UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks and adjoining land, Bedford

Water Framework Directive Assessment

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UNIVERSAL DESTINATIONS & EXPERIENCES

CONTENTS

TABLES

FIGURES

APPENDICES

APPENDIX A

PROPOSED DEVELOPMENT

APPENDIX B

WFD WATER BODY DATA

APPENDIX C

PHOTOGRAPHIC RECORDS

APPENDIX D

ENVIRONMENT AGENCY ENGAGEMENT RESPONSE

APPENDIX E

MITIGATION MEASURES COMPARISON TABLES

1 INTRODUCTION

1.1 BACKGROUND

1.1.1. WSP UK Ltd, hereafter referred to as WSP, has been commissioned by Universal Destinations & Experiences ("the Client") to undertake a Water Framework Directive (WFD) Screening and Scoping assessment for Project 320 in support of a planning application, hereafter referred to as the 'Proposed Development'.

1.1.2. The Proposed Development interacts with two WFD surface water bodies, the Elstow Brook (US Shortstown) (GB105033038050) and the Harrowden Brook (GB105033038010) and one WFD lake water body, Stewartby Lake water body (GB30539450). Thus, each activity associated with the Proposed Development, such as watercourse crossings, new bridges, outfalls, and channel relocation/realignments, will be assessed against the biological, physico-chemical, and hydromorphological quality elements that comprise the WFD. There are no groundwater water bodies located within the redline boundary of the Proposed Development. Hence, impacts to groundwater bodies have been excluded from the WFD assessment.

1.1.3. This report presents the initial WFD screening and scoping stage outcomes. Based on current designs, proposed mitigation measures have been made at this stage to support the detailed design. The mitigation measures mentioned in this report are set out in the Environmental Statement (as shown in **Appendix E**) and secured by the **Environmental Controls** (**Document Reference 1.16.0**).

1.1.4. The purpose of this WFD assessment is to evaluate the potential operational impacts arising due to the Proposed Development on the Elstow Brook (US Shortstown) (GB105033038050) and Harrowden Brook (GB105033038010) surface water WFD water bodies. The potential construction impacts are also evaluated due to the potential effects they may have upon the status of WFD quality elements.

1.2 STUDY AREA

1.2.1. The study area has been defined as the Red Line Boundary (RLB) of the Proposed Development plus a buffer of 1 km (**see Appendix A**). The Study Area has been determined based on professional judgement and experience and encompasses a distance in which potential impacts may be realised.

1.2.2. The Proposed Development and associated study area is located adjacent to the settlement of Kempston Hardwick, to the south west of Bedford (Bedfordshire, England). The Proposed Development is divided into a number of zones based on the type of development planned, and the study area is located within the Elstow Brook WFD Water body catchment area. The Study Area and drawings of the Proposed Development are provided in Appendix A. The Proposed Development could potentially impact the following WFD water bodies (further information is provided in Appendix B):

- Elstow Brook (US Shortstown) WFD surface water body (GB105033038050), Harrowden Brook WFD surface water body (GB105033038010) and Stewartby Lake water body (GB30539450) lie within the Great Ouse Bedford Operational Catchment, the Ouse Upper and Bedford Management Catchment and the Anglian River Basin District.

1.3 PROPOSED DEVELOPMENT

1.3.1. The Proposed Development consists of several zones; the Lake Zone, the East Gateway Zone, the Core Zone, and the West Gateway Zone. The following headings describe the activities that will occur as a result of development in each zone.

LAKE ZONE

- The existing water filled Kempston Hardwick Clay pits and Artificial Lake within Lake Zone (a full description of these features is provided in Chapter 12 of the Environmental Impact Assessment; and are also shown in Appendix B) will be enhanced to provide surface water attenuation for the Core and Lake Zone. The lake will be modified to act as a primary treatment stage with overflow from the lake cascading into the northern clay pits before continuing via overflow structures to the northern most pit. The existing clay pits will be modified to provide additional habitat and water harvesting for re-use of water on-site.
- As the pits are approximately 3 to 6 metres lower than the nearby outfall at Elstow Brook, pumping will be required. The water from the northern most lake and drainage from the surrounding Lake Zone will be pumped and returned towards the southern part of the Lake Zone to a newly constructed process water treatment plant, which will recycle water for re-use within the proposed development site.
- At the water treatment plant, lake discharge will enter a valve complex and either;
    - Discharge via a further rising main to the process water treatment plant and provide process water for the Proposed Development or at times when the water treatment plant does not require inflows; or
    - Discharge to the Kempston Hardwick Clay Pits (North) - Artificial lake or Elstow Brook at a rate not to exceed the greenfield QBar run-off rate for the contributing catchment.
    - Discharge to the Elstow Brook will be maintained at a minimum equivalent greenfield rate for the 50ha of the Lake Zone currently draining directly to the Elstow Brook for all return period events to ensure the watercourse is not starved of flows.
- The valve compound telemetry will be configured to make sure flows are released to the correct receptor (Elstow Brook or the Artificial lake) so as not increase surface water flood risk on or offsite.
- Lake Zone includes isolated will include works to the existing artificial lake where existing surface water drainage connections are located, which will be upgraded to accommodate increased flow rates. However, the lake is not designed for attenuation storage, thus protecting the existing water level fluctuation and maintaining the habitat zone located along the bank near to waters-edge.
- Existing overflow from Kempston and Hardwick Pits (South) lake into Elstow Brook, via Kempston and Hardwick Pits (North) - Artificial Lake, will be maintained.

