

E1.14

ES Chapter 14 - Water Resources and Flood Risk

Authored by Expedition

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THE CROWN
 ESTATE

East Hemel

14. Water Resources and Flood Risk

14.1 Introduction

14.1.1 This Chapter of the Environmental Statement ('ES') has been prepared by Expedition Engineering Ltd ('Expedition') on behalf of The Crown Estate ('the Applicant'). It assesses and mitigates the potential effects of the Development on water resources and flood risk.

14.1.2 The baseline is based on the current condition of the Site before the start of any construction activities. Mitigation measures to reduce any detrimental environmental effects are proposed, and the residual environmental effects have also been assessed.

14.1.3 This Chapter is supported by the following technical appendices which are provided in **ES Volume 3**:

- **Appendix 14.1** - Flood Risk Assessment, Expedition (2025);
- **Appendix 14.2** – Sustainable Drainage Strategy, Expedition (2025); and,
- **Appendix 14.3** – Land Condition Report, A-Squared (2025)

14.1.4 This Chapter should be read alongside the Development Specification and Parameter Plans, which are submitted as part of the outline planning application.

14.1.5 This Chapter is supported by the following technical figures:

- **Figure 14.1** – Site Location Plan
- **Figure 14.2** – BGS Combined Geology Map (BGS, 2025)
- **Figure 14.3** – Aquifer Designation (DEFRA, 2025)
- **Figure 14.4** – Groundwater Source Protection Zones (EA, 2025)
- **Figure 14.5** – Groundwater Vulnerability (DEFRA, 2025)
- **Figure 14.6** – Site Topography (DEFRA, 2025)
- **Figure 14.7** – Water Stress for England (EA, 2021)
- **Figure 14.8** – Surface Water Flood Risk (EA, 2025)
- **Figure 14.9** – Groundwater Flood Risk (JBA Consulting, 2019)
- **Figure 14.10** – Reservoir Flood Risk (EA, 2025)

14.2 Assessment Methodology and Significance Criteria

Policy Context

14.2.1 This section sets out legislation, national and local policy guidance of relevance to the technical assessment in this Chapter.

National Legislation

Water Framework Directive, 2000¹

14.2.2 The Water Framework Directive 2000/60/EC ('WFD') applies to all European Union ('EU') water bodies and aims to make sure they are protected from further deterioration, and that improvements in water quality are made. The assessment and protection of water bodies should be undertaken irrespective of political or administrative boundaries by implementing River Basin Management Plans to be prepared within a formal series of six-year cycles, following the identification of River Basin Districts. In general terms, there is an onus on developers to protect and, if possible, enhance water bodies close to proposed developments. Following the United Kingdom's exit from the European Union, this Directive has been converted into UK legislation.

Floods Directive, 2007²

14.2.3 The Floods Directive 2007/60/EC came into force in November 2007. This Directive requires Member States to assess whether water courses and coastlines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk. The Directive requires Member States to carry out a preliminary assessment of flood risk by 2011, to draw up flood risk maps by 2013 and to establish flood risk management plans focused on prevention, protection, and preparedness by 2015. The Directive is to be implemented in co-ordination with the Water Framework Directive (WFD). Following the United Kingdom's exit from the European Union, this Directive has been converted into UK legislation.

Land Drainage Acts, 1991³ and 1994⁴

14.2.4 The Land Drainage Acts 1991 as amended by the Land Drainage Act 1994 sets out the responsibilities given to the Environment Agency ('EA'), Internal Drainage Boards, Local Authorities ('LAs') and riparian landowners in regard to land drainage. Under the Acts, the EA and LAs have discretionary powers of management and maintenance for 'Main Rivers' and 'Ordinary Watercourses' respectively. It is the riparian owner, i.e. the owner of the land through which the watercourse flows, who is ultimately responsible for the maintenance of the relevant section of the

¹ European Commission. Water Framework Directive. 2000.

² European Commission. Floods Directive. 2007.

³ UK Parliament. Land Drainage Act. 1991.

⁴ UK Parliament, Land Drainage Act. 1994.

watercourse. It covers provision for flood risk management works, control of flow of watercourses, controls discharge rates including levies, and duties with respect to the environment and recreation.

Water Resources Act, 1991 (Amendment) (England and Wales) Regulations, 2009⁵

14.2.5 The Water Resources Act (as amended by the Water Resources Act 1991 Regulations 2009) relates to the control of the water environment. The main aspects of the Act (as amended) which are relevant to the Development include provisions concerning land drainage, flood mitigation and controlling discharges to watercourses to prevent water pollution. It also outlines the functions and responsibility of the EA in regulating the water environment.

Water Industry Act, 1991⁶

14.2.6 The Water Industry Act consolidates previous legislation on water supply and drainage services and covers a wide range of activities required of the privatised water companies that were created in 1989. The main relevant provisions relate to trade effluent discharges made to drain for which the privatised companies act as the regulatory authorities.

The Environmental Permitting Regulations, 2010⁷

14.2.7 The Environmental Permitting Regulations of 2010 replaces parts of the Water Resources Act 1991 that relate to the regulation of discharges to controlled surface waters.

Water Act, 2003⁸

14.2.8 The Water Act 2003 amends the Water Resources Act 1991 and the Water Industry Act 1991. The Act brings about a number of changes, including streamlining arrangements for flood defence organisation, funding and changes to the types of abstraction licences, and places a duty on water companies to conserve water and prepare for drought. It formalises the Government's commitment to the sustainable management and use of water resources.

Water Environment (Water Framework Directive) (England and Wales) Regulations, 2003⁹

14.2.9 This transposes the requirements of the WFD into UK law. Eleven River Basin Districts have been identified in England and Wales. The Regulations include a requirement for water bodies (categorised as: 'rivers'; 'lakes'; 'transitional waters'; 'coastal waters'; or 'groundwaters') to achieve 'good' status with respect to ecology and water chemistry by 2015. Progress is monitored by the EA in its role as the 'competent authority'.

⁵ UK Parliament. Water Resources Act, 1991 (Amendment) (England and Wales) Regulations. 2009.

⁶ UK Parliament. Water Industry Act. 1991.

⁷ UK Parliament. The Environmental Permitting Regulations. 2010

⁸ UK Parliament. Water Act. 2003.

⁹ UK Parliament. Water Environment (Water Framework Directive) (England and Wales) Regulations. 2003.

Flood and Water Management Act, 2010¹⁰

14.2.10 The Flood and Water Management Act 2010 implements the recommendations from Sir Michel Pitt's Review of the floods in 2007 and places a series of responsibilities on County and Unitary Councils as Lead Local Flood Authorities ('LLFAs') with the intention of improving flood risk management. It sets the requirements for the development, maintenance, application and monitoring of a strategy for local flood risk management in its area. It also removes the automatic right of connection into public water drains and places the onus on LAs to adopt Sustainable Drainage Systems ('SuDS'). The Act enables lead local authorities to delegate flood or coastal erosion functions to another risk management authority by agreement.

Environment Act, 1995¹¹

14.2.11 The Environment Act 1995 (Section 57) establishes the Environment Agency and The Scottish Environment Protection Agency bodies, and provides for the transfer of functions, property, rights and liabilities to those bodies concerning general functions with respect to pollution control, provision with respect to water, environmental and recreational duties including sites of special interest, codes of practice with respect to environmental and recreational duties, and provision with respect to flooding and coastal change. It makes provisions for a risk-based framework for the identification, assessment and management of contaminated land within the UK. The provisions of the Act came into effect in April 2000 and are aimed at ensuring that actions taken with respect to contaminated land are directed by a technical assessment of risk that exists in the source / pathway / receptor scenario (pollutant linkage). This extends to preventing the contamination of controlled waters.

Environment Act, 2021¹²

14.2.12 The Environment Act 2021 aims to improve air and water quality, protect wildlife, increase recycling and reduce plastic waste. The Act is part of a new legal framework for environmental protection, following the exit of the UK from the European Union. Part 6 sets the requirements for protection of the water environment, including water resources and drought management plans, storm overflows, regulation of water and sewerage undertakers, groundwater abstraction, water quality and land drainage.

Flood Risk Regulations, 2009¹³

14.2.13 The Flood Risk Regulations 2009 implement the EU Flood Directive in England. They provide a framework for managing flood risk over a 6-year cycle, and require:

- Production of a Preliminary Flood Risk Assessment ('PFRA');
- Identification of potential significant risk, referred to as flood risk areas ('FRAs');
- Mapping of flood hazard and risk; and

¹⁰ UK Parliament. Flood and Water Management Act. 2010.

¹¹ UK Parliament. Environment Act. 1995.

¹² UK Parliament. Environment Act. 2021.

¹³ UK Parliament. Flood Risk Regulations. 2009.

- Flood Risk Management Plans, setting out measures and actions to reduce the risk.

14.2.14 The Regulations require that each of the four elements identified above be reviewed and updated where necessary, at least every six years.

National Planning Policy

National Planning Policy Framework (NPPF), 2024¹⁴

14.2.15 The National Planning Policy Framework ('NPPF') sets out how local authorities should meet the challenges presented by climate change, flooding and coastal change. Chapter 14 (162) states that "Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures."

14.2.16 Footnote 63 to the NPPF states that a site-specific flood risk assessment should be provided for all developments in Flood Zones 2 and 3, and that for Flood Zone 1, an assessment should be provided for:

- Sites of 1 hectare or more;
- Land which has been identified by the Environment Agency (EA) as having critical drainage problems;
- Land identified in a strategic flood risk assessment as being at increased flood risk in future; or
- Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

Planning Practice Guidance (PPG)¹⁵

14.2.17 To accompany the NPPF, the Planning Practice Guidance ('PPG') provides web-based advice on various topics associated with planning. For flood risk and coastal change, it "advises how to take account of and address the risks associated with flooding and coastal change in the planning stage."

