

**ADVISORY**

Richborough  
Land East of Rugby Road  
Clifton-upon-Dunsmore, Rugby  
Flood Risk Assessment

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## **EXECUTIVE SUMMARY**

This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. It has been produced on behalf of Richborough in respect of a planning application for a proposed residential development at Land East of Rugby Road in Clifton-upon-Dunsmore, Rugby (approximate grid reference: SP 526 759).

This report demonstrates that the proposed development is not at significant flood risk, subject to the recommended flood mitigation strategies being implemented.

The site is located entirely within Flood Zone 1 (land at a low probability of flooding from rivers and sea). The nearest Environment Agency (EA) Flood Zone extents are located approximately 245m south-west of the site, which are associated with the Clifton Brook, an EA Main River. EA Light Detection and Ranging (LiDAR) data shows the site is raised a minimum of approximately 15m above the nearest Flood Zones extents. Therefore, fluvial flood risk from Main Rivers is not expected to pose a risk to the site.

An unnamed ordinary watercourse (UOW) is located approximately 210m north-west of the site and there is also noted to be an UOW located approximately 300m south-east of the site. A review of the topographical survey and EA LiDAR data suggests that at the closest point, the site is elevated approximately 12m above these UOW. The site is therefore considered to be at low risk of fluvial flooding from the UOWs.

The majority of the site is shown to be at very low probability of surface water flooding. There is an isolated area of low to high probability of pluvial flooding in the north of the site, which is attributed to an existing topographical low spot. There are also isolated areas at low probability of surface water flooding depicted in the south of the site and low to high probability of surface water flooding along the route of the drainage outfall, which are considered to also be associated with existing topographical features. Surface water depth mapping indicates a very low to low probability of depths reaching 0.3m within the site. The proposed built development is arranged such that it is considered to be at low risk of surface water flooding.

The proposed development has been reviewed against other potential sources of flood risk, including canals, groundwater, sewers and reservoirs. Based on the available data, these sources were found to pose a low risk to the proposed development.

It is recommended that where possible, finished floor levels are raised a minimum of 150mm above immediate surrounding ground levels to help mitigate the residual risk of flooding. Ground levels should be profiled to encourage pluvial runoff and overland flows away from the built development and towards the nearest drainage point.

In compliance with the requirements of the NPPF, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the proposed development will not increase flood risk to the wider catchment area subject to suitable management of surface water runoff discharging from the site.

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## 1. INTRODUCTION

- 1.1 This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG). The FRA has been produced on behalf of Richborough in respect of a planning application for a proposed residential development at Land East of Rugby Road in Clifton-upon-Dunsmore, Rugby.
- 1.2 This FRA is intended to support an outline planning application and as such, the level of detail included is commensurate and subject to the nature of the proposals at the planning stage. Summary information is included as **Table 1.1**.

**Table 1.1: Site Summary**

<b>Site Name</b>	Land East of Rugby Road
<b>Location</b>	Clifton-upon-Dunsmore, Rugby
<b>NGR (approx.)</b>	SP 526 759
<b>Application Site Area (ha)</b>	7.9 (approx.)
<b>Development Type</b>	Residential
<b>Flood Zone Classification</b>	Flood Zone 1
<b>NPPF Vulnerability</b>	More Vulnerable – Residential Dwellings Less Vulnerable – Community Facility and Car Parking Water Compatible – Playing Fields
<b>Anticipated Development Lifetime</b>	100+ years
<b>Environment Agency Office</b>	West Midlands
<b>Lead Local Flood Authority</b>	Warwickshire County Council
<b>Local Planning Authority</b>	Rugby Borough Council

### Sources of Data

- i. Topographical survey undertaken by Greenhatch Group in January 2025, reference: 53046\_T\_Rev0
- ii. Environment Agency (EA) 1m spatial resolution Light Detection and Ranging (LiDAR) data (2022)
- iii. EA Flood Map for Planning
- iv. EA Risk of Flooding from Surface Water (RoFSW) data
- v. Rugby Borough Council (RBC) Level 1 Strategic Flood Risk Assessment

- vi. Warwickshire County Council (WCC) Preliminary Flood Risk Assessment and Addendum
- vii. WCC Local Flood Risk Management Strategy
- viii. WCC Surface Water Management Plan
- ix. WCC Section 19 Flood Investigation Reports
- x. Severn River Basin District Flood Risk Management Plan
- xi. Rugby Borough Council Local Plan 2011-2031
- xii. Site visit undertaken by BWB Consulting Limited in January 2025
- xiii. British Geological Survey (BGS) Drift and Geology maps
- xiv. BGS Groundwater Flooding Susceptibility Mapping
- xv. Severn Trent Water (STW) sewer records

### Existing Site

- 1.3 The site is located to the south of Clifton-upon-Dunsmore, approximately 2km east of Rugby town centre. The site is bound to the north by playing fields, to the east and south by agricultural land and to the west by residential properties and Rugby Road. The redline boundary is extended to the south east to provide a drainage outfall to a watercourse, approximately 270m to the main site. The site is considered to be greenfield, comprising agricultural land. The location of the site is illustrated within **Figure 1.1**.



**Figure 1.1: Site Location**

- 1.4 A topographical survey of the site is included in **Appendix 1**. Ground levels generally fall in a south-westerly direction across the site, ranging from approximately 118metres Above Ordnance Datum (m AOD) in the north-east to approximately 104m AOD in the south.

### **Proposed Development**

- 1.5 The proposals comprise a residential development of up to 160 dwellings with open space, landscaping and associated infrastructure. Access is proposed from Newall Close, to the west. An Illustrative Framework Plan is presented in **Appendix 2**.

## 2. FLOOD RISK PLANNING POLICY & GUIDANCE

### National Planning Policy Framework

- 2.1 The NPPF<sup>1</sup> sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. The PPG is also available online<sup>2</sup>.
- 2.2 The PPG sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 2.3 The PPG also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing an FRA.
- 2.4 The NPPF and the PPG include a series of tables that define Flood Zones (Table 1 of the PPG), the flood risk vulnerability classification of development land uses (Annex 3 of the NPPF) and 'compatibility' of development within the defined Flood Zones (Table 2 of the PPG). Annex 3 of the NPPF and Table 2 of the PPG are recreated within **Appendix 3** of this report for reference.
- 2.5 This FRA is written in accordance with the NPPF and the PPG.

### Flood Map for Planning

- 2.6 With particular reference to planning and development, the Flood Map for Planning identifies Flood Zones in accordance with Table 1 of the PPG. Further details on the Flood Zone classifications are outlined in **Table 2.1**.

**Table 2.1: Flood Zone Classifications**

Flood Zone	Description
Flood Zone 1 (Low Probability)	Land having less than a 1 in 1000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability). All land outside of Flood Zone 2 and 3.
Flood Zone 2 (Medium Probability)	Land having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1% AEP); or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1% AEP).
Flood Zone 3a (High Probability)	Land having a 1 in 100 or greater annual probability of river flooding (>1% AEP); or land having a 1 in 200 or greater annual probability of flooding from the sea (>0.5% AEP). This is represented by "Flood Zone 3" on the Flood Map for Planning.
Flood Zone 3b (The Functional Floodplain)	Flood Zone 3b (The Functional Floodplain) is defined as land where water must flow or be stored in times of flood. This is not identified or separately distinguished from Zone 3a on the Flood Map for Planning.

<sup>1</sup> Revised National Planning Policy Framework, Ministry of Housing, Communities & Local Government, amended December 2024

<sup>2</sup> Planning Practice Guidance: <https://www.gov.uk/government/collections/planning-practice-guidance>, amended February 2024

2.7 The site is shown to be located entirely within Flood Zone 1, as shown in **Figure 2.1**.



**Figure 2.1: Flood Map for Planning**

### The Design Flood

- 2.8 The PPG identifies that new developments should be designed to provide adequate flood risk management, mitigation, and resilience against the 'design flood' for their lifetime.
- 2.9 This is a flood event of a given annual flood probability, which is generally taken as fluvial (river) and surface water (pluvial) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or tidal flooding with a 0.5% annual probability (1 in 200 chance each year), against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

### Climate Change

- 2.10 Predicted future changes in peak river flows caused by climate change are provided by the EA<sup>3</sup>, with a range of projections applied to regionalised 'River Basin Districts', which are further subdivided into Management Catchments.

<sup>3</sup> Environment Agency, Flood risk assessments: climate change allowances: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>. Last accessed May 2025.