EAST GATEWAY ZONE

- Construction and operation of a new outfall structure with associated flow controls, attenuation and pollution prevention measures into the tributary of the Harrowden Brook. Flows will be restricted to the Greenfield QBar rate, with attenuation storage provided for events up to and including the 1 in 100-year plus 40% climate change annual probability event within the zone. Attenuation is to be provided on-site via attenuation basins supplemented by upstream SuDS devices where appropriate for pollution prevention.

CORE ZONE

- Core Zone has an existing ordinary watercourse (a watercourse not classified as a main river, thus not under the management responsibility of the Environment Agency, but the Lead Local Flood Authority) passing through the centre of the site in a southeast to northwest direction. To allow for the Proposed Development, this watercourse is proposed to be relocated along the eastern boundary of the Site. The watercourse relocation includes 10 m of riparian protection zone set back from the top of bank. The riparian zone, which forms a transition between the watercourse and surrounding land, has important benefits, including habitat and habitat connectivity, strengthening riverbanks, diffusing pollution mitigation, reducing risk of flooding, and amenity/recreation. Existing vegetation in the riparian zone will be protected, and if disturbed (during construction) will be replaced with similar or improved landscape vegetation. Proposed permanent constructed features (e.g. roads, car parking, hard pavements, buildings, barriers, walls and fences), will not be located within 10 m of the top of bank.
- The newly developed Core Zone will drain to the diverted watercourse. This watercourse will then discharge into the Kempston Hardwick Clay Pits (North) - artificial lake, in Lake Zone, via an existing connection beneath Manor Road.
- Coronation Pit, which is located outside of the Red Line Boundary, to the east of the Core Zone is a former clay pit which will be restored by Waste Recycling Group as part of an application seeking the deletion of condition and variations of a previous restoration scheme (22/2007), originally granted in 2007. The long-term objective of this scheme is for surface water collection and natural regeneration. This currently does not drain to an offsite network. However, once surface water is collected over a period of 25 years and a final water level of 32.4m AOD is reached, water will overflow into the Core Zone watercourse routing towards the Lake Zone, adding to the overflow from the lake to the Lake Zone Clay Pits. It will subsequently be available for use as process water, with excess flows discharged to the Elstow Brook (US Shortstown) WFD water body, which is designated under the Water Framework Directive.

WEST GATEWAY ZONE

- West Gateway Zone includes adjustment in surface drainage pathways, and changes in land parcel drainage, outfalls and local flow controls, attenuation and pollution prevention pathways;
- Installation and operation of a road crossing located over Elstow Brook will consist of a clear span bridge set 600mm higher than the 1 in 100 year plus climate change modelled river level (See Environmental Statement Volume 1 Chapter 12 – Water Resources and Appendix 12.3 – Drainage Strategy (Volume 3) Annex G); and,
- The proposed bridge over Elstow Brook will be designed such that abutments are set back 10m from the top of bank with detailed design informed by riparian habitat, bank stability and ecological importance to reduce impacts.

CONSTRUCTION ACTIVITIES

Based on the Proposed Development outlined above, the following construction activities pertinent to the surface water environment would occur:

- Enabling Works including reprofiling of ground levels, and site clearance;
- Construction of surface water drainage system and associated outfalls. This includes development of the Kempston Hardwick Clay Pits (north) and Coronation Pits overflow into Lake Zone SuDS features;
- Relocation and enhancement of the Core Zone Watercourse. This is an Ordinary Internal Drainage Board (IDB) watercourse within the wider Elstow Brook (US Shortstown) catchment;
- Construction of a new clear span bridge structure over Elstow Brook (US Shortstown); and,
- Construction of a water valve compound and water processing and collection plant.