14.2.18 The NPPF sets strict tests to protect people from flooding, and the PPG states that the following steps are to be followed to assess a new development in planning:

- Assess flood risk;
- Avoid flood risk; and
- Manage and mitigate flood risk.

National Technical Guidance

¹⁴ Ministry of Housing, Communities and Local Government. National Planning Policy Framework (NPPF). 2024.

¹⁵ Ministry of Housing, Communities and Local Government. Planning Practice Guidance. 2014.

Non-statutory National standards for sustainable drainage systems (SuDS), DEFRA, 2025¹⁶

14.2.19 This document details the standards for sustainable drainage systems under specific topic headings: runoff destinations; management of everyday rainfall (interception); management of extreme rainfall and flooding; water quality; amenity; biodiversity; and design of drainage for construction, operation, maintenance, decommissioning and structural integrity.

Local Planning Policy**South West Hertfordshire Water Cycle Scoping Study (WCS) (2010)¹⁷**

14.2.20 The WCS Scoping Study was completed in 2010 by Hyder Consulting on behalf of Dacorum Borough Council, St Albans City and District Council, Three Rivers District Council, Watford Borough Council and Welwyn Hatfield Borough Council, incorporating a high-level assessment of growth to 2031. It was noted that the majority of the wastewater treatment works (WwTW) in the area will require upgrades to accommodate developments. The sewer networks around and in Hemel Hempstead were defined as near capacity. The impact of additional development on flood risk due to surface water discharge was not defined in this study.

Hertfordshire Water Study 2021-2051 (2017)¹⁸

14.2.21 The Hertfordshire Water Study is underpinned by four key principles: resilience, sustainability, security and prosperity. It validates the findings of the WCS but caveats that this is dependent on efficient fittings in both new and old buildings. The Study determined that leveraging SuDS, separating surface water flows, upsizing existing sewers, 'Blue-Green' planning, incorporating alternative water sources (rain- and greywater) and efficient fittings are the highest priority.

14.2.22 The Study further evaluated several local regions' predicted need for investment and strategic interventions, such as WwTW and piped network upgrades, based on forecasted population and development growth. The Site, located in St Albans, was identified as a region of lesser concern and will likely only need strategic interventions from 2051.

Hertfordshire (Lead Local Flood Authority) SuDS Policy Statement (2015)¹⁹

14.2.23 The evolution of SuDS design shall run in parallel with the planning process and be aligned with CIRIA guidance. This document defines the SuDS deliverables required for Concept, Outline and Detailed Planning submissions. The Policy Statement defines that all SuDS features are designed to be integrated with the public realm and employ appropriate source control and surface management. Discharge to ground and/or a surface water body shall be

¹⁶ DEFRA. Non-statutory National standards for sustainable drainage systems (SuDS). 2025.

¹⁷ Hyder Consulting. South West Hertfordshire Water Cycle Scoping Study (WCS). 2010.

¹⁸ Hertfordshire County Council. Hertfordshire Water Study 2021-2051. 2017.

¹⁹ Hertfordshire County Council. Hertfordshire (Lead Local Flood Authority) SuDS Policy Statement. 2015.

prioritised where appropriate. Designs shall be cost-effective over the entire design life and accompanied by climate change statements validating the proposed design's robusticity.

St Albans City & District Council Draft Local Plan 2041 (2024)

14.2.24 The emerging Local Plan for St Albans City and District incorporates a risk-based approach to flood risk management, guided by the NPPF and informed by the Level 1 and Level 2 South West Hertfordshire Strategic Flood Risk Assessments. The Plan prioritises steering development to areas of lowest flood risk and mandates site-specific flood risk assessments where necessary. It also promotes natural flood management techniques and integration of green infrastructure to reduce flood impacts and enhance climate resilience.

Local Technical Guidance

Hertfordshire Local Flood Risk Management Strategy 2 (LFRMS2) (2019)²⁰

14.2.25 The LFRMS2 functions as a tool to understand local flood risks in Hertfordshire and define actions that will be needed to manage it. This document has 6 key principles, including the priority of taking a risk-based approach to local flood risk management and ensuring that new developments' impacts on flood risks are managed.

South West Hertfordshire Level 1 Strategic Flood Risk Assessment (2019)²¹

14.2.26 The Level 1 SFRA assessed flood risk across the four South West Hertfordshire Boroughs (Dacorum, St Albans, Three Rivers, and Watford). It considers all potential sources of flooding and historic floods. Fluvial flood risk is largely concentrated around the watercourses with few areas of extensive floodplain. It notes a higher proportion of surface water flooding in densely urbanised areas such as Hemel Hempstead and St Albans, however the Site of the Development did not have any record of flooding. The risk of groundwater flooding is low, although the chalk valleys of the Rivers Bulborne, Gade and Ver are at a heightened risk. Additionally, the SFRA notes that all residential developments should have safe access and egress for the 1:100-year + climate change event.

Dacorum Council Policy Statement on Sustainable Drainage²²

14.2.27 This document sets out how Dacorum Council would deliver sustainable drainage systems to address concerns raised in the Pitt Review and clarifies the approach to sustainable drainage in accordance with Hertfordshire guidance, described in the Core Strategy Policy CS31: Water Management.

²⁰ Hertfordshire County Council. Hertfordshire Local Flood Risk Management Strategy 2 (LFRMS2). 2019.

²¹ JBA Consulting. South West Hertfordshire Level 1 Strategic Flood Risk Assessment. 2019.

²² Dacorum Borough Council. Dacorum Council Policy Statement on Sustainable Drainage. 2015.

Assessment Methodology

- 14.2.28 This section describes the assessment methodology and how it has been applied to the assessment of Water Resources and Flood Risk for the Development.
- 14.2.29 With regards to Water Resources, this assessment covers groundwater and surface water receptors, which include surface water features and aquifers within or adjacent to the Site that could be affected by the Development. This assessment also considers the effect of the Development on water stress in the local area.
- 14.2.30 With regards to flood risk, this assessment covers the Site itself and surrounding areas that could be affected by the same sources of flooding that could affect the Site, with the following sources of flood risk being considered: surface water, groundwater, reservoirs, and sewers.
- 14.2.31 Potential significant effects have been assessed for both the construction and operational phases of the Development. These have been identified and evaluated in terms of impacts on identified environmental receptors.
- 14.2.32 Potential effects are assessed both pre and post incorporation of any required additional mitigation measures.
- 14.2.33 The baseline for the Site and Development has been established from the following sources of information, all of which have been used to inform both the FRA and the Drainage Strategy:
- Topographical Survey, Kings Land Surveyors Ltd. (2014) and Wardell Armstrong (2019);
 - Environment Agency (EA) published 'Open Data' datasets available online, reproduced with OS mapping under licence to Expedition (contains Ordnance Survey data © Crown copyright and database right [2019], contains Environment Agency information © Environment Agency and database right);
 - Source Protection Aquifer Designation, and Groundwater Vulnerability Mapping, DEFRA (2025);
 - Records of sewer flooding events, Thames Water (2017);
 - Ground Investigation Factual Report, EKHU-WAA-1XX-XX-RP-E-09033, CC Ground Investigations (2020);
 - Preliminary Ground Condition Assessment, EHUK-WAA-1XX-XX-RP-R-09023, Wardell Armstrong (2017);
 - Review and discussion of ground conditions and chalk dissolution risk, 3577-A2S-XX-XX-TN-Y-0001-00, A-squared Studio (2025);
 - Land Condition Report, A-Squared Studio Engineers Ltd (2025);
 - Drainage infrastructure asset records, Thames Water (2017); and
 - Utilities Strategy, Expedition (2025).

Methodology for assessing construction effects

14.2.34 The impact of construction works on the key sensitive water resources and flood risk receptors has been qualitatively assessed. This assessment has considered the construction of the key elements of the Development that may impact on these receptors, with a preliminary understanding of the construction methods.

Methodology for assessing operational effects

14.2.35 The impact of the Development in operation on the key sensitive water resources and flood risk receptors has been qualitatively assessed. The methods for assessing the operational effects are based on the engineering principles established in the FRA and Sustainable Drainage Strategy.

14.2.36 The FRA and Surface Water Drainage Strategy have been developed in line with the requirements of the NPPF, BS EN 752, and best practice SuDS design guidance (CIRIA C753) and are included in **ES Volume 3, Appendix 14.1** and **14.2** respectively. This has served as a basis to establish flood risks to the Site and potential impacts on local flooding.

14.2.37 This is supplemented by the Development Specification which includes a section which focuses on the integration of sustainable water management with ecological enhancement and landscape design.

Significance Criteria

14.2.38 Potential significant effects have been assessed for both the construction and operational phases of the Development. These have been identified and evaluated in terms of impact on the following environmental receptors:

- River Ver;
- Local aquifers;
- Regional water resources;
- Public foul sewers and wastewater treatment infrastructure
- Public water mains infrastructure
- Public surface water sewers
- Occupants of the Site; and
- Nearby residents

14.2.39 Effects have been identified and evaluated based on the following parameters:

- The value of the resource (international, national, regional and local importance);
- The magnitude of the impact;
- The duration involved;

- The reversibility of the effect; and
- The number and sensitivity of receptors.

14.2.40 The significance of an effect is generally determined as the combination of the ‘**sensitivity** and / or value’ of the affected environmental receptor and the predicted ‘extent and / or **magnitude**’ of the impact or change. The significance criteria are used to report the effect of the impact. The assessment of significance ultimately relies on professional judgement, although comparing the extent of the effect with criteria and standards specific to each topic can guide this judgement.

Receptor Sensitivity

14.2.41 The sensitivity of a receptor refers to its importance, i.e. its environmental value / attributes. The terminology used to describe the sensitivity of a resource or receptor against the baseline is as follows: **Very High, High, Medium** or **Low**, and example criteria of sensitivity is in **Table 14.1**.

