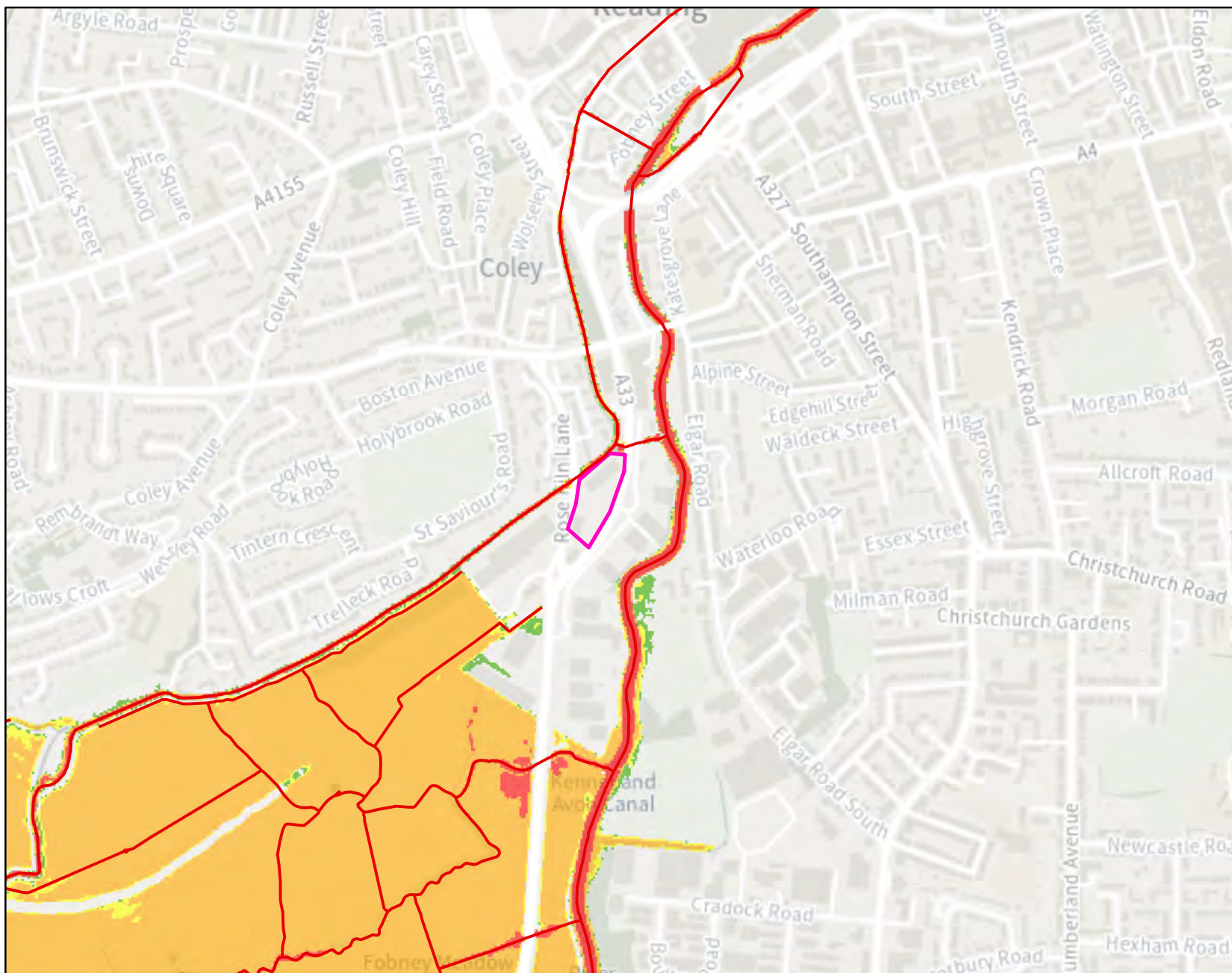
The resultant hazard rating is then classified according to:

Flood Hazard	Colour	Hazard to People Classification
Less than 0.75	Green	Very low hazard - Caution
0.75 to 1.25	Yellow	Danger for some - includes children, the elderly and the infirm
1.25 to 2.0	Orange	Danger for most - includes the general public
More than 2.0	Red	Danger for all - includes the emergency services

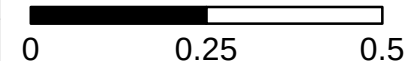
REF: HR Wallingford and Environment Agency (May 2008) Supplementary note of flood hazard ratings and thresholds for development planning and control purpose – Clarification of the Table 113.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1