OPERATION ACTIVITIES

Based on the Proposed Development outlined above, the following operation activities pertinent to the surface water environment will occur:

- Operation of the new surface water drainage system and associated outfalls;
- Operation of the relocated ordinary watercourse within the Core Zone and Elstow Brook (US Shortstown Catchment)
- Operation of the new clear span bridge structure on the Elstow Brook (US Shortstown)
- Operation of new pumping system between Lake Zone and Elstow Brook. This system would supply water to onsite processes with excess water being discharged to the Elstow Brook (US Shortstown).
- Supply of potable water to the Proposed Development. Anglian water has identified that potable water could be supplied from two possible locations at Manton Lane or Ampthill Reservoir. These locations are yet to be confirmed by Anglian Water and subject to further investigation and design development by the undertaker. The water supply solutions along with all other Utility supplies, falls outside of the Study Area. The installation of water supply to the Site and any upgrades to existing infrastructure deemed necessary by Anglian Water to existing Anglian Water infrastructure can be delivered by Anglian Water using Anglian Water's statutory powers and permitted development rights or, where applicable, another regulated provider's statutory power, to the extent permitted development rights are not available planning permission will be sought. These works will be subject to the necessary ecological and where necessary WFD Assessment.

1.4 CONSULTATION

1.4.1. The detailed design of proposed works to Elstow Brook and Core Zone watercourse will be progressed by the relevant undertaker (those parties carrying out works pursuant to which planning permission would be granted or through permitted development rights) in consultation with the IDB and Environment Agency, and subject to Land Drainage Consent. The Environment Agency will be consulted under the Water Framework Directive to deliver on the commitments made under Environmental Statement Volume 1 Chapter 12 Water Resources Section 12.6.2 WFD Consideration. Engagement with the Environment Agency has been undertaken to inform the preparation of this document. Environment Agency comments are included as **Appendix D**. **Appendix E** confirms that the measures recommended by the Environment Agency have been incorporated into the Proposed Development**.**

1.5 BACKGROUND TO THE WFD

1.5.1. An impact assessment of any works/modifications to water bodies in the UK is required under The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 2017 Regulations) (SI 2017/407) and The Groundwater (Water Framework Directive) (England) Direction 2016.

1.5.2. The WFD assessment shall also comply with relevant CEN/ISO Standards, as stated within Annex V of the WFD legislation. Relevant standards are listed within Section 2 (Methodology).

1.5.3. The primary aim of the WFD is to improve/maintain the Ecological Status/Potential of all water bodies and to prevent deterioration in status of the water bodies and their associated WFD quality elements. Ecological Status/Potential is determined by a suite of biological, physico-chemical and hydromorphological quality elements. This WFD Screening and Scoping assessment aims to establish the baseline conditions, evaluate potential impacts of the Proposed Development and assess compliance against WFD objectives.

1.5.4. The overarching objective of the WFD is for surface water bodies in Europe to attain overall 'Good Ecological Status' (GES) or 'Good Ecological Potential' (GEP). GES refers to situations where the ecological characteristics show only a slight deviation from natural/near natural conditions. In such a situation, the biological, chemical, physico-chemical, and hydromorphological conditions are associated with limited or no human pressure, and the waterbody is not designated artificial or heavily modified. Artificial and heavily modified water bodies have a target to achieve GEP, which recognises their important uses, whilst ensuring the quality elements are protected as far as possible.

1.5.5. The WFD sets several objectives including:

- Prevent deterioration in status for water bodies;
- Aim to achieve good biological and good surface water chemical status in water bodies. For those water bodies that did not achieve GES by 2015, alternative objectives have been set by the Environment Agency where water bodies have been allocated a target date for compliance of either 2021 or 2027. The target date set for each water body takes into consideration measures that are practicably achievable for achieving GES or GEP; and,
- For water bodies that are designated as artificial or heavily modified, the objective is to achieve GEP. Those artificial/heavily modified water bodies that did not achieve GEP by 2015 need to achieve compliance by 2021 or 2027;
- Where is it considered either technically infeasible or disproportionately expensive to achieve GES or GEP by 2021 or 2027, alternative objectives have been set for the water body, such as a target to achieve Moderate status;
- Comply with objectives and standards for protected areas, where relevant; and,
- Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances

1.5.6. Where a new modification, change in activity or change to a structure on a water body is proposed, a WFD assessment needs to consider whether the proposed alteration would cause deterioration in the Ecological Status or Potential of any water body. For heavily modified/artificial water bodies, proposed new modifications, or changes to activities or structures, may also result in WFD mitigation measures or actions, set to help a water body achieve GES/GEP, being ineffective. This could result in the water body failing to meet GES/GEP. Where a WFD assessment concludes that deterioration or failure to achieve GES/GEP may occur, an Article 4.7 assessment would be required, which makes provision for deterioration of status provided that certain stringent conditions are met.