2.11 The site falls within the Avon Warwickshire Management Catchment of the Severn River Basin District. **Table 2.2** identifies the relevant peak river flow climate change allowances from this Management Catchment.

**Table 2.2: Peak River Flow Climate Change Allowances for the Avon Warwickshire Management Catchment within the Severn River Basin District**

Allowance Category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2125)
Upper End	22%	31%	59%
Higher Central	12%	14%	32%
Central	7%	8%	21%

2.12 When determining the appropriate allowance for use in an FRA, the Flood Zone classification, the flood risk vulnerability and the anticipated lifespan of the development should be considered. **Table 2.3** provides a matrix summarising the EA's guidance on determining the appropriate allowance(s).

**Table 2.3: Application of Appropriate Peak River Flow Climate Change Allowances**

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	Use the central allowance where a location may fall within Flood Zone 2 or 3 in the future.				
2	Use the higher central allowance	Use the central allowance			
3a	Use the higher central allowance	Development should not be permitted	Use the central allowance		
3b	Use the higher central allowance	Development should not be permitted			Use the central allowance
If development is considered appropriate by the local authority when not in accordance with Flood Zone vulnerability categories, then it would be appropriate to use the higher central allowance.					

2.13 The site is located entirely within Flood Zone 1; the proposed development is classified as 'More Vulnerable' and has an anticipated lifespan of 100 years. Therefore, the Central allowance for the '2080s' epoch should be considered for peak river flows where a site may fall within Flood Zones 2 or 3 within the proposed lifespan of a development.

2.14 A review of EA LiDAR data shows the site is elevated approximately 15m above the nearest Flood Zone Extents. In addition, EA LiDAR data suggests that the site is elevated

a minimum of approximately 2m above the nearest mapped watercourse to the north-west of the site. Therefore, fluvial flood risk is not expected to pose a risk to the site now or in the future and the impacts of climate change on peak river flows will not be considered further within this report

### **Strategic Flood Risk Assessment**

- 2.15 A Strategic Flood Risk Assessment (SFRA) is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future.
- 2.16 The RBC Level 1 SFRA<sup>4</sup> has been reviewed in the production of this FRA. The SFRA provides information specific to the site location in the form of fluvial, surface water and groundwater flood risk mapping, as well as records of historical flooding. It also includes flood risk policy and guidance for the area. Information from the Level 1 SFRA will be referenced within **Section 3** where applicable.

### **Preliminary Flood Risk Assessment**

- 2.17 A Preliminary Flood Risk Assessment (PFRA) is an assessment of floods that have taken place in the past and floods that could take place in the future. It generally considers flooding from surface water runoff, groundwater and ordinary watercourses, and is prepared by the Lead Local Flood Authorities (LLFAs).
- 2.18 The WCC PFRA<sup>5</sup> considers flooding from surface water runoff, groundwater, ordinary watercourses and canals. It also references the historical river flooding which occurred in the county between 1992 and 2008. However, no historical instances of flooding at the site are referenced. Information from the PFRA will be referenced within **Section 3**, where applicable.
- 2.19 An addendum<sup>6</sup> was produced to update the WCC PFRA and a review of past and future flood risk and flood risk areas was undertaken. Upon review, no applicable information relating to flood risk at the site was identified.

### **Local Flood Risk Management Strategy**

- 2.20 A Local Flood Risk Management Strategy (LFRMS) is prepared by an LLFA to help understand and manage flood risk at a local level.
- 2.21 The LFRMS aims to ensure that the knowledge of local flood risk issues is communicated effectively so that they can be better managed. The LFRMS also aims to promote sustainable development and environmental protection.
- 2.22 The WCC LFRMS<sup>7</sup> has been reviewed; however, no applicable information in relation to flood risk at the site was identified

<sup>4</sup> Level 1 Strategic Flood Risk Assessment (JBA Consulting, October 2022)

<sup>5</sup> Preliminary Flood Risk Assessment (Royal Haskoning UK Ltd, May 2011)

<sup>6</sup> Preliminary Flood Risk Assessment Addendum (Warwickshire County Council, December 2017)

<sup>7</sup> Local Flood Risk Management Strategy (Warwickshire County Council, April 2016)

## River Basin Flood Risk Management Plan

- 2.23 Flood Risk Management Plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. FRMPs set out how risk management authorities will work with communities to manage flood and coastal risk. Risk management authorities include the EA, Natural Resources Wales, local councils, Internal Drainage Boards, National Highways and LLFAs.
- 2.24 The first FRMPs were published in March 2016 and were subsequently updated in December 2022. These describe actions to manage flood risk across England between 2021 to 2027.
- 2.25 The site is located within the Severn River Basin District. The Severn River Basin District FRMP<sup>8</sup> has been reviewed; however, no relevant site scale objectives were identified.

## Surface Water Management Plan

- 2.26 Surface Water Management Plans (SWMPs) are non-statutory plans which preceded the introduction of the Flood and Water Management Act 2010. These can provide an important evidence base of local flood risk issues which can include surface water drains, groundwater and small watercourses.
- 2.27 The WCC SWMP<sup>9</sup> has been reviewed but the site is not specifically referenced.

## Section 19 Flood Investigation Reports

- 2.28 Under their duties of the Flood and Water Management Act 2010, LLFAs have a responsibility to publish reports of investigations of flood incidents. A Section 19 flood investigation report is a public statement of the circumstances of a historical flood event and what parties have a role in managing the risks. The investigation does not always give an in-depth analysis of the flood risk or mechanisms, but it can provide a valuable record of past events.
- 2.29 WCC have published twelve Section 19 reports on their website, which document the flooding that occurred between 2017 and 2024. The reports have been reviewed in relation to the location of the site, but no evidence of flooding at the site or in its vicinity was identified.

## Local Plan

### Rugby Borough Council Local Plan 2011-2031

- 2.30 The RBC Local Plan 2011-2031<sup>10</sup> sets out the long-term spatial vision and strategic planning policies for the area. This has been reviewed for policies of relevance to flood risk.

<sup>8</sup> Severn River Basin District Flood Risk Management Plan 2021 to 2027 (Environment Agency, December 2022)

<sup>9</sup> Surface Water Management Plan (AECOM, September 2015)

<sup>10</sup> Rugby Borough Council Local Plan 2011-2031 (Rugby Borough Council, June 2019)

- 2.31 *Policy SDC5: Flood Risk Management* requires that “development does not increase flood risk elsewhere”. Specific flood risk guidance includes that within a site, the most vulnerable development should be located in areas of lowest flood risk and that any development is “appropriately flood resilient and resistant”.
- 2.32 This policy is complemented by *Policy SDC6: Sustainable Drainage*. This requires the use of Sustainable Drainage Systems (SuDS) in all major developments and all development in flood zones 2 and 3. It sets out that SuDS “should preferably be provided on-site” and should be located outside of the floodplain.

### **Other Relevant Policy and Guidance**

- 2.33 This FRA has considered the following document when assessing sources of flood risk and when recommending mitigation and resilience measures.

#### Warwickshire County Council LLFA Flood Risk Guidance for Development

- 2.34 WCC, as the LLFA, have produced a guidance document<sup>11</sup> relating to flood risk and drainage for new developments within the county. Key points from the guidance, which is referenced in this FRA where applicable, are included below:
- Where overland flows originate from outside of the proposed development, an FRA and drainage strategy should identify how these flows will be managed.
  - If existing ground levels are to be altered as part of development proposals, the drainage strategy must demonstrate that this will not negatively disrupt existing flood flow routes or floodplain and must ensure that there will be no increased flood risk on or off site.

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<sup>11</sup> Flood Risk Guidance for Development (Warwickshire County Council, June 2023)

### 3. POTENTIAL SOURCES OF FLOOD RISK

3.1 Flooding can occur from a variety of sources, or combination of sources, which may be natural or artificial. **Table 3.1** below identifies the potential sources of flood risk to the site in its current condition, and the impacts which the development could have in the wider catchment, prior to mitigation. These are discussed in greater detail in the forthcoming section. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within **Section 4**.