Table 14.1: Receptor Sensitivity

Sensitivity	Criteria	Example Criteria
Very High	Attribute has a high quality and rarity on a regional or national scale	<p>Watercourse with Water Framework (‘WFD’) Class ‘High’.</p> <p>Site protected/designated under EC or UK habitat legislation (Special Area of Conservation (‘SAC’), Special Protection Area (‘SPA’), Site of Special Scientific Interest (‘SSSI’), Drinking Water Protection Zone (‘DWPZ’), Ramsar site, and Freshwater Fishery/Shellfish Water).</p> <p>Land uses classified as ‘highly vulnerable’ to flood risk in by the National Policy Guidance on Flood Risk and Coastal Change (Table 2).</p> <p>EC Bathing Waters Directive Beach class – ‘Higher’ classification.</p>
High	Attribute has a high quality and rarity on a local scale	<p>Watercourses with Water Framework Directive (WFD) Class ‘Good’.</p> <p>Watercourse that supports species protected under EC or UK habitat legislation but is not a designated site.</p> <p>Groundwater currently used, or likely to be suitable for use as, public potable supplies (e.g. Principal Aquifers, Source Protection Zone for a potable groundwater supplies).</p> <p>Main river >10m wide.</p> <p>Land uses classified as ‘more vulnerable’ to flood risk in by the National Policy Guidance on Flood Risk and Coastal Change (Table 2).</p> <p>EC Bathing Waters Directive Beach class – ‘Minimum’ classification.</p>

Sensitivity	Criteria	Example Criteria
Medium	Attribute has a medium quality and rarity on a local scale	<p>Watercourses with Water Framework Directive (WFD) Class 'Moderate'.</p> <p>Groundwater currently used for, or likely to be suitable for, providing non-potable supplies or limited domestic supplies (e.g. Secondary Aquifers for domestic supplies or industrial abstractions).</p> <p>Main river <10m wide. Ordinary watercourse >5m wide.</p> <p>Land uses classified as 'less vulnerable' to flood risk in by the National Policy Guidance on Flood Risk and Coastal Change (Table 2).</p>
Low	Attribute has a low quality and rarity on a local scale	<p>Groundwater that is unlikely to be suitable for providing abstractions (e.g. aquifers in areas of saline intrusion).</p> <p>Watercourses with Water Framework Directive (WFD) Class 'Poor'.</p> <p>Unclassified field drain which is therefore likely to be <5m wide.</p> <p>No fishery of any type.</p> <p>Land uses classified as 'water compatible' in by the National Policy Guidance on Flood Risk and Coastal Change (Table 2).</p> <p>EC Bathing Waters Directive Beach class- Fail.</p>

14.2.42 Magnitude is determined by predicting the scale of any potential change in the baseline conditions. The terminology used to describe the magnitude of impact against the baseline is as follows: **Major, Moderate, Minor** or **Negligible**.

14.2.43 **Table 14.2** summarises example descriptions of the different classes of beneficial and adverse effects in relation to Water Resources and Food Risk.

Table 14.2: Impact Magnitude

Impact Magnitude	Description of Criteria
Major Beneficial	<p>Significant local scale and moderate to major regional scale reduction in flood risk.</p> <p>Major improvement of groundwater quality underneath the Site and/or off-Site.</p> <p>Major improvement in water quality of the surface water resources.</p> <p>Significant permanent reduction in water demand on local / regional water resources.</p>
Moderate Beneficial	<p>Moderate scale reduction in localised flood risk.</p> <p>Moderate improvement of groundwater quality underneath the Site and/or off-Site.</p> <p>Moderate improvement in water quality of the surface water resources.</p> <p>Permanent reduction in water demand on local / regional water resources.</p>
Minor Beneficial	<p>Minor local scale reduction in localised flood risk.</p> <p>Minor and local scale improvement of groundwater quality underneath the Site and/or off-Site.</p> <p>Minor and local scale improvement in water quality of the surface water resources.</p> <p>Temporary or minor reduction in water demand on local / regional water resources.</p>
Negligible	<p>No significant effect on flood risk.</p> <p>No significant effect on groundwater flow or water quality.</p> <p>No significant effect on surface water quality.</p> <p>No significant effect on reduction in demand on local / regional water resources.</p>
Minor Adverse	<p>A minor increase in the risk of flooding and minor and local scale change in groundwater flow.</p> <p>Minor and local scale deterioration in groundwater quality underneath the Site and/or off-Site.</p> <p>Minor and local scale deterioration in water quality of the surface water resources.</p> <p>Temporary or minor increase in demand on local / regional water resources.</p>
Moderate Adverse	<p>Minor to moderate local scale increase in flood risk.</p> <p>Minor to moderate local scale change in flow of groundwater.</p> <p>Minor to moderate local scale deterioration in water quality of the groundwater underneath the Site and/or off-Site.</p> <p>Minor to moderate local scale deterioration in water quality of the surface water resources.</p> <p>Permanent increase in demand on local / regional water resources.</p>

Impact Magnitude	Description of Criteria
Major Adverse	Moderate to severe increases in flood risk.
	Moderate to severe local scale change in flow of groundwater underneath the Site and / or modest changes in off-Site groundwater flow.
	Moderate to severe local scale deterioration in water quality of the groundwater underneath the Site and/or off-Site.
	Moderate to severe local scale deterioration in water quality of the surface water resources.
	Major increase in in demand on local / regional water resources, and associated requirements for new sources e.g. application of an abstraction licence.

14.2.44 The significance of identified effects arising from the construction or operation of the Development have been determined via the sensitivity of the affected receptor and the magnitude of impact of the effect. The matrix in **Table 14.3** identifies how the magnitude of impact and sensitivity of the receptor is used to determine the significance of an effect.

14.2.45 The terminology used to describe the classification of beneficial or adverse effects is as follows: **Major, Moderate, Minor** or **Neutral**. Effects are considered Significant if they are Major, Moderate or Minor and Not Significant if they are Neutral.

Table 14.3: Significance of Effect

		Magnitude of Impact			
		Major magnitude	Moderate magnitude	Minor magnitude	Negligible magnitude
Sensitivity of Receptor	Very High	Major	Major	Moderate	Neutral
	High	Major	Moderate	Minor	Neutral
	Medium	Major	Moderate	Minor	Neutral
	Low	Moderate	Minor	Neutral	Neutral

Consultation

14.2.46 During preparation of this ES Chapter and supporting technical documents, consultation was conducted with St Albans District Council (SADC) as the Lead Planning Authority (LPA), with Dacorum Borough Council (DBC) in attendance, through a pre-application process.

14.2.47 The scope of this ES Chapter was agreed through the EIA scoping process, and no changes were required as a result of the scoping opinions received. Accordingly, the scope presented here is consistent with that outlined in the submitted scoping report.

14.2.48 The LPA sought comments from key technical stakeholders on the pre-application submission. This includes the following organisations, with whom we have had held meetings on the dates shown (meeting minutes are included in the FRA and Drainage Strategy included in **ES Volume 3, Appendices 14.1 and 14.2**):

- Hertfordshire County Council as Lead Local Flood Authority Meetings, 13/09/2024, 19/03/2025 and 23/06/2025
- Environment Agency Meetings, 25/09/2024 and 07/03/2025
- Thames Water Meetings, 08/01/2025, 15/07/2025 and 28/07/2025.

14.2.49 Consultation has also been conducted with the following stakeholders, during community-based events:

- River Ver Society
- Residents of Kings Cup Avenue in Leverstock Green

Assumptions and Limitations

14.2.50 The information used to inform this Chapter is based on the sources of information outlined within the Assessment Methodology Section.

14.2.51 Where information is missing and further surveys are required to establish baseline conditions accurately, this has been highlighted in the relevant section. However, the information available at this outline stage is considered sufficient to support a robust level of assessment for this ES Chapter.

14.2.52 For the robustness of the assessment, it has been assumed that any embedded mitigations highlighted relating to the construction phase can be implemented appropriately by the appointed contractor on the project. Further consultations with the appointed contractor will be carried out in the next delivery stages to understand the construction methodology and sequencing of works. Any issues relating to carrying out embedded mitigations outlined in **Section 14.4** will be addressed and resolved as part of the consultation.

14.2.53 It has been assumed that any information provided by third parties is accurate and correct.

14.3 Relevant Baseline Conditions

Current Conditions

14.3.1 A general description of the Site and a description of the Development is provided in **ES Volume 2: Chapter 3 and Chapter 5** respectively. The existing Baseline year for the purpose of this assessment is 2025.

14.3.2 Baseline conditions have been described by considering the following aspects:

- Geology and groundwater;
- Topography and hydrology;
- Flood risk;
- Surface water drainage;
- Local water resources; and
- Water infrastructure.

Location

14.3.3 The Site is located 1.7km east of Hemel Hempstead and directly west of the M1 Motorway, with the approximate centre at National Grid reference 509066 208141. The Site covers an area of approximately 356.95ha and is sub-divided into four areas for the purpose of description: EH North, EH Central, EH South and EH East.

Figure 14.1: Site Location Plan



Current Use

14.3.4 The Site is largely undeveloped and comprises of several irregular shaped agricultural fields, with some fields used for pasture (including grazing horses). As shown in **Figure 14.1** much of the Site is bordered by the M1 motorway to the east, the B487 Hemel Hempstead Road (Redbourn Road) to the north, urban areas of Hemel Hempstead to the west (including the neighbourhoods of Spencer's Park and Leverstock Green and Maylands Industrial Estate) and the A4147 Hemel Hempstead Road to the south.

14.3.5 The Site is cut (east-west) by the Nickey Line (a disused railway line that now forms a long-distance footpath and cycle way), Punchbowl Lane, Hogg End Lane and the A414 Breakspear Way.