2 METHODOLOGY

2.1 DATA COLLECTION

DESK STUDY

2.1.1. A desk-based study was carried out to inform the WFD assessment, reviewing the existing information on the Proposed Development and study area to develop a baseline for the catchments, watercourses and surrounding areas. The following data sources were used for the desk study:

- Contemporary OS maps (Ordnance Survey, 2025);
- Geology maps (British Geological Survey, 2025);
- Soil maps (Soilscapes 2025);
- Map of invasive non-native plants (National Biodiversity Atlas (NBN, 2025));
- Current and recent historic aerial photography (Google Earth);
- WFD status and objectives from Catchment Data Explorer (Environment Agency, 2025a).
- Environment Agency Ecology and Fish Data Explorer (Environment Agency, 2025b);
- Environment Agency Water Quality Data (Environment Agency, 2025c);
- Environment Agency LiDAR data (Environment Agency, 2025d);
- Flood Estimation Handbook (FEH 2025)
- Hydrometric gauge data (Shoothill, 2025);
- Historic Aerial Imagery (Historic England, 2025);
- Historical maps (National Library of Scotland, 2025);
- Nature on the Map for designated areas, habitats and species, and landscape data (Department for Environment, Food and Rural Affairs (DEFRA, 2025); and
- National River Flow Archive (UK Centre for Ecology and Hydrology [UKCEH], 2025)
- Topographic Survey of existing site (40SEVEN, 2023)

2.2 FIELD SURVEY

GEOMORPHOLOGY WALKOVER SURVEY

2.2.1. A geomorphological walkover survey was conducted on 12 and 13 February 2025 to gain an understanding of baseline conditions of the Elstow Brook and Harrowden Brook WFD Surface water bodies.

2.2.2. In addition to field notes, maps of the study area were annotated to capture the key geomorphological features and prevailing fluvial processes. Weather conditions leading up to and during the survey were mild with limited rainfall and water levels were observed as being within bank and within the seasonal range.

2.2.3. The survey covered approximately 1.8 km of the Elstow Brook within the RLB of the Proposed Development (0.6 km in the West Gateway Zone and 1.2 km in the Lake Zone). The survey area also encompassed 1.25 km of the Ordinary Watercourse within the Core Zone of Proposed Development. Walkover surveys were also undertaken along approximately 0.25 km of the Harrowden Brook tributary and 0.35 km of the main thread of the Harrowden Brook.

- Photographs and observations from the site visit are provided in Appendix C. The survey methodology was adapted from Thorne (1998) and included data on:
- Valley form;

- Land use;
- Floodplain and riparian zone;
- Channel geometry;
- Bank material and structure;
- Bed material and forms;
- Erosion features (sediment sources);
- Depositional forms (sediment sinks); and,
- Artificial features and modifications.

2.2.4. The geomorphological investigation is used to inform the assessment of the hydromorphological quality elements. The assessment also adheres to the following European Committee for Standardization (CEN, French: Comité Européen de Normalisation) standards on hydromorphology, as required by Annex V of the WFD legislation:

- CEN EN 14614:2020 Water Quality – Guidance standard for assessing the hydromorphological features of rivers.
- CEN EN 15843:2010 Water Quality – Guidance standard on determining the degree of modification of river hydromorphology.

AQUATIC ECOLOGY SURVEY

2.2.5. Aquatic habitat scoping assessments were carried out by a team of suitably experienced and qualified aquatic ecologists on 04 April 2024, to gain an understanding of the baseline aquatic ecological conditions of watercourses present within the Red Line Boundary (RLB) and the potential for these watercourses to support legally protected or otherwise notable aquatic species (Appendix 6.2: Aquatic Habitat Scoping Assessment Report (Volume 3)).

2.2.6. Following the initial aquatic habitat scoping assessment, fish, aquatic macroinvertebrate, and macrophyte surveys were carried out on both Elstow Brook and the Core Zone watercourse. Full details of the methodology of these surveys are outlined in Appendix 6.8: Macrophyte Survey Report (Volume 3) and Appendix 6.17: Aquatic Ecology Survey Report (Volume 3) respectively

Fish Surveys

2.2.7. Channel profiles, steep banks, and bankside vegetation cover constrained access to the watercourse such that an electric fishing survey to inform the baseline was not possible. To gain a better understanding of the fish populations of these watercourses, water samples were taken at strategic locations within the watercourses and analysed for fish environmental DNA (e-DNA) against an extensive reference library.