**Table 3.1: Pre-Mitigation Sources of Flood Risk**

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial			X		The site is located entirely in Flood Zone 1. The site is raised approximately 12m above the nearest unnamed ordinary watercourse (UOW) according to EA LiDAR data.
Coastal				X	The site is removed from coastal/ tidal influence.
Canals			X		The Oxford Canal is located approximately 180m south-west of the site. The site is raised approximately 12m above the canal.
Reservoirs and waterbodies			X		The site is located outside of the area at risk of inundation in the event of reservoir failure.
Pluvial Runoff			X		The majority of the site is at very low probability of surface water flooding. An isolated area in the north of the site is indicated to be at low to high probability of surface water flooding, and there are some small pockets of low to high probability of surface water flooding along the route of the drainage outfall.
Groundwater			X		There is indicated to be limited potential for groundwater flooding to occur within the site.
Sewers			X		There is no public sewers within the site. Public foul and surface water sewers are located to the west of the site; exceedance flows would be expected to remain within the highway in the first instance and be conveyed away from the site.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Effect of Development on Wider Catchment			X		The proposed development will not result in the impedance or loss of fluvial floodplain or surface water flow routes.
		X			The proposed development will increase the area of impermeable surfaces, leading to a potential increase in runoff, prior to mitigation.

### Fluvial Flood Risk

- 3.2 Flooding from watercourses occurs when flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.

#### Historical Flooding

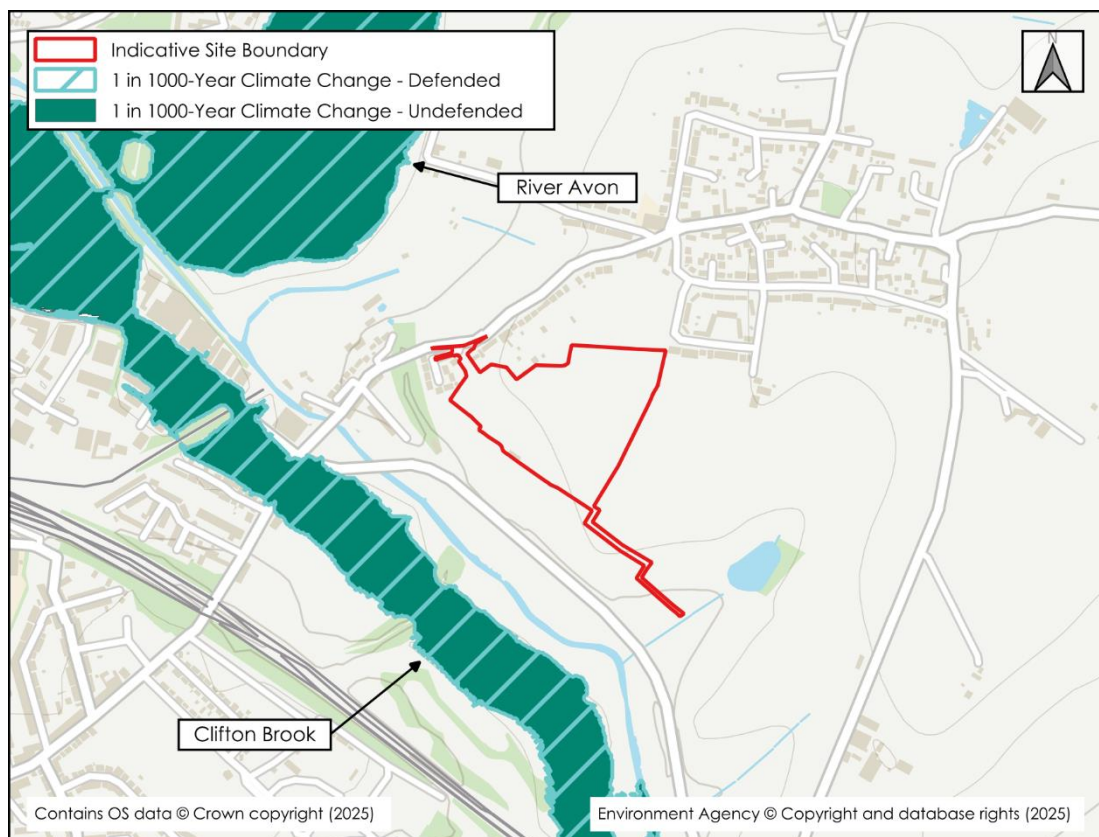
- 3.3 EA mapping shows the nearest recorded flood outlines to be located approximately 245m south-west of the site, associated with the Clifton Brook in September 1992. No details on the cause of flooding are provided.
- 3.4 The WCC Historical Flooding website<sup>12</sup> indicates that there are one to five reports of flooding in Clifton-upon-Dunsmore and a further one to five reports of flooding to the south-west of the site; however, no location details are provided.
- 3.5 The RBC Level 1 SFRA notes that within the four-digit postcode area 'CV23 0', comprising the site, there were 10 recorded incidents of fluvial flooding since 2008. However, details on the exact location and extent of these flood events are not provided.

#### EA Fluvial Flood Risk Mapping

- 3.6 The site is located entirely within Flood Zone 1, which is defined as land at a low probability of flooding from rivers and sea. The nearest Flood Zone extents are located approximately 245m south-west of the site, attributed to the Clifton Brook, an EA Main River. The site is raised a minimum of approximately 15m above these Flood Zones extents.
- 3.7 There are also noted to be Flood Zone extents located approximately 300m north-west of the site, attributed to the River Avon, an EA Main River. The site is similarly raised a minimum of 16m above these Flood Zones extents.

<sup>12</sup> Historical Flooding (Warwickshire County Council, November 2024) Last accessed May 2025. Available at: <https://maps.warwickshire.gov.uk/historical-flooding/>

- 3.8 The latest EA Flood Map for Planning includes defended and undefended climate change extents. These include the following scenarios: 0.1% AEP (1 in 1000) Rivers/Sea and 1% AEP (1 in 100) Rivers/0.5% AEP (1 in 200) Sea. The climate change scenarios used are the 'Central' allowance for the '2080s' epoch for flooding from rivers and the 'Upper End' allowance for flooding from the sea, accounting for cumulative sea level rise to 2125. The mapping does not account for any potential future changes to defence design or operation. This is considered to be the most precautionary data on rivers and sea currently published by the EA. The defended and undefended 0.1% AEP scenarios are shown within **Figure 3.1**.



**Figure 3.1: EA Flood Map for Planning – 1 in 1000-Year (0.1% AEP) Climate Change Extents (Defended and Undefended)**

- 3.9 The site is shown to be removed from the mapped floodplains for the Clifton Brook and the River Avon. The nearest mapped flood extents are located approximately 220m south-west of the site, attributed to the Clifton Brook; the site is topographically raised minimum of approximately 14m above these flood extents.

- 3.10 Therefore, fluvial flood risk from the Clifton Brook and the River Avon is not expected to pose a risk to the site now or in the future

#### Ordinary Watercourses

- 3.11 Based on OS Mapping and site-specific topographical survey data, there are no apparent ordinary watercourses located within the site boundary.

- 3.12 A review of OS mapping shows an unnamed ordinary watercourse (UOW) located approximately 210m north-west of the site. A review of the topographical survey (**Appendix 1**) and EA LiDAR data suggests that at the closest point, the site is elevated approximately 12m above the UOW. The site is therefore considered to be at low risk of fluvial flooding from the UOW.
- 3.13 There is also noted to be an UOW located approximately 300m south-east of the site. It was observed during a site visit undertaken by BWB in January 2025 that this outfalls to the nearby Oxford Canal. A review of the topographical survey (**Appendix 1**) and EA LiDAR data suggests that at the closest point, the site is elevated approximately 13m above the UOW. The site is therefore considered to be at low risk of fluvial flooding from the UOW.
- 3.14 Overall, the site is considered to be at low risk of flooding from fluvial sources.