Geology and Groundwater

- 14.3.6 Our understanding of the geology is based on British Geological Survey (BGS) mapping (**Figure 14.2**) and historic investigations undertaken by Wardell Armstrong in 2014, 2017 and 2019 to support previous proposals. A technical note summarising key ground condition information is included as an appendix to the Drainage Strategy (**ES Volume 3, Appendix 14.2**).
- 14.3.7 Mapping and investigations indicate that the Site lies within three dry Chalk Valleys in proximity to the surrounding Chiltern National Landscape.
- 14.3.8 The superficial deposits beneath the Site consist of Clay with Flints Formation, described as a deposit formed from the dissolution, decalcification and cryoturbation of bedrock strata of the White Chalk Sub-Group. The depth of the superficial deposits varies with the topography of the Site. Part of the Site is also covered by Lambeth Group bedrock.
- 14.3.9 Superficial deposits from the Clay-with-Flints are present across the Site, however the strata lies ununiformly above the chalk and appears to be deepest where the topographical elevation is high.
- 14.3.10 The Site is predominantly underlain by the Lewes Nodular Chalk and Seaford Chalk Formation.
- 14.3.11 The White Chalk Sub-Group is a Principal Aquifer, which is defined by the EA as layers of rock that have high intergranular and/or fracture permeability. This means they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. The River Ver, to the east of the Site, is a “chalk” river, fed from the Principal Aquifer.
- 14.3.12 The permeability of the White Chalk Sub-group means that it is also susceptible to dissolution. Dissolution poses significant geotechnical risks, however. Chalk dissolution will be considered in this Chapter in so far as it relates to water resources and flood risk.
- 14.3.13 The Lambeth Group is classified as a Secondary (A) Aquifer, which is defined as 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.
- 14.3.14 The Clay-with-Flints superficial deposits are classed as an Unproductive aquifer, which is defined as a largely unusable aquifer characterised by low permeability. These aquifers are therefore less prone to pollution and are do not contribute significantly to groundwater flow or storage.
- 14.3.15 The vast majority of the Site, excluding a portion in the south, lies within a ‘Zone 3 Total Catchment’ source protection zone (SPZ) as per the EA data for source protection zones (**Figure 14.3**). A Zone 3 SPZ is also defined as a Source Catchment Protection Zone as the total catchment area will need to be protected to support long-term groundwater recharge. The southernmost area of the Site is within SPZs Zone 1 ‘Inner Protection Zone’ and Zone 2 ‘Outer Protection Zone’.

- 14.3.16 There are three groundwater abstraction locations within 500m of the Site, the nearest being located approximately 175m to the west, within the Buncefield Oil Depot Site.
- 14.3.17 Groundwater levels identified in previous investigations and synthesised by A-Squared (Appendix E of **ES Volume 3, Appendix 14.1**) indicate that groundwater levels range between 84.6mAOD and 96.3mAOD with the groundwater depth generally increasing to the south and east. Contouring of groundwater elevations identified an easterly groundwater flow in the north and centre of the Site and a southeasterly flow in EH South.
- 14.3.18 The EA groundwater vulnerability map shows the overall vulnerability to groundwater from a particular activity, development, or pollution. The EA classifies the areas into five risk categories; High, Medium-High, Medium, Medium-Low and Low which is based on the likelihood of a pollutant reaching the groundwater, the type of aquifers present and the potential impact (i.e. the aquifer designation).
- 14.3.19 The groundwater vulnerability map classifies the Site as having a medium-high to high groundwater vulnerability in the southwest, central and northwestern parts of the Site, and medium to medium-low vulnerability in the northeast and southeast of the Site (refer to **Figures 14.4 and 14.5**).
- 14.3.20 A major incident (explosion and fire) occurred at the Buncefield Oil Depot, immediately adjacent to the west of the Site boundary on 11 December 2005. Following this incident, contamination was released from the oil depot site, which presented a risk to the underlying chalk aquifer. Contaminants included fuel hydrocarbons, BTEX compounds and contaminants originating from firefighting foam. In particular, the firefighting foams included Perfluoro-Octanesulfonic acid (PFOS), an environmentally persistent substance which has subsequently been banned.
- 14.3.21 The presence of PFOS has also been recorded within the Site ground investigations undertaken by Wardell Armstrong in 2017. The PFOS was located within part of the Principal Aquifer with highest concentrations adjacent to Buncefield in the centre of the Site. This is included here as part of the baseline condition for drainage and water management and will also be covered further in this ES Chapter.
- 14.3.22 The Land Condition Report (**ES Volume 3, Appendix 14.3**) provides an overview of the geo-environmental risks related to this potential contamination, and has been used to inform the Water Resources and Flood Risk effects. Groundwater monitoring was undertaken on behalf of the Applicant in July 2025 of the residual PFOS, and of PFOA and PFAS substances included in the Drinking Water Inspectorate (DWI) guidance, within the Site, which is interpreted in the Land Condition Report.
- 14.3.23 It is also understood that the Buncefield Oil Depot is undertaking ongoing monitoring of the Residual PFOS within and near their site, which will be reported independently to the EA.
- 14.3.24 Given the agricultural use of the Site, there is currently a risk of contamination of the water environment by fertilisers and pesticides being infiltrated into the ground or reaching surface water features, however the 2025 investigations determined the current agricultural use did not present an unacceptable risk in accordance with Land Contamination Risk Management (LCRM) guidance.

Topography and Hydrology

14.3.25 A detailed topographical survey was undertaken in 2019 by Wardell Armstrong and Kings Land Surveyors (Appendix A of the Drainage Strategy in **ES Volume 3, Appendix 14.2** of this Chapter). The pre-development site levels can be summarised as follows:

- The EH North area generally falls from the south to the north towards the B487 with levels between 134mAOD and 106mAOD. The southern part of EH North between Punchbowl Lane and Hogg End Lane slopes to the south, with levels between 134mAOD and 128mAOD.
- The EH Central area slopes in two directions with the high point of approximately 137mAOD near Green Lane roundabout then down to 124mAOD in the north and 128mAOD in the south.
- The EH South area, slopes between 130mAOD to 126mAOD in the south-east through a low-lying valley running diagonally towards the M1 motorway. At the lowest point, the valley is approximately 111mAOD.
- The EH East area immediately to the east of the M1, has a high point of approximately 136mAOD and falls to the north, east and south. The approximate lowest point is at 124m AOD.

Watercourses

14.3.26 A review of the EA Statutory Main River Map, retrieved from EA online ArcGIS, shows that the River Ver is located approximately 3km to the east of the Site, flowing south and eventually joining the River Thames. The River Gade runs through Hemel Hempstead and is located approximately 3.3km to the west of the Site, flowing south until it joins the Grand Union Canal.

14.3.27 Based on topographical LiDAR data from DEFRA (refer to **Figure 4.6**), the Site is considered to be within the River Ver's catchment. The River Ver is a protected river, fed by a chalk aquifer underneath, and is designated by the EA as a 'Main River' with a 'Moderate ecological status'.

14.3.28 No permanent watercourses or rivers run through the Site.

Flood Risk

Surface Water Flood Risk

14.3.29 The EA surface water flood risk map (refer to **Figure 14.8**) shows that there is a relatively low risk of flooding from surface water across the majority of the Site. The low-lying valleys, however, function as overland flow conveyance routes and are at risk of surface water flooding during intense rainfall events.

14.3.30 The Site is not formally developed, and mainly consists of agricultural fields, hedgerows and small woodlands and is therefore considered to be greenfield. It generally drains naturally via infiltration though during intense storms, excess rainfall runs off to the base of valleys creating temporary overland flow routes.

14.3.31 Leverstock Green to the southwest of the Site has had a number of historic flood events (2016 and 2020), understood to originate from the Marchmont Pond. Thames Water are responsible for managing the Marchmont

Pond and are aware of these flooding incidents. The last recorded flood event associated with Marchmont Pond was October 2020, during Storm Alex, where the nearby Kings Copse development recorded significant flooding. It is understood that this was a 1:99-year storm event where the valve within the Marchmont Pond was left open, which exacerbated downstream flooding. No recent flooding has been recorded since the valve has been closed.

14.3.32 The area along the northern Site boundary along the B487, has also had reported flooding originating from Redbourn Reservoir, adjacent to the northwestern boundary. Thames Water are responsible for managing the Redbourn Reservoir. Thames Water have indicated that they are aware of this known issue with anecdotal evidence following public engagement sessions indicating flooding along the B487 is believed to arise from the surcharge of the existing surface water sewer connected to the Redbourn Reservoir. The flooding could therefore be related to sewer capacity issues of the existing 375mm diameter pipeline connecting the reservoir to the outfall at the River Ver.

Groundwater Flood Risk

14.3.33 The South-West Herts Level 1 SFRA (2019) notes that within the wider South-West Hertfordshire area there have been several incidents of groundwater flooding. Notably within the Chilterns in the winter of 2000/2001, with areas in the north-east of St Albans affected. It is also noted that the upper reaches of the River Ver catchment (Marykate) had groundwater flooding recorded in 2014.

14.3.34 The historic groundwater flooding records detailed in the SFRA indicate that groundwater flooding is mostly around the Tring Reservoirs, the Chilterns and Marykate; all of which are several miles outside of the Site boundary. The SFRA further confirms that there is further localised risk of groundwater flooding within areas of permeable sand and gravel deposits, however these are also not present within the Site boundary.

14.3.35 Geotechnical site investigations have been carried out on the Site. This includes geophysical investigation in 2014, groundwater investigation in 2017 and more recently investigations in 2019 and 2025. This also includes infiltration testing completed May 2025 (included in the appendices of the Drainage Strategy). A review and synthesis of historic investigations undertaken by A-Squared to support the Ground Conditions and Contamination Scoping Opinion (Appendix E of the Flood Risk Assessment) also notes that BGS mapping indicates the risk of groundwater flooding is either low or negligible across the Site.