2.2.8. e-DNA samples were collected from locations within Elstow Brook and the Core Zone watercourse, by suitably qualified and experienced aquatic ecologists on 26 November 2024. The methodology employed is consistent with the BS EN 17805:2023. Water quality. Sampling, capture and preservation of environmental DNA from water.

Aquatic Macroinvertebrate Sampling

2.2.9. Aquatic macroinvertebrate surveys were undertaken on 30 May 2024 (spring) and 26 November 2024 (autumn) on Elstow Brook and the Core Zone watercourse.

2.2.10. Aquatic macroinvertebrate samples were collected using the standard three-minute kick sampling of all in channel habitats in proportion to their occurrence at the Core Zone watercourse. However, due to steep banks, access to Elstow Brook was constrained. Therefore, the aquatic macroinvertebrate samples were collected using the Environment Agency's standard three-minute sweep sampling methodology. These surveys were carried out using a standard sample net (1 mm mesh) with a one-minute timed manual search following the Environment Agency (2017) procedure. Both sampling methodologies conform to BS EN ISO 10870:2012 Water Quality – Guidelines for the selection of sampling methods and devices for benthic macroinvertebrates in fresh waters.

Macrophyte Survey

2.2.11. Macrophyte surveys were carried out along 100m stretches of Elstow Brook and the Core Zone watercourse in August 2024 by a team of suitably experienced and qualified aquatic ecologists. These surveys were conducted to establish an accurate composition of the macrophyte communities.

2.2.12. Macrophyte surveys were carried out using the Water Framework Directive UK Technical Advisory Group's methodology for assessing macrophytes in rivers (WFD UKTAG, 2014). This conforms with industry standard methodology BS EN ISO 14184:2003 Water quality – Guidance standard for the surveying of aquatic macrophytes in running waters.

ENVIRONMENT AGENCY RECORDS

2.2.13. Fish, aquatic macroinvertebrate, and macrophyte survey data for Elstow Brook were obtained from the Environment Agency's Ecology and Fish Data Explorer (Environment Agency, 2025b).

2.2.14. Water quality data was downloaded from the Environment Agency Water Quality Archive (Environment Agency, 2025c).

2.3 WFD ASSESSMENT PROCESS

2.3.1. The assessment methodology used here is based on guidance provided by the Planning Inspectorate Advice Note 18: The Water Framework Directive (Planning Inspectorate, 2017). This note does not prescribe a format for the WFD assessment process, however Environment Agency guidance (2023) suggests a three-stage assessment process: screening, scoping, and impact assessment. Although the Proposed Development is not a Nationally Significant Infrastructure Project (for which Advice Note 18 was primarily developed), the core content of Advice Note 18 is still relevant as it outlines best-practice approaches to WFD assessments, including:

- Evidence requirements
- Assessment structure
- Types of impacts
- Mitigation and enhancement
- Consultation

2.3.2. The Environment Agency have reviewed the assessment and agree that the approach taken is appropriate, as set out in the comments provided in **Appendix C**.

STAGE 1: SCREENING

2.3.3. Screening is required to identify activities which have the potential to result in the deterioration of a water body or failure to comply with the objectives of that water body. Screening also serves to identify those proposed activities (e.g. proposed construction methods) that are required to be taken through to scoping, and those activities that are unlikely to result in the deterioration of the water body.

STAGE 2: SCOPING

2.3.4. Scoping is required to identify risks to receptors from a project's activities, based on the relevant water bodies and their water quality elements (including information on status, objectives, and the parameters for each water body). Potential risks to hydromorphology, biology (habitats and fish), water quality, WFD protected areas, and invasive non-native species should be assessed. The scoping stage identifies which elements need to be carried forward to Stage 3.

STAGE 3: IMPACT ASSESSMENT

2.3.5. Where assessment has been considered necessary at the scoping stage, an impact assessment is carried out for each receptor identified as being at risk in terms of potential deterioration or non-compliance with its specific objectives as set out in the River Basin Management Plan as a result of the project. Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, the project would need to be assessed in the context of Article 4(7) of the WFD.

2.3.6. Whilst the assessment of potential construction impacts is not required as part of a WFD assessment, these impacts may have detrimental impacts on the WFD quality elements and construction periods may sometimes be of long duration (i.e. several years). Thus, construction impacts are considered, along with mitigation to reduce or eliminate potential impacts on the water body and WFD quality elements.