### **Flood Risk from Canals**

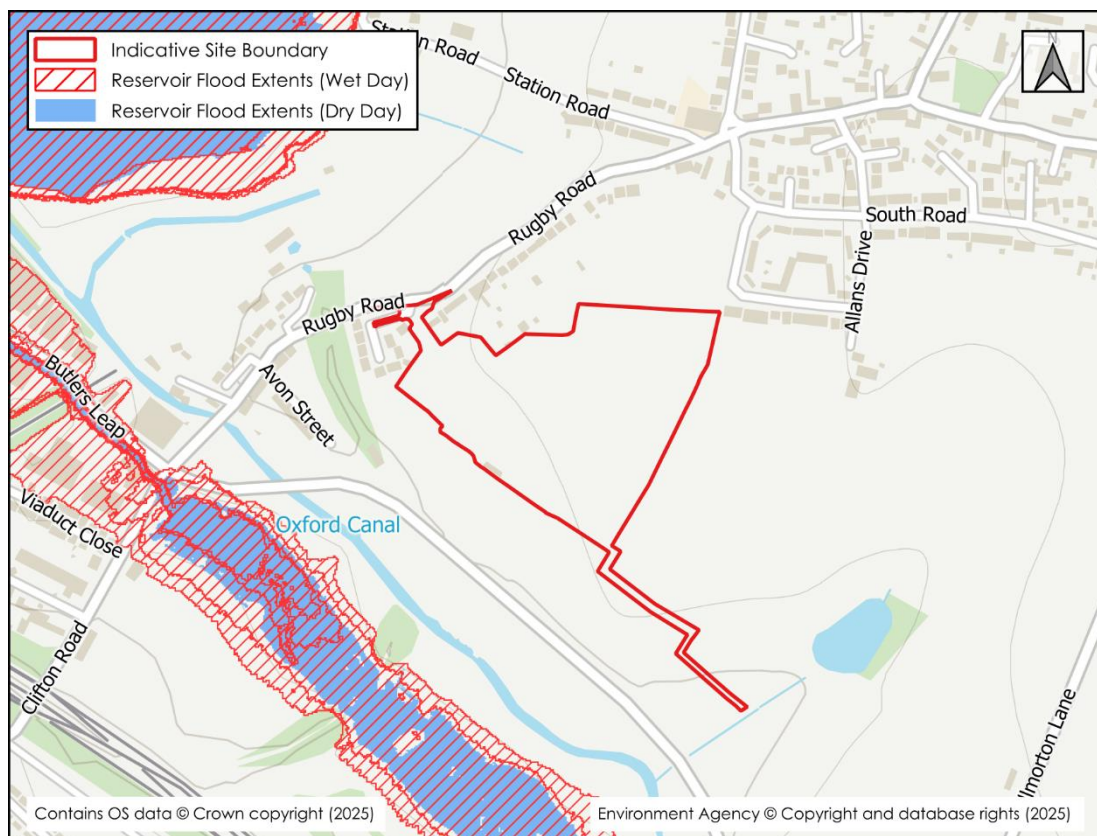
- 3.15 The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders and boreholes and manages water levels by transferring it within the canal system.
- 3.16 Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. The control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 3.17 Flooding can also occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 3.18 The Oxford Canal is located approximately 180m south-west of the site. The site is approximately 12m above the canal. As such, there is considered to be little risk of flood water from the Oxford Canal entering the site.
- 3.19 There are no records of canal breach or overtopping within the Level 1 SFRA associated with the Oxford Canal in the vicinity of the site.
- 3.20 The risk of flooding from canals is therefore considered to be low.

### **Flood Risk from Reservoirs & Large Waterbodies**

- 3.21 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 3.22 To help identify this risk, reservoir failure flood risk mapping has been prepared and published by the EA; this shows the largest area that might be flooded if a reservoir were

to fail and release the water it holds. The map displays a worst-case scenario and is only intended as a guide. An extract of the mapping is included as **Figure 3.2**.

- 3.23 There are two flooding scenarios shown on the reservoir flood maps: a 'dry-day' and a 'wet-day'. The 'dry-day' scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels. The 'wet-day' scenario predicts how much worse the flooding might be if a river is already experiencing an extreme flood.

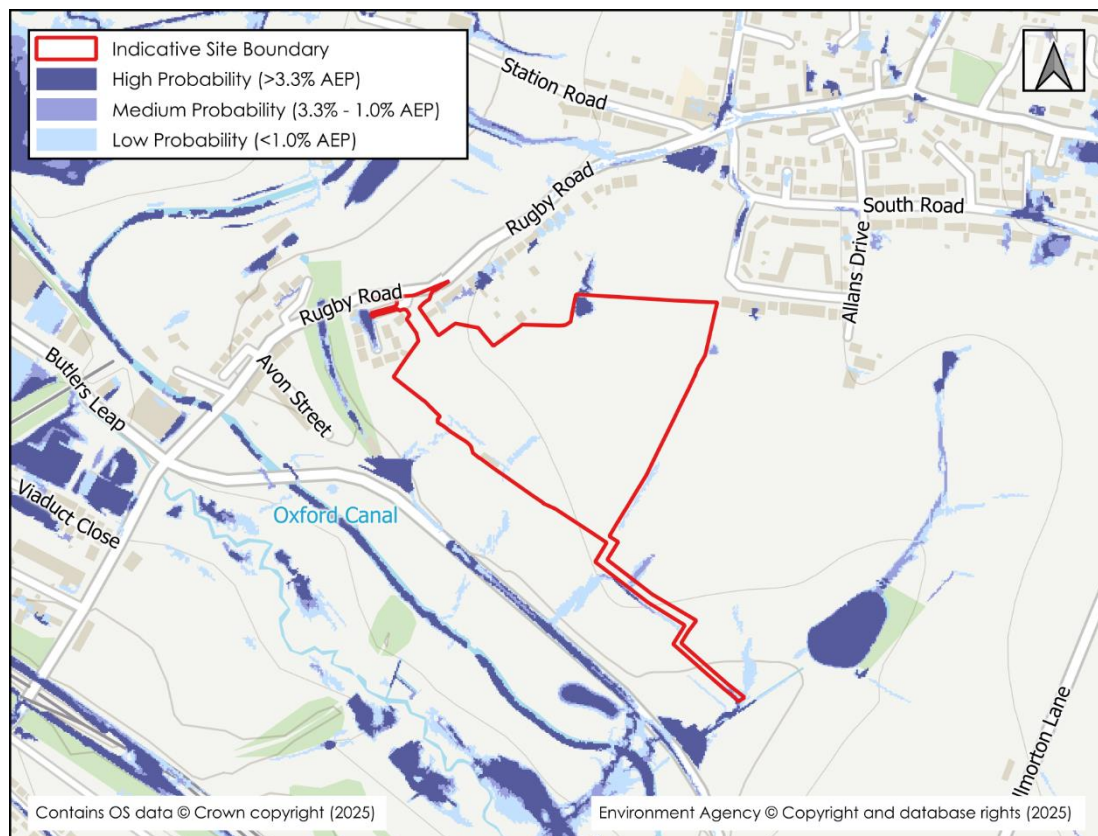


**Figure 3.2: EA Reservoir Failure Flood Extents**

- 3.24 The site is shown to be located outside of the flood extents associated with any reservoir failure. The nearest reservoir failure flood extents are located approximately 240m south-west of the site, associated with the Stanford Reservoir during both 'wet-day' and 'dry-day' scenarios.
- 3.25 There are no large waterbodies mapped in the vicinity of the site. A surface waterbody is noted to the south-east of the site; should any exceedance occur from this, flows would be expected to flow south-west away from the site in line with the local topography.
- 3.26 Overall, the risk of flooding from reservoirs and large waterbodies is considered to be low.

## Pluvial Flood Risk

- 3.27 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 3.28 RoFSW mapping has been collated and published by the EA; this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. An extract from the mapping is included as **Figure 3.3**.
- 3.29 The EA RoFSW mapping shows the probability of surface water flooding based on the 'Central' climate change allowances for the '2050s' epoch. The data does not extend to the 2080s epoch (required for the development lifetime); however, this dataset is considered to be the most precautionary surface water data currently published by the EA.