14.3.36 Groundwater levels identified in previous investigations and synthesised by A-Squared (Appendix E of **Appendix 14.1**) indicate that levels range from 84.56mAOD to 96.27mAOD with the groundwater depth generally increasing to the south and east. Contouring of groundwater elevations identified an easterly groundwater flow in the north and centre of the Site and a southeasterly flow in EH South. Due to the relatively low groundwater levels and relatively low permeability of the superficial ground conditions, the risk of groundwater flooding is considered to be low.

Reservoir Flood Risk

- 14.3.37 The risk of flooding from reservoirs is considered to be generally very low across most of the Site as per the EA 'Reservoir Flood Map' but there is localised risk associated with Redbourn Reservoir to the northwest of EH North.
- 14.3.38 This is confirmed by the South-West Herts SFRA (2019) which defines a possible route of flooding from nearby reservoirs (**Figure 14.9**). The risk of flooding from the reservoirs is noted in the EH North area. Whilst the region at greatest risk (around the Tring reservoirs) is beyond the Site, the proximity to the Redbourn Reservoir to the northwest of the Site brings some localised risk of reservoir flooding to the EH North area.
- 14.3.39 Redbourn Reservoir is included in the EA and the SFRA mapping. Both maps indicate a localised risk associated with the Redbourn Reservoir being breached or failing. The risk of flooding from reservoir breach is currently limited to localised natural surface water conveyance landscape areas though anecdotal evidence, shared during public engagement events, suggests the existing surface water network may be surcharging and flooding the B487 (Redbourn Road/Hemel Hempstead Road). This is being investigated by Thames Water and HCC LLFA.
- 14.3.40 Marchmont Pond, located to west of EH South, has not been identified in the SFRA and DEFRA mapping as this is not defined as a reservoir. This Thames Water balancing pond has been noted to be associated with flood risk when the pond is breached and/or fails, however, since a flooding incident associated with an open valve in October 2020, the pond is confirmed to be regularly maintained and the valve closed.
- 14.3.41 As outlined in the SFRA, however, all reservoirs are managed and maintained with dedicated emergency planning teams and response plans. Overall, the risk of flooding from reservoir breach is localised to the natural valley in the northern part of the Site and is mitigated by regular inspection and supervision by a reservoir panel engineer.

Sewer Flood Risk

- 14.3.42 There are no specific records of sewer flooding incidents near or within the Site. The South-West Herts SFRA (2019) does not mention any historic sewer flooding events. It is understood, however, that there may be flooding associated with the surcharge of the 375mm diameter sewer connected to Redbourn Reservoir to the north of EH North based on anecdotal evidence.
- 14.3.43 Leverstock Green, upstream of EH South, has also flooded due to surcharge of the 375mm diameter sewer connected to the Marchmont Pond due to an open valve. The valve has since been confirmed to be closed by Thames Water with sustained maintenance to prevent further surcharge. No recent flooding has been recorded since the valve has been closed. The localised risk of sewer flooding will be further investigated during the development of the drainage strategy.

Existing Surface Water Drainage

- 14.3.44 The Site is largely undeveloped, and mainly consists of agricultural fields, hedgerows and small woodlands and is therefore considered in large part to be greenfield.

- 14.3.45 A number of smaller existing agricultural buildings and dwellings are located within the Site extents; however, these appear to all be served by private drainage connections. There are no Thames Water assets identified within Hogg End Lane or Punchbowl Lane. These appear to all be served by private drainage connections.
- 14.3.46 Thames Water records show a number of surface water sewers in the vicinity of the Site, as well as surface water attenuation ponds and reservoirs nearby. In EH North there is an existing 375mm diameter surface water sewer which runs adjacent to the B487 Hemel Hempstead Road (Redbourn Road) which connects from the Redbourn Reservoir to a part of the River Ver near Chequer Lane and The Common. The Redbourn Reservoir is directly to the west of the Site at Grid Reference TL083096. There is also a 375mm diameter surface water sewer in Three Cherry Lane draining the caravan park. These sewers connect to an 875mm and then 1200mm diameter sewer which discharge to the Redbourn Reservoir.
- 14.3.47 In EH South, there is a 375mm diameter surface water sewer bisects the Site. This connection drains the development and Marchmont Pond to the west of the Site and passes beneath the M1 motorway discharging into the River Ver.
- 14.3.48 Surface water runoff from the M1 Motorway is currently managed through four smaller balancing ponds along the eastern side of the M1 Motorway. Similarly, surface water runoff from the A414 is managed through a small balancing pond along Breakspear Way. These ponds are owned and managed by National Highways.

Local Water Resources

- 14.3.49 Affinity Water is the statutory undertaker for water supply in the region, whilst Thames Water is the statutory undertaker for surface and foul water drainage.
- 14.3.50 The Site is located within the Affinity Water 'Seriously Stressed' region on the EA Water Stress map (2021, refer to **Figure 14.7**). The Affinity Water catchment has been classified as 'Seriously Stressed' since 2013 and given the current climatic and regional economic growth trends, pressure on water resources is predicted to get worse.
- 14.3.51 Affinity Water's Revised Draft WRMP (2024) confirms the seriousness of the pressure on water resources. Affinity Water are committed to increasing investment to increase resilience to severe droughts (1:200 year return period) and extreme droughts (1:500 year return period). This will include investigating, where appropriate, alternative water resource options including rainwater and greywater harvesting, smart meters, mains renewals and leakage reduction.
- 14.3.52 Thames Water are undertaking consultation of a new South-East Strategic Reservoir Option (SESRO) in Oxfordshire, with the aim of securing water supply across the south-east region, which includes the Site.

Water Infrastructure

Potable Water Infrastructure

14.3.53 Water supply infrastructure is owned and maintained by Affinity Water. The Site itself is not currently developed or formally connected to the water network at scale though there are water supply mains adjacent to the Site.

Surface Water Infrastructure

14.3.54 Two existing Thames Water infrastructure assets exist to the west of the Site. The Marchmont Pond, directly northwest of EH South, functions as a balancing pond for the local catchment. Redbourn Reservoir, directly to the northwest of EH North, is a local reservoir. Both assets discharge to the River Ver through existing Thames Water surface water sewers. Redbourn Reservoir discharges through a 375mm diameter surface water sewer adjacent to B487 Hemel Hempstead Road (Redbourn Road). Marchmont Pond discharges through a 375mm diameter surface water sewer which bisects the EH South area.

14.3.55 An existing 375mm diameter surface water sewer is also located in Three Cherry Tree Lane draining the caravan park. These sewers connect to an 875mm diameter and then 1200mm diameter sewer which discharges to the Redbourn Reservoir.

14.3.56 Further information on existing surface water drainage arrangements is discussed in paragraphs 14.3.46 through to 14.3.38.

Foul Water Infrastructure

14.3.57 Foul water and combined sewers are owned and maintained by Thames Water. The Site is currently largely undeveloped and not formally drained but there are foul water sewers adjacent to the Site.

14.3.58 There is a residential area just to the northwest of the Site near Redbourn Road that is serviced by foul sewers that connect to the Redbourn Road Hemel Hempstead Sewerage Pumping Station (SPS) to the north of Nickey Lane.

Summary

14.3.59 The environmental receptors that have been identified for the Development and their corresponding perceived sensitivity have been summarised in **Table 14.4**.

Table 14.4: Receptor Sensitivity

Receptor	Sensitivity	Justification
River Ver – water quality	Medium	EA ecological status classification maps indicate that the classification of the River Ver is moderate.
Local chalk aquifer – groundwater quality	High	Chalk aquifer is a regional resource for potable water supply
Local Secondary A (Lambeth Group) aquifer – groundwater quality	Medium	Lambeth Group Secondary Aquifer has potential to support local water supply and base flow to rivers.

Receptor	Sensitivity	Justification
Proposed Development – dissolution features	High	High sensitivity to dissolution features in the chalk bedrock
Water resources – abstraction for water supply	High	Regional water resources within the area are scarce
Public foul sewers and wastewater treatment infrastructure	Medium	Existing capacity in the public foul sewer network is limited
Local water mains	Medium	Limited potable water supply infrastructure surrounding site
Public surface water sewers	Medium	Existing capacity in the public surface water sewer network is limited
Occupants of Development – local flooding	High	Land use classified as “More Vulnerable” to flooding in line with the National Policy Guidance on Flood Risk and Coastal Change (Table 2).
Existing surrounding communities – local flooding	Low to High	Depending on land use vulnerability to flooding in line with the National Policy Guidance on Flood Risk and Coastal Change (Table 2).

Future Baseline

14.3.60 The future baseline of the Site is an assessment of how the baseline conditions of the Site could change in the future due to external effects such as climate change and continued usage of the Site and further development in the local area.

Factors influencing the Baseline

14.3.61 Baseline conditions for flood risk could change over the anticipated lifetime of the Development due to climate change, land use changes and changes in groundwater regime.

Climate Change and Flood Risk

14.3.62 It is likely that flood events could increase in frequency, magnitude and extent. Current EA guidance (EA, 2025) predicts increases in peak rainfall intensity within the range of 25% (Central allowance) and 35% (Upper allowance) for the period 2061 to 2125, for the 3.3% annual exceedance rainfall event, and a range of 25% and 40% for the 1% annual exceedance rainfall event. As stated in the Drainage Strategy (**Appendix 14.2**), upper end climate change allowances of 35% and 40% for the 3.3% and 1% annual exceedance rainfall events respectively have been applied.

14.3.63 Within the Colne Management Catchment (within which the River Ver flows, and the Site is located) there is an anticipated 21% increase in peak river flows (2080s central allowance).

14.3.64 Key receptors will be identified and assessed in accordance with the Planning Practice Guide (PPG) Table 2 (Flood Risk and Vulnerability Classification) and using the baseline assessment.