LIMITATIONS AND ASSUMPTIONS

2.3.7. Observations recorded during the site visit represent a snapshot of that moment in time; thus, the watercourses have been characterised and assessed based on the prevailing conditions at the time of the site visits. The watercourses may exhibit additional characteristics during, for example, extreme flow events or prolonged drought; however, these were not captured during the survey.

2.3.8. Data recorded during the field survey reflects the weeks and months leading up to the survey: the watercourses may exhibit other morphological phenomena during particularly high flow events or following an extreme flow event. Thus, in the absence of time series data for the watercourses, inferences have been made based upon field data and a desk study exercise.

2.3.9. No consultation with the Environment Agency had been undertaken at the time of writing this assessment, given the confidentiality of the Proposed Development. Hence, no specific features or points of interest pertaining to the WFD quality elements have been provided and were not necessarily observed during the site walkover surveys.

2.3.10. Ecological survey data is typically valid for 18 months unless otherwise specified, for example, if conditions are likely to change more quickly due to ecological processes or anticipated changes in management. Where possible, the most up to date aquatic ecology data from surveys conducted in 2024 have been used to inform this assessment. Where recent data are unavailable, this assessment has used desk study data gathered from surveys conducted over 18 months ago. However, as the aquatic habitats surveyed are unlikely to have experienced significant changes in condition, desk study data older than this are considered to still be valid for the purposes of informing appropriate mitigation measures.

3 BASELINE CONDITIONS

3.1 WFD STATUS

3.1.1. The WFD water bodies within the study area are:

- Elstow Brook (US Shortstown) (GB105033038050);
- Harrowden Brook (GB105033038010); and
- Stewartby Lake (GB30539450)

3.1.2. The full WFD data for these water bodies is presented in Appendix B but each are summarised below.

3.1.3. WFD status classifications provide the basis for describing the state of the existing environmental conditions and are defined below in **Table 3-1**.

Table 3-1 – WFD Status classification descriptions

WFD Status Classification	Meaning	Description
High	Near-natural condition	No or very minor human impact. The water body is in excellent ecological and chemical condition, with biological, chemical, and hydromorphological elements near undisturbed levels.
Good	Slightly altered from natural condition	Ecosystems show only minor changes from natural conditions. Supports healthy aquatic life and meets key chemical standards.
Moderate	Moderately altered from natural condition	Some deterioration in biological quality. Human impact is more evident, and chemical standards may be marginally exceeded.
Poor	Heavily altered from natural condition	Significant damage to aquatic life. Biological and chemical elements deviate substantially from natural conditions.
Bad	Severely altered from natural condition	Severe impact on biological communities. Fails to meet most or all WFD standards.

3.1.4. Elstow Brook (US Shortstown) is a river water body and is currently performing at Moderate Overall Water Body status comprising Moderate Ecological Status and a Chemical Status that 'Does not Require Assessment'. The water body is heavily modified and the reasons for not achieving Good include:

- Diffuse sources of pollution from contaminated land and poor soil management, (impacting macrophytes and phytobenthos);

- Physical modification as result of land drainage (impacting macrophytes, phytobenthos and fish); and,
- Awaiting recovery due to impacts from Polybrominated diphenyl ethers (PBDE). The water body is targeted to achieve Good status by 2063.

3.1.5. Harrowden Brook is a river water body and is currently performing at Bad Overall Water Body status; comprising Bad Ecological Status and a Chemical Status that 'Does not Require Assessment'. The water body is heavily modified and the reasons for not achieving Good include:

- Unknown sources pending investigation, awaiting recovery due to impacts from Polybrominated diphenyl ethers (PBDE);
- Point sources of phosphate pollution from urban development;
- Diffuse sources of pollution resulting from poor nutrient management and poor livestock management, leading to impacts to macrophytes, phytobenthos, and phosphate quality elements; and
- Physical modification of the watercourse of land drainage has also impacted the macrophyte and phytobenthos quality element for the watercourse. The water body is targeted to achieve Good status by 2063.

3.1.6. Although screened out of further assessment, Stewartby Lake occurs within the Study Area, thus baseline information is provided here for context. Stewartby Lake is a lacustrine water body and is currently performing at Moderate Overall Water Body Status; comprising Moderate Ecological Status and a Chemical Status that "'Does not Require Assessment'. The water body is Artificial and the reasons for not achieving Good include:

- Diffuse sources of pollution from agricultural and rural land management (impacting Total Nitrogen);
- Continuous point source sewage discharges from the water industry (impacting Total Nitrogen, Phosphorus and Phytoplankton);
- Awaiting recovery from Polybrominated diphenyl ethers (PBDE); and
- An investigation is pending to understand the sources of Perfluorooctane Sulphonate (PFOS).