**Figure 3.3: EA Risk of Flooding from Surface Water (Yearly Chance of Flooding Between 2040 and 2060)**

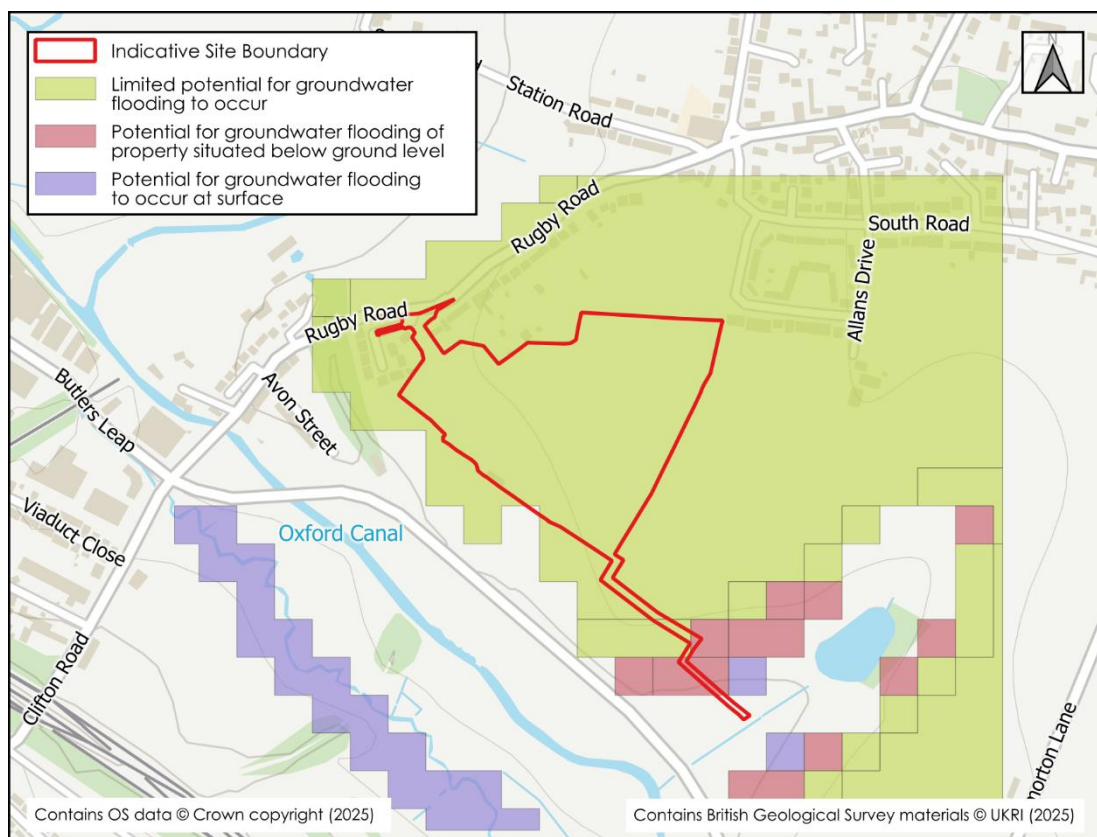
- 3.30 The majority of the site is shown to be at very low probability of surface water flooding.
- 3.31 There is an isolated area of low to high probability of pluvial flooding in the north of the site. This is attributed to an existing topographical low spot.

- 3.32 The updated RoFSW mapping shows the likelihood of surface water flooding. The mapping indicates a low to high probability of surface water depths reaching 0.2m and a low probability of surface water depths of up to 0.3m within this area of ponding.
- 3.33 There is also some small pockets of low to high probability of pluvial flooding along the route of the drainage outfall in the southeast of the site due to slight depressions in the topography. The mapping indicates a very low probability of surface water depths reaching 0.2m within these areas.
- 3.34 There are isolated areas at low probability of surface water flooding depicted in the south of the site. These are considered to be associated with existing topographical features and are thought to originate within the site itself. Surface water depth mapping indicates a very low to low probability of depths reaching 0.2m in these areas.
- 3.35 Access via Newall Close and Rugby Road is shown to be at very low probability of surface water flooding.
- 3.36 The RBC Level 1 SFRA notes that within the four-digit postcode area 'CV23 0', comprising the site, there were nine recorded incidents of surface water flooding since 2008. However, details on the exact location and extent of these flood events are not provided.
- 3.37 Overall, the site is considered to be at low risk of flooding from surface water. Appropriate mitigation measures for the residual risk are provided in **Section 4**.

### **Groundwater Flood Risk**

- 3.38 Groundwater flooding occurs when the water table rises above ground elevations, or it rises to depths containing basement level development. It is most likely to happen in low lying areas underlain by permeable geology. This is most common on regional scale chalk aquifers, but there may also be a risk on sandstone and limestone aquifers or on thick deposits of sands and gravels underlain by less permeable strata such as that in a river valley.
- 3.39 BGS mapping shows the site to be underlain entirely by bedrock of the Charmouth Mudstone Formation (Mudstone). This is designated by the EA as a Secondary (Undifferentiated) Aquifer, which is assigned in cases where it has not been possible to attribute either category A or B to a rock type.
- 3.40 Superficial deposits of the Dunsmore Gravel (Sand and Gravel) are mapped across the site. These are designated by the EA as Secondary A Aquifers; these 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.
- 3.41 The BGS holds historical records of borehole samples across the UK which include measurements of groundwater levels taken during the sample. These are measurements taken at one point in space and time and are not a substitute for a long-term record of groundwater levels. However, these measurements provide an indication of possible groundwater levels in metres below ground level (m bgl) that could be experienced.

- 3.42 There is one BGS borehole record (reference: SP57NW202) within the site, in the south-west. However, no information on groundwater is provided.
- 3.43 Areas Susceptible to Groundwater Flooding mapping, presented in the PFRA, depicts the site to fall within areas at low (less than 25%) to moderate (between 25% and 50%) susceptibility to groundwater flooding. However, it should be noted that groundwater susceptibility data is based on strategic scale mapping that uses a 1km<sup>2</sup> grid. It identifies areas susceptible to flooding from groundwater at a broad scale on the basis of geological and hydrogeological conditions. Therefore, the classification could potentially be based on another area within the 1km<sup>2</sup> cells, such as the low-lying land in the vicinity of the River Avon.
- 3.44 BGS groundwater flooding susceptibility mapping, shown in **Figure 3.4**, indicates that there is indicated to be limited potential for groundwater flooding to occur across the main area of the site, in alignment with underlying the Dunsmore Gravel (Sand and Gravel) deposits. The route of the drainage outfall passes through an area indicated to have potential for groundwater flooding of property situated below ground level.
- 3.45 However, it should be noted that this mapping indicates where groundwater may come close to the surface and so identifies areas susceptible to flooding from groundwater on the basis of geological and hydrological conditions. It is also noted that this susceptibility data should not be used on its own to make planning decisions at any scale and, in particular, should not be used to inform planning decisions at the site scale.



**Figure 3.4: BGS Groundwater Flooding Susceptibility Mapping**

- 3.46 Overall, based on the available data, the risk of groundwater flooding is considered to be low.

### **Flood Risk from Sewers**

- 3.47 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.
- 3.48 The local sewerage undertaker is Severn Trent Water; a copy of their sewer records is included as **Appendix 6**.
- 3.49 There is no public sewerage infrastructure within the site. The nearest asset is a 150mm diameter public foul water sewer located within Newall Close, approximately 20m west of the site. There is also a public surface water sewer within Newall Close. Should exceedance occur from these assets, flows would be expected to be conveyed within Newall Close in the first instance and to flow away from the site, in line with local topography.
- 3.50 No private sewerage infrastructure is indicated to be present on the topographical survey (**Appendix 1**).
- 3.51 The RBC Level 1 SFRA notes that within the four-digit postcode area 'CV23 0', there were nine recorded incidents of sewer flooding. However, details on the exact location and extent of these flood events are not provided.
- 3.52 Overall, the site is considered to be at low risk of flooding from sewers.

### **Effect of Development on Wider Catchment**

#### Development Land Use/Drainage Considerations

- 3.53 The proposed development will increase the impermeable area of the site, which will lead to an increase in surface water runoff. This could increase flood risk to downstream receptors prior to mitigation. The appropriate management of surface water is discussed in **Section 4**.

## **4. FLOOD RISK MITIGATION**

- 4.1 **Section 3** has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be incorporated within the proposed development to address and reduce the risk of flooding to within acceptable levels.

### **Sequential Arrangement**

- 4.2 The proposed development is located entirely within Flood Zone 1. The proposed built development, comprising the 'More Vulnerable' and the 'Less Vulnerable' uses (namely the proposed residential dwellings and the built infrastructure associated with the proposed sports facilities), is situated to be at low risk of surface water flooding. The proposed 'Water Compatible' uses, such as the proposed sports pitches and areas of open space, are located within areas of risk of surface water flooding in the north and south of the site. The proposed development is therefore considered sequentially arranged.

### **Development Levels**

- 4.3 It is recommended that finished floor levels are raised a minimum of 150mm above immediate surrounding ground levels, to help mitigate the residual risk of flooding
- 4.4 Ground levels should be profiled to encourage pluvial runoff and overland flows away from the built development and towards the nearest drainage point.

### **Safe Access and Egress**

- 4.5 The proposed vehicular access from Newall Close, in the west of the site, is considered to be at low risk of flooding from all sources, such that safe access and egress is considered possible from this location.

### **Surface Water Drainage**

- 4.6 To mitigate the impact of the proposed development on the current runoff regime, it is proposed to incorporate surface water attenuation and storage as part of the development proposals.
- 4.7 In brief, the proposed development will discharge surface water to the UOW to the south-east of the site at the equivalent greenfield QBAR rate. Attenuated surface water storage will be provided in the form of SuDS detention basins with capacity for the 1 in 100-year storm with an allowance for climate change. This will not only manage surface water flood risk to the proposed development, but it will also prevent the development from adversely affecting downstream flood risk.
- 4.8 The proposed development should be designed with exceedance in mind and the road network and landscaped areas should be used to convey excess overland flows above the capacity of the drainage networks towards the SuDS features.