14.4 Likely Effects of the Development and their Significance

Embedded Mitigation

14.4.1 This section of the Chapter describes the measures and environmental enhancements which will be incorporated within the design and construction management of the Development. These design and management measures will avoid, prevent, reduce, or offset potential environmental impacts.

Construction Embedded Mitigations

14.4.2 It is anticipated that prior to commencement of any construction activities, a Construction Environmental Management Plan ('CEMP') will be agreed with the Local Planning Authority, which will seek to manage and where practical minimise the impact of the construction phase of the Development upon the Site and surrounding area. An outline CEMP has been prepared and is included in **ES Volume 3, Appendix 6.1**, and those of relevance to water resources and flood risk are described below.

14.4.3 Measures set out in the CEMP will be developed following best practice guidance of pollution control from construction sites (CIRIA C753, Chapter 31) and Pollution Prevention Guidelines 5 & 6. They will include:

1. A temporary surface water drainage system will be provided for the construction period until a permanent system is installed and operational. The feasibility of discharging construction runoff to the local sewer system will be assessed at the different stages during construction. The necessary approvals will be obtained from Thames Water, and the water treatment facilities necessary to meet water quality requirements will be provided, for example pollution control and silt interception.
2. Wherever possible, any mixing and handling of concrete done on site, together with any washing down and cleaning of equipment used for concrete handling will be undertaken in a designated contained area.
3. Storage of plant, machinery fuel, or material (including stockpiles) should be avoided in sensitive areas and within overland flow routes. Appropriate storage areas will be provided. Plants and machinery will include drip trays wherever possible. All water runoff from designated refuelling areas will be channelled to an oil separator or an alternative treatment system prior to discharge.
4. Obstruction of overland flow routes, e.g. via temporary embankments, haul roads or temporary drainage infrastructure should be avoided.
5. An emergency response plan will be followed in the event of a pollution incident. This will be developed in consultation with the EA. The plan will include the provision of appropriate emergency response equipment on-site and staff training in emergency procedures. Spill kits will be held on site with a variety of absorbent materials to be used in the event of a spill of fuel, oil or chemicals.
6. Contained wheel-washing facilities, silt traps, and cut-off ditches and/or silt fences will be installed around excavations, exposed ground, and stockpiles to prevent uncontrolled release of suspended solids.

7. Operations will be appropriately contained to ensure that the risk of surface water flooding to neighbouring sites does not increase during construction.
8. Any dewatering associated with construction of foundations and substructures will be limited by adopting best practice and creating an effective groundwater cut-off around the work area. Dewatering flows will be managed, removing any pollutants before disposal by infiltration.
9. Water demand will be reduced with the use of water efficient fittings wherever possible in the site compounds and through the use of non-potable water for suitable water uses.

Design Embedded Mitigations

Sustainable Drainage

- 14.4.4 A sustainable water management system has been developed to manage the Site surface water run-off, the flood risk associated with existing overland flow routes and retain water, for use on-site.
- 14.4.5 The following key spatial principles have been defined on the parameter plans and within the Development Specification and form part of the design embedded mitigations incorporated in the sustainable water management system:
- Multi-function stormwater attenuation basins (“ponds”) integrated in the topography and landscape, including permanent water to achieve biodiversity and amenity value.
 - The ponds are a central feature of the sustainable water management strategy for the Site and are designed to be “multi-value”. These ponds are integrated within the green infrastructure to enhance the landscape, biodiversity, remove diffuse urban pollutants and contribute to climate resilience and environmental quality
 - The ponds will not exceed a maximum 2m depth as outlined in the CIRIA SuDS Manual C753 for the 1:100 + 40% cc storm and have floodable extents for the 1:30 and 1:100 events which form part of the public open space network.
 - Conveyancing of surface water via a network of open ditches, swales and rain gardens planted with flood and drought resistant species, including along streets where appropriate, to control run-off and diffuse urban pollutants at source before discharging to attenuation basins.
 - The use of permeable surfaces and similar methods within the built areas to reduced run-off.
 - The use of underground pipes when necessary, including the conveyance of surface water underneath the M1 motorway.
- 14.4.6 Additional measures not defined above have been included as part of the sustainable surface water Drainage Strategy (**ES Volume 3, Appendix 14.2**) for the Development. These are further discussed in Section 14.5.

Flood Risk Management

- 14.4.7 The Development buildings have been sited away from the low-lying valleys subject to surface water, sewer, and reservoir flood risk (i.e., low-lying areas are to remain undeveloped/open space). Overland flow routes which convey flood waters are to remain within the low-lying valleys with all generated runoff up to the 1:100 +40% cc event safely contained in the low-lying valleys away from the Development.
- 14.4.8 As the Site is considered to contain some potential contamination following the Buncefield Oil Depot incident, concentrated infiltration (through soakaways or engineered infiltration structures used for primary disposal route of surface water) is not possible on the Site given the risk of mobilising contaminants, such as PFOS and BTEX. Refer to Land Condition Report and Drainage Strategy for further information. The Drainage Strategy therefore proposes controlled discharge to the River Ver, with diffuse infiltration (mimicking the behaviour of soft landscape across drainage catchment) also proposed. This infiltration strategy should minimise risk of mobilising contaminants and ground dissolution. Refer to Land Condition Report for further details (**Appendix 14.3**).

The Works

Geology and Groundwater

- 14.4.9 If required for the Development, construction of any deep pile foundations that terminate in the groundwater could create a pollution pathway and impact the quality of the Chalk aquifer if unmitigated. The Chalk aquifer is noted as having a high sensitivity given its regional significance for water supply, and impact magnitude of moderate adverse if unmitigated. This impact on groundwater quality is likely to result in **direct, permanent, and regional** effects of **moderate adverse significance**.

Surface Water

- 14.4.10 There is a potential risk of surface water pollution, through the construction of the drainage system or accidental runoff or spillage, by sediments, fuels, chemicals and construction materials. However, these potential impacts will be controlled by the measures taken as part of the CEMP (including chemical storage and construction drainage management plan), and any impact would be negligible to minor, depending on nature and extent of pollution incident. The River Ver is considered to have a medium sensitivity to pollution. This impact on the surface water regime is considered **not significant**.

Flood Risk

- 14.4.11 During the construction phase there could be a potential risk of local flooding on the Site, due to the increase in runoff from the Site associated with construction activity. It will be necessary to assess and potentially provide a temporary drainage system that can negate any risk to localised flooding. The magnitude of the impact would be negligible to minor. During the construction phase there could also be an impact on overland flow routes due to haul roads or temporary drainage infrastructure, however with implementation of the CEMP magnitude of the impact of this would be negligible. The sensitivity of the construction site to flooding is considered low. This impact on local flooding on the Site is considered **not significant**.

Local Water Resources

14.4.12 During the construction phase, there is potential for increased water demand associated with site compounds, dust suppression, concrete batching and other temporary activities. However, this demand will be minimised via the CEMP through the use of water-efficient fittings, leak detection, and non-potable water sources where appropriate. Thus, the impact on regional water resources is considered to be of negligible magnitude, and while the sensitivity of regional water resources are high, the overall effect is considered **not significant**.

Water Infrastructure

14.4.13 Construction activities may result in temporary connections to existing water supply and drainage infrastructure, with potential for disruption or increased load. However, these impacts will be mitigated through coordination with statutory undertakers and adherence to best practice construction protocols outlined in the CEMP. As such, the impact on water infrastructure (including potable water mains, foul and surface water sewers) is considered to be negligible, and while the sensitivity of water infrastructure is medium, the overall effect is considered **not significant**.

The Completed and Operational Development

Geology and Groundwater

14.4.14 The Development proposes diffuse infiltration of surface water across the Site. There is a potential risk for any pollutants in the surface water runoff, or already existing in the ground such as PFOS, to cause an impact on groundwater quality. The sensitivity of the Principal Aquifer and Secondary Aquifer to pollution is considered high. However, as no concentrated infiltration is proposed anywhere across the Site, any impact is therefore considered negligible. This impact on groundwater quality is considered **not significant**.

14.4.15 As the Site is underlain by Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) bedrock geology, the sensitivity of the local geology to dissolution features in the event of infiltration is high. As no concentrated infiltration is proposed, the impact is considered negligible. This impact on the local geology is considered **not significant**.

14.4.16 The Site is currently in agricultural use, which could present a baseline risk of contamination to the groundwater environment from fertilisers and pesticides though given the 2025 investigation results this was not determined as an unacceptable risk. However, as part of the Development, the Site will no longer be used for agricultural activities, therefore removing the source of potential contamination. The impact is considered to be of negligible magnitude, and thus the overall effect is **not significant**.

Surface Water

14.4.17 The surface water drainage strategy will implement a multi-stage pollution control approach, with source control SUDS and new multi-functional ponds prior to discharge of surface water runoff to the local sewer network and

subsequently to the Ver. The Development would have a negligible impact on surface water quality. The River Ver is considered to have a medium sensitivity to pollution. This impact on the River Ver is considered **not significant**.

Flood Risk

14.4.18 Surface water discharge to the River Ver will be limited to greenfield runoff rates and volumes, mimicking the existing regime, therefore the impact on surface water flooding will be negligible, and the overall effect is considered **not significant**.

14.4.19 Existing overland flow routes will be maintained, with no increase in flood risk to areas outside of the Site. Existing nearby residents are considered to have a high risk of local flooding considering proximity to instances of surface water flooding during intense rainfall events. This impact on flood risk is considered likely to result in **direct, long-term** and **local** effects of **minor beneficial significance**.