Hazard map centred on RG2 0BY

Created on 31/01/2023 REF: THM294761



Kilometres



Legend

- Main River
- Site
- Low hazard
- Danger to some
- Danger to most
- Danger to all

For hazard and debris factor we used HR Wallingford and Environment Agency (May 2008) supplementary note on flood hazard ratings and thresholds for development planning and control purpose. The following calculation is used:

$$HR = d \times (v+0.5) + DF$$

HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

Appendix G - LLFA Response

Lucy Antell

From: Cook, Darren <Darren.Cook@reading.gov.uk>
Sent: 02 March 2023 15:29
To: Lucy Antell
Subject: FW: LLFA Data request Rose Kiln Court (91193.557191 / 22-1640.07)

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Lucy,

The proposed development should ensure that the proposal achieves where possible greenfield run off rates but should this not be achievable the proposal should not exceed the run off rate prior to development. The application should be assessed against the 1 in 1 year, 1 in 30 year and 1 in 100 year + climate change events.

A 10% urban creep should be incorporated within any proposal.

I hope that the above is of use but should you require anything further please let me know.

Kind regards,

Darren Cook
Transport Development Control Manager
Transport | Directorate for Economic Growth and Neighbourhood Services (DEGNS)

Reading Borough Council
Civic Offices
Bridge Street
Reading
RG1 2LU

0118 937 2612 (72612)
07812 462820

[Website](#) | [Facebook](#) | [Twitter](#) | [YouTube](#)



From: Shean, Sam <Sam.Shean@reading.gov.uk>
Sent: 21 February 2023 08:20
To: Lucy Antell <Lucy.Antell@deltasimons.com>; TransportDevelopmentControl <Transport.DevelopmentControl@reading.gov.uk>
Subject: RE: LLFA Data request Rose Kiln Court (91193.557191 / 22-1640.07)

Morning Lucy

I've copied in our Development Control team who provide comments on Planning Applications on Highways behalf.

Regards
Sam

SAM SHEAN

Highways & Traffic Services Manager

Environmental & Commercial Services | Economic Growth & Neighbourhoods Directorate

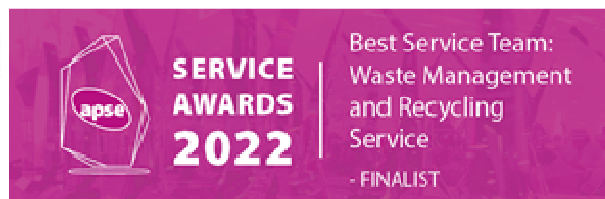
Reading Borough Council 19 Bennet Rd, Reading, RG2 0QX

M: 0771 516 7880 (O) 0118 937 2138 (72138) (sam.shean@reading.gov.uk)

Environmental & Commercial Services: www.reading.gov.uk/commercialservices

; commercialservices@reading.gov.uk

[Website](#) | [Facebook](#) | [Twitter](#) | [YouTube](#) | [Instagram](#) | [LinkedIn](#)



From: Lucy Antell <Lucy.Antell@deltasimons.com>

Sent: 20 February 2023 15:35

To: Brett.Dyson@reading.gov.uk; Shean, Sam <Sam.Shean@reading.gov.uk>

Subject: LLFA Data request Rose Kiln Court (91193.557191 / 22-1640.07)

***** *WARNING - this is an External Email *****

STOP, THINK, before you CLICK links or OPEN attachments or REPLY.

Good afternoon,

I'm wondering if you're able to help me with the below data request? We have undertaken the drainage strategy with the approach of a 30% betterment on the existing 1 in 2 brownfield rate. Are you happy with this approach?

Please don't hesitate to get in touch / let me know if you require any more information.

Lind regards,

Lucy

Lucy Antell (She/Her)