3.2 CATCHMENT CHARACTERISTICS

3.2.1. The Elstow Brook (US Shortstown) WFD river catchment has become progressively more suburbanised through time and is designated as a heavily modified waterbody. The catchment was also heavily industrialised throughout the 19th and 20th centuries, as the region was a nationally important centre for the manufacturing of bricks. The local topography, hydrology and land use reflect the deindustrialisation of the catchment, with disused clay quarries and take-pits being repurposed into lakes (Stewartby and Brogborough WFD lake water bodies) throughout the 20th century. Resultantly, the hydrology of the catchment has been modified.

3.2.2. Elstow Brook rises from agricultural land located to the south west of Bedford, flowing in a north-eastern direction towards Bedford, through the settlements of Marston Moretaine, Lower Shelton, Lidlington, Stewartby and Kempston Hardwick. The catchment elevation ranges from approximately 27 to 134 metres Above Ordnance Datum (mAOD).

3.2.3. Elstow Brook is partially culverted throughout the catchment, where the watercourse is intersected by the A421 carriageway and two railway lines. The Elstow Brook (US Shortstown) reach flows into the Elstow Brook (DS Shortstown) water body at Harrowden, at the confluence of the Elstow Brook (US Shortstown) and Harrowden Brook WFD water bodies. The Elstow Brook (DS Shortstown), which is also designated as a heavily modified waterbody, flows in a north eastern direction towards Bedford city centre, before discharge to the River Ouse.

3.2.4. The catchment of Harrowden Brook has also become more suburbanised through time, and this land cover proportion will only increase as the new settlement of Wixams continues to be constructed in the northern half of the catchment. This will result in a residential belt stretching west from the A6 to the B530. Historically, the catchment was heavily industrial, containing the Royal Ordnance Factory (ROF) Elstow, however this has now been replaced with the Wixams settlement.

3.2.5. Harrowden Brook rises from agricultural land located around the village of Houghton Conquest, and the ditch network combines along the B530 at Quest Bungalow, from where the watercourse flows north along the western side of the road. The catchment elevation ranges from 24 to 126 mAOD.

3.2.6. Harrowden Brook is contained in multiple culverts, notably where it passes east under the B530 and A6, as well as newer structures within the Wixams development. The waterbody is designated as a heavily modified waterbody.

CATCHMENT GEOLOGY AND SOILS

Bedrock Geology

3.2.7. To the south of the Elstow and Harrowden catchments, where elevations are greatest along a southwest to northeast ridge, the bedrock geology comprises Stewartby Member and Weymouth Member. The Stewartby Member comprises predominantly pale to medium grey, commonly smooth, variably silty, calcareous, poorly fossiliferous, blocky mudstones formed during the Callovian Age (circa 165.3 and 161.5 million years ago).

3.2.8. Conversely the Weymouth Member comprises Predominantly pale grey, blocky, smooth, calcareous mudstones, generally only slightly silty formed during the Oxfordian Age; 161.5 and 154.8 million years ago.

3.2.9. The majority of the Elstow Brook (US Shortstown), including all of Stewartby Lake, and Harrowden Brook catchments, including and north of Stewartby are underlain by Peterborough Member; a brownish-grey, fissile mudstone, rich in organics. This formation was previously known as Lower Oxford Clay. This formation was formed during Callovial Age.

Superficial Geology

3.2.10. The Elstow Brook and Harrowden Brook catchments superficial geology comprises Head deposits; a poorly sorted and poorly stratified angular rock debris and/or clayey hillwash. It consists of a heterogenous mixture of gravel, sand and clay and with localised lenses of silt, clay or peat and organic material.

3.2.11. The geology within the localities of the contemporary channels of both the Elstow Brook and Harrowden Brook are underlain by alluvium; unconsolidated clay, silt, sand and gravel.

3.2.12. Undifferenced river terrace deposits are noted within the Elstow Brook (US Shortstown), consisting of sand and gravel, locally with lenses of silt and clay.

Soils

3.2.13. The Elstow Brook (US Shortstown) and Harrowden Brook catchment areas comprises a range of soils (Soilscapes 2025). At the highest catchment elevations in the south, the soils are generally freely draining slightly acid sandy soils. These soils drain to groundwater and are vulnerable to leaching of nitrate and pesticides to groundwater. These are highly erodible under arable and vegetable crops where sloping.