Local Water Resources

14.4.20 While the Development will increase overall water demand, this will be limited to Building Regulations Part G requirements for residential, which state dwellings should not consume more than 125 litres of potable water per person per day (125 lpd) though the SADC Local Plan (Regulation 19 update) defines that the higher option of 110lpd from the Building Regulations Part G2 shall be adhered to. Residential dwellings shall therefore not consume more than 100lpd. Non-residential water is not regulated, however SADC specifies within their Strategic Sites Design Masterplan Toolkit (Principle 8.4, 2023, a supporting document to the Local Plan) that all non-residential properties shall achieve maximum BREEAM credits and optimise harvesting and reuse, where appropriate. Despite local water resources having a high sensitivity, Affinity Water have confirmed that the requisite capacity can be supplied to the Site, therefore the Development will have a negligible impact on water resources, given the relatively low water supply required. This impact on local water resources is considered likely to result in **direct, long-term** and **local** effects of **minor adverse significance**.

Water Infrastructure

14.4.21 The Development will require new connections to the potable water supply network. However, Affinity Water has confirmed that the existing infrastructure has sufficient capacity to accommodate the proposed demand. The use of water efficiency measures will further reduce peak demand and overall consumption. As such, the impact on water supply infrastructure is considered to be of negligible magnitude, and the overall effect is **not significant**.

14.4.22 The Development will increase foul water discharge to the existing Thames Water network. Thames Water have indicated that the current foul sewer system is unlikely to have sufficient capacity without reinforcement, which could pose a risk of pollution or Combined Sewer Overflow (CSO) events. As part of the Hemel Garden Communities (HGC) programme, Thames Water will undertake the necessary upgrades to the network to ensure discharges can be accepted. Thames Water also propose to undertake further modelling and potentially reinforcement works to the local network and further infrastructure enhancements at the downstream Wastewater Treatment Works at Maple Lodge. Therefore, the overall effect is **not significant**.

14.4.23 The Development will also increase surface water discharge to the existing Thames Water network which with its current capacity could cause sewer flooding. Thames Water will upgrade the network as part of the HGC programme, mitigating the risk of flooding and ensuring sufficient capacity. Temporary impacts during upgrade works will be managed by Thames Water. Therefore, the overall effect is **not significant**.

14.5 Additional Mitigation / Enhancement and Likely Residual Effects of the Development and their Significance

14.5.1 The following sections highlight additional mitigation measures required to mitigate the significant effects identified in the previous section for both the works and operation phases. Any additional mitigations have been identified and evaluated within the context of the following environmental elements:

- Geology and Groundwater;
- Surface Water;
- Flood Risk; and
- Water Resources.

The Works

Geology and Groundwater

14.5.2 A robust piling method statement, particularly for any piles terminating near or within the groundwater, and risk assessment will be developed to mitigate against creating pathways that could contaminate the groundwater. This will be secured by way of an appropriately worded planning condition.

Surface Water

14.5.3 No significant adverse effects on surface water during the construction period have been identified. Therefore, no further mitigation measures are required.

Flood Risk

14.5.4 No adverse effects on flood risk during the construction period have been identified. Therefore, no further mitigation measures are required.

Local Water Resources

14.5.5 No adverse effects on water resources during the construction period have been identified. Therefore, no further mitigation measures are required.

Water Infrastructure

- 14.5.6 No adverse effects on water infrastructure during the construction period have been identified. Therefore, no further mitigation measures are required.

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Geology and Groundwater

- 14.5.7 No significant adverse effects on geology and hydrogeology associated with the operational phase have been identified. Therefore, no further mitigation measures are required.

Surface Water

- 14.5.8 No significant adverse effects on surface water associated with the operational phase have been identified. Therefore, no further mitigation measures are required though detailed surface water drainage strategies will be submitted for approval at each key phase of the project based on the Sustainable Drainage Strategy (**Appendix 14.2**).

Flood Risk

- 14.5.9 No significant adverse effects on flood risk associated with the operational phase have been identified. Therefore, no further mitigation measures are required though detailed surface water drainage strategies will be submitted for approval at each key phase of the project based on the Sustainable Drainage Strategy (**Appendix 14.2**).

Local Water Resources

Reduction of Water Use and Connection with Drainage Infrastructure

- 14.5.10 The south-east of the UK is subject to serious stress on water resources, which is likely to be aggravated by climate change.
- 14.5.11 Water demand will be reduced at source with the use of efficient water fittings, metering and leak detection. Irrigation requirements will be minimised with the use of native planting not requiring irrigation beyond the establishment period (refer to Landscape and Green & Blue Infrastructure Strategy within the Design and Access Statement for further details on planting strategy). Drip irrigation and efficient scheduling of irrigation will minimise demand for any allotment gardens. Water efficiency measures will be included in the Site Wide Strategies approved via pre-commencement condition and Key Phase Design Codes (at Tier 2 stage of approvals).
- 14.5.12 The Development, as mentioned in the Drainage Strategy (**Appendix 14.2**), includes the use of smart technology to harvest rainwater from stormwater attenuation features without the need for dedicated storage. Harvested water will be used to flush WCs in schools and most commercial buildings, for irrigation of the allotment gardens and to top-up the natural ponds. This technology is based on real-time management of the drainage attenuation

capacity. The system takes a feed from the weather forecast and controls in real-time the retention of water in dry periods for irrigation use or its release in anticipation of a storm to free up the surface water storage capacity.

14.5.13 This smart technology removes the need for some dedicated rainwater harvesting tanks and allows harvesting rainwater in a material, carbon and cost-efficient way. This technology has been successfully implemented in the US and mainland Europe for over a decade and is being applied in the UK to a growing number of projects.

14.5.14 A number of rainwater harvesting and attenuation tanks are proposed. They form part of the attenuation capacity and will harvest rainwater for school and commercial buildings, minimising the risk of contamination by wildlife.

14.5.15 This approach will reduce irrigation water demands for the Development, offsetting the amount of water required to be supplied from the local mains network. While the Development will increase overall water demand, this will be minimised through water efficient fittings, metering, leak detection, drought resistant plant and efficient irrigation practice for the allotment gardens. It is also proposed to harvest rainwater to flush WCs in schools and commercial buildings, irrigate the allotment gardens and supply the natural ponds. This approach is in line with best practice and will achieve local planning requirements. Despite local water resources having a high sensitivity, Affinity Water have confirmed that the requisite capacity can be supplied to the Site, therefore the Development will have a negligible impact on water resources, given the relatively low water supply required. The impact on local water resources following additional mitigations is considered **not significant**.

Water Infrastructure

14.5.16 No adverse effects on water infrastructure during the construction period have been identified. Therefore, no further mitigation measures are required.

Residual Effects

14.5.17 The following sections highlight any residual effects following implementation of the proposed additional mitigation measures, for both the construction and operation phases.

The Works

14.5.18 Potential contamination of the Chalk aquifer will be fully mitigated by the implementation of a robust piling method statement. Any residual impact would therefore be of negligible to minor adverse magnitude. This would therefore result in a **neutral** to **minor adverse** residual effect, considered **not significant**.

14.5.19 Due to the necessary upgrades to water infrastructure there are likely to be residual impacts associated with upgrading the sewers, however these will be managed appropriately by Thames Water, therefore the overall effect will be **not significant**.

14.5.20 No additional mitigation measures are required with respect to flood risk, surface water, and water resources during the construction phase, and therefore the residual effects are as set out in **Section 14.4**.

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14.5.21 No mitigation measures are required with respect to flood risk, surface water, and water resources during the operational phase and therefore the residual effects are as set out in **Section 14.4**.

14.6 Likely Residual Cumulative Effects and their Significance

14.6.1 This section considers the likely significant cumulative effects of the Development on water resources and flood risk when assessed in combination with other relevant developments (“Cumulative Schemes”) that either have planning permission or that are reasonably foreseeable.

14.6.2 The objective is to identify whether effects from several developments which individually might be insignificant could, when considered together, cause a significant indirect and cumulative effects requiring mitigation.

14.6.3 Twenty-three schemes have been identified for potential consideration for this ES, the status and description of each development, as well as a map showing their locations can be found in **ES Volume 2, Chapter 2: EIA Methodology** of this ES.

14.6.4 The Development is part of the wider Hemel Garden Communities (HGC) Programme, which covers the town of Hemel Hempstead, within the borough of Dacorum, as well as proposed growth areas straddling both Dacorum and St Albans district to the north and east of the town and wider movements beyond. It is anticipated that this programme will involve its own infrastructure development plan which will provide further qualification on the cumulative impact of the Development, particularly regarding upgrades to the sewer network by Thames Water.

Assumptions and Approach

14.6.5 A review of the schemes identified in **Table 2.1** of **ES Chapter 2: EIA Methodology** of this ES, including the evaluation of their proximity to the Site, size, and location relative to environmental receptors, has found that the following schemes are relevant to the cumulative effect on the assessment of water resources and flood risk:

- 1: Land at Green Lane, Hemel Hempstead, Hertfordshire (DBC: 21/03793/MOA);
- 2a: Land Between Three Cherry Trees Lane and Cherry Tree Lane, Hemel Hempstead (DBC: 4/02539/16/MOA, SADC: 5/2016/2845);
- 2b: Land Between Three Cherry Trees Lane and Cherry Tree Lane, Hemel Hempstead (SADC: 5/2024/0927);
- 3: Land at Eastman Way, Atlas Copco, Hemel Hempstead Industrial Estate, Swallowdale Lane, Hemel Hempstead, Hertfordshire, HP2 7DU (DBC: 22/03812/MFA);
- 9: Land Between Caravan Site and Watling Street, Park Street, St Albans, Hertfordshire (SADC: 5/2022/0267);
- 13: Plots 1 & 2, Maylands Avenue, Hemel Hempstead, HP2 4FQ (DBC: 21/04556/MFA);
- 19: North Hemel Hempstead Development Site, Hemel Hempstead Road, Redbourn, Hertfordshire (SADC: 5/2025/0645);

- 20: Proposed Solar Farm, Potters Crouch, Hertfordshire (SADC: 5/2025/0733);

14.6.6 The inter-project assessment is quantitative where possible, and relevant data from the corresponding planning applications relating to construction timing where available, however it is noted that information on construction timing is limited in relation to the identified schemes.