- 4.9 Further information on the surface water drainage approach is provided within the accompanying Sustainable Drainage Statement (SDS) (reference: 244849-BWB-ZZ-XX-T-W-0002\_SDS).

### **Foul Water Drainage**

- 4.10 It is proposed to drain foul water from the development separately to surface water.
- 4.11 Further information on the foul water drainage approach is provided within the accompanying SDS (reference: 244849-BWB-ZZ-XX-T-W-0002\_SDS).

## 5. CONCLUSIONS AND RECOMMENDATIONS

- 5.1 This FRA has been prepared in accordance with requirements set out in the NPPF and the associated Planning Practice Guidance. The FRA has been produced on behalf of Richborough in respect of a planning application for a proposed residential development at Land East of Rugby Road in Clifton-upon-Dunsmore, Rugby.
- 5.2 This FRA is intended to support an outline planning application and as such, the level of detail included is commensurate and subject to the nature of the proposals at the planning stage.
- 5.3 This report demonstrates that the proposed development is not at significant flood risk, subject to the recommended flood mitigation strategies being implemented. The identified risks and mitigation measures are summarised within **Table 5.1**:

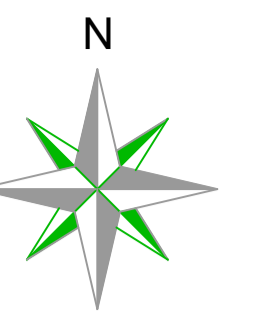
**Table 5.1: Summary of Flood Risk Assessment**

Flood Source	Risk & Proposed Mitigation Measures
Pluvial	<p>The majority of the site is at very low probability of surface water flooding. EA RoFSW mapping depicts an isolated area of low to high probability of pluvial flooding in the north of the site, isolated areas at low probability of surface water flooding in the south of the site, and small pockets of low to high probability of pluvial flooding along the length of the drainage outfall. These are considered to be associated with existing topographical features. The proposed built development is situated in areas at low risk of surface water flooding.</p> <p>It is recommended that where possible, finished floor levels are raised a minimum of 150mm above immediate surrounding ground levels to help mitigate the residual risk of flooding.</p> <p>Ground levels should be profiled to encourage pluvial runoff and overland flows away from the built development and towards the nearest drainage point.</p>
Other Sources of Flood Risk	The site is considered to be at low to no risk of flooding from fluvial, coastal/tidal, canal, groundwater, sewer and reservoir sources.
Impact of the Development	<p>Surface water runoff from the proposed development will be controlled and discharged appropriately.</p> <p>Foul water from the proposed development will be discharged separately to surface water.</p>
This summary should be read in conjunction with BWB's full report. It reflects an assessment of the Site based on information received by BWB at the time of production.	

- 5.4 In compliance with the requirements of the NPPF, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the proposed development will not increase flood risk to the wider catchment area subject to suitable management of surface water runoff discharging from the site.

**APPENDICES**

**Appendix 1: Topographical Survey**



SURVEY STATIONS			
Name	Easting	Northing	Height
GH1	452373.370	276204.127	108.199
GH2	452414.930	276100.998	108.165
GH3	452478.671	276116.188	108.754
GH4	452472.211	276013.746	100.655
GH5	452487.443	275994.890	113.750

**OS Note:**  
 This survey has been orientated to the Ordnance Survey (O.S.) National Grid OSGB36 (15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS AN).  
 A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.  
 The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for single orientation.  
 No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.  
 Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

**Legend:**

	Building		Overhead Cable		Cover (green)		Hole
	Wall		Trench edge		Kerb		Manhole
	Kerb line		Drainage		Manhole cover		Manhole cover
	Line marking		Drop kerb		Manhole cover		Manhole cover
	Top of kerb		Kerb line		Manhole cover		Manhole cover
	Station level		Kerb line		Manhole cover		Manhole cover
	Tree		Kerb line		Manhole cover		Manhole cover
	Area of Undergrowth		Kerb line		Manhole cover		Manhole cover
	Woodland		Kerb line		Manhole cover		Manhole cover
	Ridge Level		Kerb line		Manhole cover		Manhole cover
	E Level Line		Kerb line		Manhole cover		Manhole cover
	F Flat Roof Level		Kerb line		Manhole cover		Manhole cover
	Gate		Kerb line		Manhole cover		Manhole cover
	Intercourse		Kerb line		Manhole cover		Manhole cover
	Iron Railings		Kerb line		Manhole cover		Manhole cover
	Wire Mesh		Kerb line		Manhole cover		Manhole cover
	Road & Sid		Kerb line		Manhole cover		Manhole cover
	Road & Mile		Kerb line		Manhole cover		Manhole cover
	Chain Link		Kerb line		Manhole cover		Manhole cover
	Wooden Paving		Kerb line		Manhole cover		Manhole cover
	Concrete Paving		Kerb line		Manhole cover		Manhole cover
	Steel Paving		Kerb line		Manhole cover		Manhole cover
	Ground Light		Kerb line		Manhole cover		Manhole cover

Rev	Date	Description	Drawn	Q. Ref.



- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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**CLIENT**  
 Richborough Estates Limited

**PROJECT**  
 Land East of Rugby Road  
 Clifton-Upon-Dunsmore  
 CV23 0DF

**TITLE**  
 Topographical Survey

SCALE A1 @ 1:1000	DATE SURVEYED 17.01.2025
DRAWN MH	QUALITY REF GH23465

Level datum	See note
Grid orientation	See note

Job number	53046
Drawing No.	53046_T
Rev.	0

**Comments**  
 This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.  
 All dimensions should be checked on site prior to design and construction.  
 Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

## **Appendix 2: Illustrative Framework Plan**



The scaling of this drawing cannot be assured.  
 Revision A Layout amended following client's comment  
 Date 09/06/2025  
 Drawn by TM  
 Checked by JRM  
 Date 15/06/2025  
 Scale 1:RM

- Site Boundary
- Existing Vegetation to be retained
- Indicative Proposed Planting
- Indicative Location for Play Area
- Residential Development
- Streets
- Private Drives
- Proposed Paths
- Proposed SUDs
- Public Open Space
- Potential All Modes Access
- Potential Pedestrian Access
- Potential Sports Pitches
- Drainage Outfall