Consultant - Water Services

Delta-Simons Ltd

e: lucy.antell@deltasimons.com

m: +44 (0)7376 634062

w: www.deltasimons.com

From: Lucy Antell

Sent: Monday, February 6, 2023 4:14 PM

To: Planning.Administration@reading.gov.uk

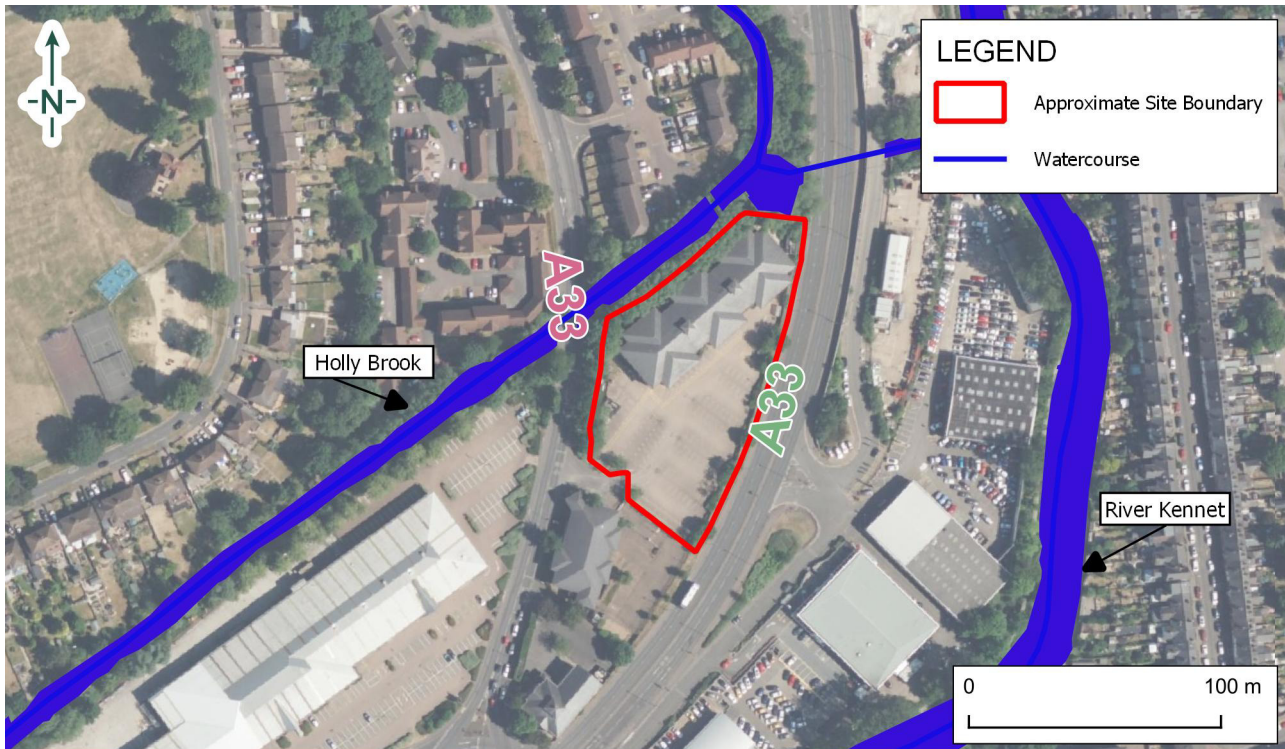
Subject: LLFA Data request Rose Kiln Court (91193.557191 / 22-1640.07)

Good Afternoon,

If I have come to the wrong department please can you forward this onto your flood risk management team?

Delta Simons are working on behalf of a Client to undertake a Drainage Strategy for a Site at **Rose Kiln Court, Rose Kiln Lane, Reading, RG2 0BY** (see approximate Site location plan attached).

The proposed development is for 11 light industrial units across 2 blocks, featuring offices and commercial units with associated vehicle access and parking areas



Bing Maps Service Layer Credits: Contains OS data © Crown Copyright and Database Right 2023

At this stage, we are keen to gain an understanding of the LLFA's requirements in relation to surface water management particularly:

- Required surface water runoff rate (we assume greenfield runoff rates will need to be achieved for undeveloped Sites with betterment over existing brownfield rates for currently developed Sites);
- Confirmation of most appropriate hydrological data - FSR or FEH?;
- Confirmation of requirement to consider urban creep and percentage creep that should be considered (we are likely to assume a 10% allowance);
- Any other requirements that should be considered as part of the Drainage Strategy
- Any additional information relating to the River Kennet or Holly Brook or nearby sewers that isn't detailed within the councils strategic documents that could impact the Site.

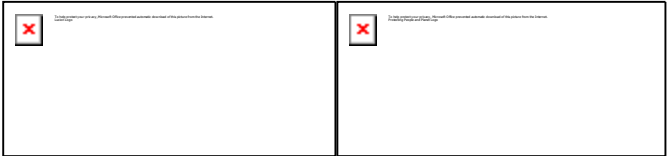
It should be noted that the Drainage Strategy will consider the most appropriate outfall location based on the drainage hierarchy set out in the PPG. In addition, the use of SuDS will be considered taking into account Site constraints with relevant justification provided where specific SuDS features are deemed not suitable.

If you require any further information to inform your response, then please do not hesitate to contact us.

Lucy

Lucy Antell (She/Her)
Consultant - Water Services
Delta-Simons Ltd

e: lucy.antell@deltasimons.com
m: +44 (0)7376 634062
w: www.deltasimons.com



Appendix H - Historic Flooding