14.6.7 Reasonable assumptions have been made, for the purpose of this inter-project assessment, on the policy requirements for developments in the area surrounding the Development, based on the thorough assessment of the local, regional and national policy that has been undertaken as part of this ES.

14.6.8 The assessment considers both the construction phase and the completed and operational phases of the Development.

The Works

14.6.9 It is assumed that all embedded and additional mitigation measures identified in this Chapter will be implemented. Therefore, this section considers only the likely residual effects of the construction phase with other Cumulative Schemes.

Geology and Groundwater

14.6.10 None of the Cumulative Schemes are deemed to be at risk of mobilising contaminants that have resulted from the Buncefield explosion. However, if any foundation piling may have a potential effect on water quality in the chalk or Lambeth group aquifers, it is anticipated that other projects will adopt a similar approach in line with regulations and policy requirements with regards to implementation of best practice procedures, and production of a piling risk assessment to protect the aquifers. Therefore, the cumulative impact on groundwater quality is negligible, and thus the effect is **not significant**.

Surface Water

14.6.11 Construction runoff from multiple sites could increase pollutant loads in the local sewer networks and watercourses. However, assuming all schemes implement best practice CEMP measures, the cumulative impact is considered negligible, and thus the effect is **not significant**.

Flood Risk

14.6.12 Temporary increases in impermeable surfaces and runoff during construction could cumulatively elevate local flood risk. However, it is anticipated that other developments will implement temporary drainage systems and phased construction, therefore the cumulative impact is considered negligible, and thus the effect is **not significant**.

The Completed and Operational Development

14.6.13 It is assumed that all embedded and additional mitigation measures identified in this Chapter will be implemented. Therefore, this section considers only the likely residual effects of the operational phase with other Cumulative Schemes.

Surface Water

14.6.14 Multiple new developments discharging to the River Ver could cumulatively affect water quality and quantity. However, it is assumed that all other developments will adhere to the SuDS hierarchy, use multi-stage SuDS, restrict to policy defined discharge rates and have pollution controls in place, therefore the cumulative impact is considered negligible, and thus the effect is **not significant**.

Flood Risk

14.6.15 Any surface water discharge to the River Ver via the local sewer network during the operational phase may have a potential adverse impact on the fluvial flood levels. Due to the location of the nearby schemes identified, it is envisaged that any surface water discharged during the operational phases (either directly to the River Ver itself or to a nearby watercourse or sewer which eventually discharges into the River Ver) may also have a potential adverse impact of the quality of the watercourse and its risk of flooding. However, as all developments will be required to comply with river discharge legislation in regard to both the quantity and the quality of the surface water runoff discharged into nearby watercourses, the cumulative impact of flood risk is considered negligible, and thus the effect is **not significant**.

Water Resources

14.6.16 The cumulative increase in water demand from all the developments could place pressure on already stressed water resources. However, it is assumed that Affinity Water will not provide confirmation of capacity without carrying out modelling of their network to ensure all developments can be provided. Furthermore, as mentioned previously, Affinity Water are committed to increasing water supply to the area, as per the WRMP (2024), therefore the cumulative impact is considered negligible, and thus the effect is **not significant**.

Water Infrastructure

14.6.17 The cumulative increase in foul and surface water discharges from all the developments will require upgrades to the existing Thames Water sewer networks and wastewater treatment infrastructure. Thames Water has committed to delivering these upgrades as part of its statutory duty and in coordination with the HGC infrastructure delivery plan. While there may be localised impacts during construction, these will be managed through best practice and environmental controls. Therefore, the cumulative impact on water infrastructure is considered to be negligible, and the overall effect is **not significant**.

14.7 Conclusions

14.7.1 This Chapter assesses the likely significant effects of the Development on water resources and flood risk in line with national, regional, and local policy and legislative requirements for the construction and operational phases of the Development. It is supported by a Flood Risk Assessment (FRA) and a Drainage Strategy (**ES Volume 3, Appendix 14.1 and 14.2**) and the Development Specification.

14.7.2 For reference, a summary of the effects outlined within this Chapter has been included in **Table 14..**

Table 14.5: Summary of Effects

Receptor	Impact	Potential Effects (taking account of embedded mitigation)	Additional Mitigation and Monitoring	Residual Effects
During Construction				
Chalk aquifer	Piled foundations causing pollution pathway to Chalk aquifer	Moderate Adverse Significance	Submission and approval of piling method statement and risk assessment to be undertaken to mitigate against creating pathways that could contaminate the groundwater. Mitigation will be secured by an appropriately worded planning condition.	Not Significant
Lambeth Group aquifer	Pile foundations causing pollution pathway to aquifer	Moderate Adverse Significance	Submission and approval of piling method statement and risk assessment to be undertaken to mitigate against creating pathways that could contaminate the groundwater. Mitigation will be secured by an appropriately worded planning condition.	Not Significant
River Ver	Potential risk of surface water pollution, through the construction of the drainage system or accidental runoff or spillage, by sediments, fuels, chemicals, and construction materials. However, these potential impacts will be controlled by the measures taken as part of the CEMP and temporary drainage management.	Not Significant	N/A	Not Significant
Site workers and occupants	Potential risk of local flooding on the Site due to increase in runoff from the Site for construction activity	Not Significant	N/A	Not Significant

Receptor	Impact	Potential Effects (taking account of embedded mitigation)	Additional Mitigation and Monitoring	Residual Effects
Local water resources	Potential for increased water demand associated with construction activities. Mitigated via embedded design and the CEMP	Not Significant	N/A	Not Significant
Water Infrastructure	Construction activities may result in increased demand from existing water supply and drainage infrastructure, which will be mitigated via CEMP	Not Significant	N/A	Not Significant
During Operation				
Chalk aquifer	Potential risk for any pollutants present in the surface water runoff to cause an impact on groundwater quality due to infiltration or mobilise any existing contaminants. No concentrated infiltration is proposed in the Development.	Not Significant	N/A	Not Significant
Lambeth Group aquifer	Potential risk of any pollutants present in the surface water runoff to cause an impact on groundwater quality due to infiltration or mobilise any existing contaminants. Groundwater is deep and no concentrated infiltration is proposed in the Development.	Not Significant	N/A	Not Significant
Chalk aquifer	Risk of dissolution features in sitewide geology for infiltration or surface water runoff. No concentrated infiltration is proposed across the Site.	Not Significant	N/A	Not Significant
Chalk aquifer	Current agricultural use presents risk of contamination from fertilisers and pesticides. The Site will no longer be used for agricultural activities.	Not Significant	N/A	Not Significant
Lambeth Group aquifer	Current agricultural use presents risk of contamination from fertilisers and pesticides. The Site will no longer be used for agricultural activities	Not Significant	N/A	Not Significant
River Ver	Multi-stage pollution control approach will be implemented prior to discharging into River Ver	Not Significant	N/A	Not Significant

Receptor	Impact	Potential Effects (taking account of embedded mitigation)	Additional Mitigation and Monitoring	Residual Effects
River Ver	Surface water discharge to the River Ver will be limited to greenfield runoff rates, mimicking the existing regime.	Not Significant	N/A	Not Significant
Local residents	Existing overland flow routes to be maintained with no increase in flood risk	Minor Beneficial Significance	N/A	Minor Beneficial Significance
Local water resources	Increase in water demand, against the current baseline. Affinity Water have confirmed sufficient capacity to supply the Development.	Minor Adverse Significance	Water demand will be minimised through water efficient fittings, metering, leak detection, drought resistant plant and efficient irrigation practice for the allotment gardens and supply for the natural ponds. It is also proposed to harvest rainwater to irrigate the productive gardens.	Not Significant
Potable water infrastructure	New connections will be required to the potable water supply network. Affinity Water have confirmed capacity to accommodate proposed demand.	Not Significant	Use of water efficiency and water reuse measures will reduce peak demand and overall consumption.	Not Significant
Foul water sewer infrastructure	The Development will result in an increased demand into the existing foul water sewer network. As part of HGC programme Thames Water will undertake necessary upgrades to the network.	Not Significant	N/A	Not Significant
Surface water sewer infrastructure	The Development will result in an increased demand into the existing surface water sewer network. Thames Water will upgrade network, in particular given wider HGC programme.	Not Significant	N/A	Not Significant

14.7.3 An integrated surface water drainage strategy is proposed, including various SuDS components (ponds and wetlands, bioretention raingardens, swales, tree pits). They will attenuate and treat surface water runoff, limiting any discharge into the Ver to greenfield runoff rates and volumes. The sustainable drainage strategy has been closely integrated with the landscape and biodiversity strategies to achieve multiple benefits, including enhancing amenity and biodiversity. Therefore, no adverse effects on the aquifers or the River Ver are predicted. The introduction of multi-functional ponds will improve water quality and enhance biodiversity.

- 14.7.4 The sustainable surface water drainage strategy has been developed based on the illustrative masterplan but the principles of it have been included in the parameter plans and Development Specification for approvals at this point. The detail of the drainage strategy would be approved at Tier 2 (Approvals at Each Key Stage) and would be secured at outline stage by condition.
- 14.7.5 The potential impact of mobilisation of existing contaminants in the soil will be mitigated by the fact that no concentrated infiltration is proposed anywhere across the Development. This forms part of the detail of the drainage strategy which would be approved at Tier 2 and secured at outline stage by condition.
- 14.7.6 Additional mitigations include water demand reduction through water efficient fittings, metering, leak detection, drought resistant plant and efficient irrigation practice for the allotment gardens. It is also proposed to harvest rainwater to flush WCs in schools and commercial buildings, irrigate the productive gardens. This approach is in line with best practice and will achieve local planning requirements, as well as Affinity Water having confirmed sufficient capacity to supply the Development