0 5m 10m 15m 20m 25m 30m

### **Appendix 3: NPPF Flood Risk Vulnerability and Flood Zone Compatibility**

### Flood Risk Vulnerability Classifications (recreated from the NPPF Planning Practice Guidance)

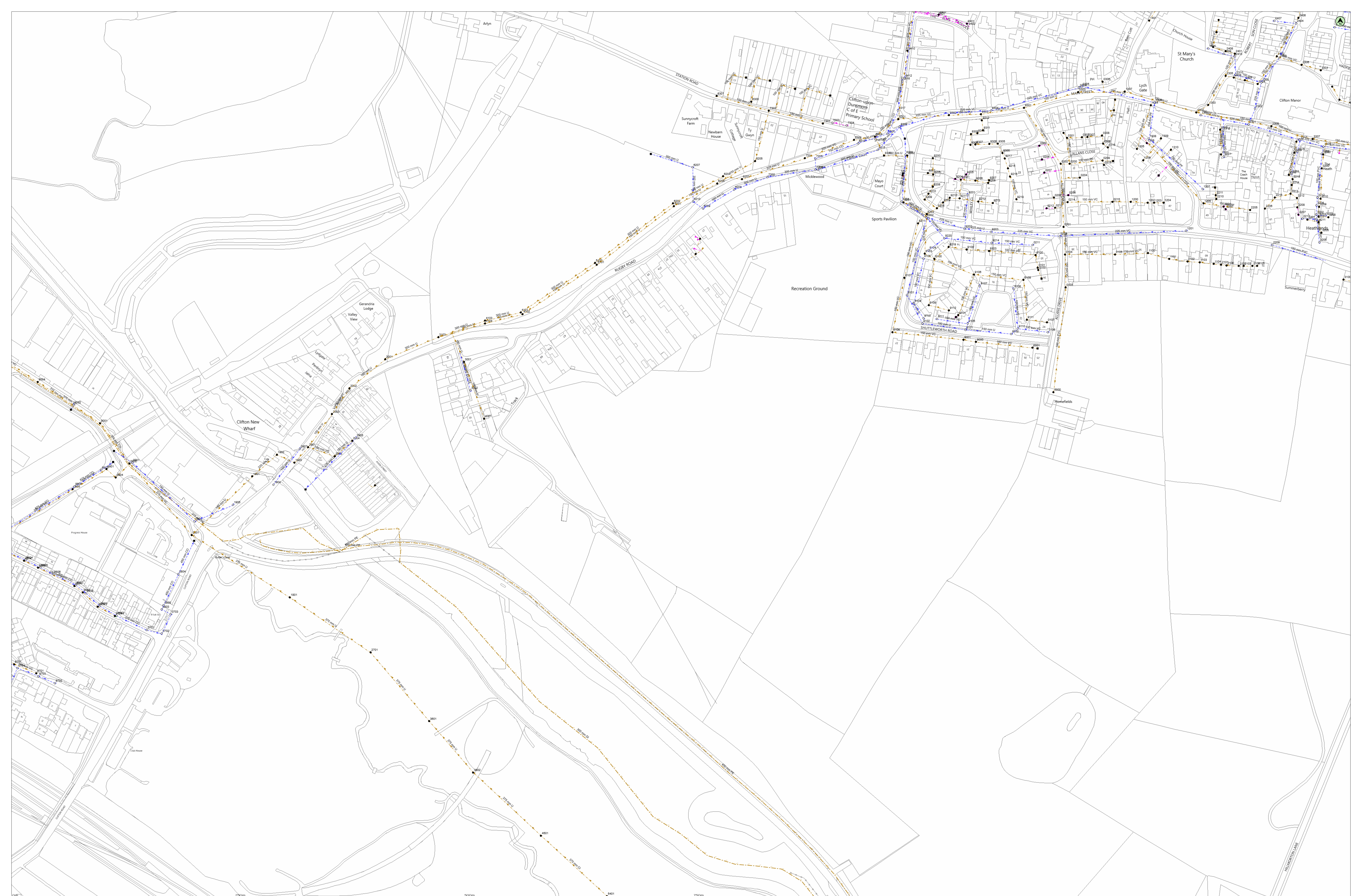
Vulnerability Classification	Description
Essential infrastructure	<ul style="list-style-type: none"> <li>• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.</li> <li>• Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood.</li> <li>• Wind turbines.</li> <li>• Solar farms.</li> </ul>
Highly Vulnerable	<ul style="list-style-type: none"> <li>• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.</li> <li>• Emergency dispersal points.</li> <li>• Basement dwellings.</li> <li>• Caravans, mobile homes and park homes intended for permanent residential use.</li> <li>• Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)</li> </ul>
More Vulnerable	<ul style="list-style-type: none"> <li>• Hospitals</li> <li>• Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.</li> <li>• Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.</li> <li>• Non-residential uses for health services, nurseries and educational establishments.</li> <li>• Landfill* and sites used for waste management facilities for hazardous waste.</li> <li>• Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.</li> </ul>
Less Vulnerable	<ul style="list-style-type: none"> <li>• Police, ambulance and fire stations which are not required to be operational during flooding.</li> <li>• Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.</li> <li>• Land and buildings used for agriculture and forestry.</li> <li>• Waste treatment (except landfill* and hazardous waste facilities).</li> <li>• Minerals working and processing (except for sand and gravel working).</li> <li>• Water treatment works which do not need to remain operational during times of flood.</li> <li>• Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.</li> <li>• Car parks.</li> </ul>
Water-Compatible Development	<ul style="list-style-type: none"> <li>• Flood control infrastructure.</li> <li>• Water transmission infrastructure and pumping stations.</li> <li>• Sewage transmission infrastructure and pumping stations.</li> <li>• Sand and gravel working.</li> <li>• Docks, marinas and wharves.</li> <li>• Navigation facilities.</li> <li>• Ministry of Defence installations.</li> <li>• Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.</li> <li>• Water-based recreation (excluding sleeping accommodation).</li> <li>• Lifeguard and coastguard stations.</li> <li>• Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.</li> <li>• Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.</li> </ul>

### Flood Zone Compatibility (recreated from the NPPF Planning Practice Guidance)

Flood Zone	Vulnerability Classification				
	Essential infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1 (Low Probability)	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate
Flood Zone 2 (Medium Probability)	Development is appropriate	<p>To be deemed appropriate an exception test is required to demonstrate:</p> <ul style="list-style-type: none"> <li>The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk</li> <li>the sustainability benefits of the development to the community outweigh the flood risk.</li> </ul>	Development is appropriate	Development is appropriate	Development is appropriate
Flood Zone 3a (High Probability)	<p>To be deemed appropriate an exception test is required to demonstrate:</p> <ul style="list-style-type: none"> <li>The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk</li> </ul> <p>the sustainability benefits of the development to the community outweigh the flood risk.</p> <p>Additionally, essential infrastructure should be designed and constructed to remain operational and safe in times of flood.</p>	Development should not be permitted	<p>To be deemed appropriate an exception test is required to demonstrate:</p> <ul style="list-style-type: none"> <li>The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk</li> <li>the sustainability benefits of the development to the community outweigh the flood risk.</li> </ul>	Development is appropriate	Development is appropriate

Flood Zone	Vulnerability Classification				
	Essential infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 3b (The Functional Floodplain)	<p>To be deemed appropriate an exception test is required to demonstrate:</p> <ul style="list-style-type: none"> <li>The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk</li> <li>the sustainability benefits of the development to the community outweigh the flood risk.</li> </ul> <p>Additionally, development should be designed and constructed to:</p> <ul style="list-style-type: none"> <li>remain operational and safe for users in times of flood;</li> <li>result in no net loss of floodplain storage;</li> <li>not impede water flows and not increase flood risk elsewhere.</li> </ul>	Development should not be permitted	Development should not be permitted	Development should not be permitted	<p>Development is appropriate if designed and constructed to:</p> <ul style="list-style-type: none"> <li>remain operational and safe for users in times of flood;</li> <li>result in no net loss of floodplain storage;</li> <li>not impede water flows and not increase flood risk elsewhere.</li> </ul>

#### **Appendix 4: Severn Trent Water Sewer Records**



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Do not scale this map. The plan and any information supplied with it is furnished as a general guide. It is only valid at the date of issue and no warranty as to its correctness is given or intended. In particular this plan and any information shown on it should not be relied upon in the event of an emergency or works. The information on this plan is derived from the 2024 Ordnance Survey data. It is not intended to be used for any other purpose. The information on this plan is provided for reference purposes only and is subject to copyright. Therefore, no further copies should be made from it.

Public: Final Gravity/Lateral Drain	Highway Drain	Manhole Flood	Manhole Surface
Public: Combined Gravity/Lateral Drain	Overflow Pipe	Abandoned Pipe	Chamber
Public: Surface Water Gravity/Lateral Drain	Disposal Pipe	Pressure Point	Pressure Combined
Pressure Point	Pressure Point	Pressure Surface Water	Fitting
Pressure Combined	Pumping Station	Private Sewers and Storm in Orange	
Pressure Surface Water	Fitting		

ponka.ivanova@twconsulting.com
244849



250m	500m	750m
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1641632-2

#### GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on: **0800 783 4444 (24 hours)**

- a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991 (a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as "STW Apparatus" in these general conditions and precautions.
- b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.
- c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.
- d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.
- e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).
- f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.
2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).
3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.
4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.
5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.
6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.
7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.
8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.
9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.
10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.
11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.
12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.
13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants.
14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

#### TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.
16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.
17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014
18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.
19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
	F	0	0	
	F	0	0	
	F	0	0	
	F	0	0	
	F	0	0	
	F	0	0	
	F	0	0	
	F	0	0	
	F	0	0	
0000	F	0	0	
0001	F	0	0	
0100	F	0	0	
0101	F	0	0	
0102	F	0	0	
0103	F	0	0	
0104	F	0	0	
0105	F	0	0	
0107	F	0	0	
0200	F	0	0	
0201	F	120.47	117.3	3.17
0202	F	119.88	116.76	3.12
0204	F	0	0	
0205	F	0	0	
0206	F	0	0	
0207	F	0	0	
0208	F	0	0	
0209	F	0	0	
0210	F	0	0	
0212	F	0	0	
0213	F	0	0	
0214	F	0	0	
0215	F	0	0	
0300	F	0	0	
0301	F	0	0	
0302	F	0	0	
0303	F	119.01	114.53	4.48
0306	F	119.14	118.16	0.98
0307	F	0	0	
0308	F	0	0	
0309	F	0	0	
0310	F	0	0	
0801	F	90.04	85.55	4.49
0802	F	88.48	85.27	3.21
0904	F	88.57	85.61	2.96
1100	F	0	0	
1101	F	0	0	
1102	F	0	0	
1103	F	0	0	
1104	F	0	0	
1200	F	0	0	
1202	F	0	0	
1203	F	0	0	
1204	F	0	0	
1205	F	0	0	
1206	F	0	0	
1302	F	120	115.43	4.57
1303	F	120.41	115.85	4.56
1304	F	0	0	
1305	F	0	0	
1306	F	0	0	
1307	F	119.62	114.85	4.77
1309	F	0	0	
1310	F	0	0	
1401	F	119.13	116.96	2.17
1801	F	88.87	85.9	2.97
1901	F	92.55	88.72	3.83
1902	F	96.55	88.89	0
1903	F	97.04	95.11	1.93
2001	F	107	104.46	2.54
2002	F	104.9	102.89	2.01
2003	F	102.54	101.04	1.5
2100	F	0	0	
2101	F	0	0	
2102	F	0	0	
2103	F	0	0	
2104	F	0	0	
2105	F	0	0	
2200	F	0	0	
2202	F	119.5	118.18	1.32
2204	F	0	0	
2205	F	0	0	
2206	F	0	0	
2207	F	0	0	
2208	F	0	0	
2210	F	0	0	
2211	F	0	0	
2212	F	0	0	
2213	F	0	0	
2214	F	0	0	
2215	F	0	0	
2216	F	0	0	
2304	F	120.45	116.22	4.23
2305	F	120.71	115.88	4.73
2306	F	119.74	116.69	3.05
2307	F	120.9	116.11	4.79
2308	F	120.74	116.04	4.7
2309	F	119.53	115.9	3.63
2311	F	120.56	118.56	2
2312	F	119.81	118.2	1.61
2314	F	119.14	117.66	1.48
2316	F	118.93	117.45	1.48
2401	F	120.64	116.96	3.68
2402	F	120.41	116.46	3.95
2406	F	120.05	116.81	3.24
2408	F	120.88	117.36	3.52
2701	F	88.07	86.24	1.83
2901	F	98.63	96.87	1.76
2903	F	100.29	99.22	1.07
2904	F	102.49	101.03	1.46
3001	F	107.71	106.14	1.57
3100	F	0	0	
3103	F	107.18	104.65	2.53
3200	F	0	0	
3201	F	0	0	
3205	F	0	0	
3207	F	0	0	
3208	F	0	0	
3209	F	0	0	
3210	F	0	0	
3211	F	0	0	
3300	F	0	0	
3301	F	119.29	116.79	2.5
3307	F	118.75	116.29	2.46
3601	F	88.24	86.46	1.78
3602	F	88.49	86.63	1.86
4001	F	108.27	107.26	1.01
4101	F	106.76	105.55	1.21
4102	F	106.89	105.93	0.96
4103	F	106.46	105.09	1.37
4104	F	106.57	105.53	1.04
4501	F	88.54	86.76	1.78
5101	F	108.1	106.43	1.67
5102	F	106	106.41	1.59
5401	F	88.78	86.74	2.04
6201	F	108.93	107.03	1.9
6202	F	108.72	107.09	1.63
6203	F	111.53	108.1	3.43
6204	F	109.89	107.76	2.13
6205	F	110.58	107.56	3.02
6206	F	109.76	107.22	2.54
6300	F	0	0	
6301	F	109.5	108.1	1.4
7201	F	112.87	109.89	2.98
7301	F	113.7	110.64	3.06
7302	F	111.96	107.87	4.09

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
8100	F	0	0	
8103	F	0	0	
8106	F	0	0	
8107	F	0	0	
8109	F	0	0	
8200	F	0	0	
8201	F	117.33	114.76	2.57
8203	F	117.74	115.13	2.61
8205	F	0	0	
8206	F	0	0	
8207	F	0	0	
8208	F	0	0	
8209	F	0	0	
8210	F	0	0	
8211	F	0	0	
8301	F	116.01	111.59	4.42
8302	F	116.21	114.19	2.02
8303	F	114.42	111.8	2.62
8304	F	115.22	111.06	4.16
8305	F	114.92	110.96	3.96
8402	F	115.85	113.55	2.3
8410	F	115.88	112.07	3.81
8701	F	17.82	0	
8814	F	90.12	87.86	2.26
9000	F	0	0	
9001	F	87.93	85	2.94
9001	F	0	0	
9004	F	87.83	84.85	2.99
9100	F	0	0	
9103	F	0	0	
9104	F	0	0	
9106	F	0	0	
9109	F	0	0	
9111	F	0	0	
9112	F	0	0	
9200	F	0	0	
9204	F	0	0	
9205	F	0	0	
9206	F	0	0	
9207	F	0	0	
9208	F	0	0	
9209	F	0	0	
9210	F	0	0	
9211	F	0	0	
9212	F	0	0	
9213	F	0	0	
9215	F	0	0	
9216	F	0	0	
9217	F	0	0	
9218	F	0	0	
9219	F	0	0	
9300	F	0	0	
9301	F	118	114.21	3.79
9302	F	116.62	113.71	2.91
9303	F	117.13	113.92	3.21
9305	F	0	0	
9306	F	0	0	
9307	F	0	0	
9308	F	0	0	
9309	F	0	0	
9310	F	0	0	
9311	F	0	0	
9312	F	0	0	
9401	F	116.49	114.61	1.88
9701	F	17.82	0	
9704	F	90.18	89.15	1.03
9801	F	89.84	88.73	1.11
9802	F	89.93	88	1.93
9803	F	89.9	88.81	1.09
9810	F	90.09	88.88	1.11
9901	F	88.21	85.9	2.31
9905	F	88.95	86.64	2.31
0106	S	0	0	
0203	S	120.37	119.08	1.29
0211	S	0	0	
0284	S	118.99	117.09	1.9
0305	S	119.01	116.41	0.6
0701	S	89.99	87.59	2.4
0702	S	89.9	87.47	2.43
0703	S	89.36	87.41	1.95
0704	S	90.18	87.88	2.3
0800	S	88.92	87.22	1.7
0803	S	89.07	87.27	1.8
0804	S	88.74	87.14	1.6
0901	S	88.42	87.13	1.29
0903	S	88.98	87.37	1.61
1201	S	121.14	120.01	1.13
1207	S	0	0	
1300	S	0	0	
1301	S	120.01	119.17	0.84
1308	S	0	0	
1404	S	120.95	119.34	1.61
1904	S	0	0	
1905	S	0	0	
2201	S	120.58	118.86	1.72
2203	S	119.49	118.19	1.3
2209	S	0	0	
2217	S	0	0	
2301	S	119.69	117.91	1.78
2302	S	120.41	118.14	2.27
2303	S	120.49	118.31	2.18
2310	S	120.75	118.68	2.07
2313	S	119.86	118.55	1.31
2315	S	119.13	117.59	1.54
2317	S	118.93	0	0
2403	S	120.42	118.6	1.82
2404	S	120.14	118.07	1.07
2407	S	120.55	119.34	1.21
2409	S	120.86	118.95	1.91
2410	S	120.65	118.82	1.83
2905	S	102.62	100.72	1.9
2907	S	98.16	97.23	0.93
3002	S	107.9	106.99	0.91
3202	S	0	0	
3203	S	0	0	
3204	S	0	0	
3206	S	0	0	
3212	S	0	0	
3213	S	0	0	
3302	S	0	0	
3306	S	0	0	
3401	S	118.89	117.47	1.42
6207	S	106.35	104.55	1.8
6208	S	111.49	109.43	2.06
6209	S	111.05	108.64	2.41
6210	S	110.84	107.61	3.23
7202	S	111.94	109.78	2.16
7203	S	113.38	110.8	2.58
7204	S	113.41	110.85	2.56
7205	S	112.77	111.26	1.51
7303	S	114.1	0	0
7304	S	114.66	113.51	1.15
8101	S	118.25	116.93	1.32
8102	S	118.73	117.4	1.33
8104	S	0	0	
8105	S	0	0	
8108	S	0	0	
8110	S	0	0	
8111	S	0	0	
8202	S	117.8	116.23	1.57
8204	S	0	0	
8308	S	0	0	
8309	S	115.94	0	0
8315	S	114.23	112.67	1.56
8316	S	0	112.72	0
8317	S	0	112.65	0
8318	S	115.81	112.32	3.49
8319	S	114.71	111.83	2.88
8401	S	115.85	114.31	1.54
8411	S	115.34	112.9	



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