3.2.14. Slightly acid loamy and clayey soils with impeded drainage are also present to the east of the Harrowden Brook catchment. These soils have slightly impeded drainage that flow into the stream network. These soils are at risk of fine sediment erosion, where land is farmed.

3.2.15. Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils are present at the base of the hillslopes, to the south west of the Elstow Brook catchment. These soils have impeded drainage and drain to the stream network. These soils are associated with overland flow risks, from compacted or poached fields. Organic slurry, dirty water, fertiliser, pathogens and fine sediment can all move in suspension or solution with overland flow or drain water.

3.2.16. The majority of both catchments is underlain by lime-rich loamy and clayey soils with impeded drainage to the stream network. These sediments are at risk of sheet erosion of fine sediment into stream network.

3.2.17. Historic landfill sites are present throughout the Elstow Brook (US Shortstown) water body catchment, and upstream of the Proposed Development redline boundary. These locations are historic clay pits. Elstow Brook (US Shortstown) flows from Stewartby Lake along the south-eastern perimeter of the Stewartby active landfill site.

CATCHMENT HYDROLOGY

3.2.18. The Environment Agency Hydrology Data explorer does not show any river level or flow gauges within the Elstow or Harrowden Brook catchments. The National River Flow Archive (NRFA) or Shoothill Gaugemap also include no gauges within the Elstow or Harrowden Brook catchments. The closest gauge to the Proposed Development is the NRFA gauge on the River Ouse in Bedford. This is over 3 km north of the northern tip of the boundary of the Proposed Development and is not hydrologically connected to the Proposed Development site so is not representative of conditions within the Elstow or Harrowden Brooks.

3.2.19. The Flood Estimation Handbook (UKCEHb, 2025) estimates that a hydrological catchment within the Harrowden Brook at TL 05700 46450 has a base flow index of 0.31 and receives and annual average rainfall of 570 mm.

HISTORICAL CHANNEL CHANGE

3.2.20. Historical mapping of the Elstow Brook and Harrowden Brook catchments was reviewed using aerial imagery Google Earth (2002-2025), historic aerial imagery (Historic England, 2025) and historical maps accessed from the National Library of Scotland (2025). This study included the complete lengths of the Elstow Brook (US Shortstown) and Harrowden Brook Water bodies.

3.2.21. Earliest available Ordnance Survey (OS) mapping from 1885 shows a land use within the catchment is markedly different from today. The catchment of both water bodies was rural, with only small settlements present, however both rail lines which serve Bedford were present.

3.2.22. In 1885 Stewartby lake did not exist, the Elstow Brook flowed north east in a straight section of open channel towards Green Lane. With the exception of this straight section of channel in the upstream of the catchment, the planform of the Elstow Brook was mostly sinuous, with notable tight necked meanders present upstream of the Marston Vale Railway culvert and downstream of this within the boundary of the Proposed Development. Aerial imagery from 1946 shows a similar situation, with the exception that the previously aforementioned meanders appear to have been cut through, leaving oxbow lakes. In terms of land use, the clay pit which now forms Stewartby lake had begun to be excavated.

3.2.23. By 1960 a new alignment of the Elstow Brook had been created around this pit (Figure 3-1), which was later filled with water creating the lake later in this decade. Further downstream sections of the watercourse appear to have been culverted under the site of Pillinge / Stewartby Brick Works. Between 1960 and today, the river has been further realigned in multiple places. Upstream of Broadmead Road, the channel appears to have been diverted to the east around a clay pit, which today appears to be a Landfill with the land now rising 30 m above the surrounding catchment. Downstream of the Marston Vale Railway culvert, the channel now arcs sharply to the north and is straight and parallel with this rail line, rather than having a sinuous planform through the fields to the east (shown Figure 3-1.). The water body is now culverted under the A421 dual carriageway downstream of which the planform is straighter as it passes retail parks suggesting potential further realignment. The brick industry has declined, and the clay pits left behind by this industry have been flooded, leaving several large lakes.

3.2.24. The Harrowden Brook has also seen a history of channel realignment and a rise of industry through its catchment. Most of the significant changes in alignment have been focussed around the site of ROF Elstow, between the A6 and the Midland Mainline Railway. The Brook was culverted and realigned around this site between the 1940 and 1960s. Google Earth historic imagery also shows that the channel was later realigned (and diverted away from the WFD water body line) as part of the ongoing construction of the Wixams new settlement in 2016. This new realignment also sees the Brook become confined in box culverts under road crossings.

Figure 3-1 – Historic Change in the Upper Elstow Brook Catchment

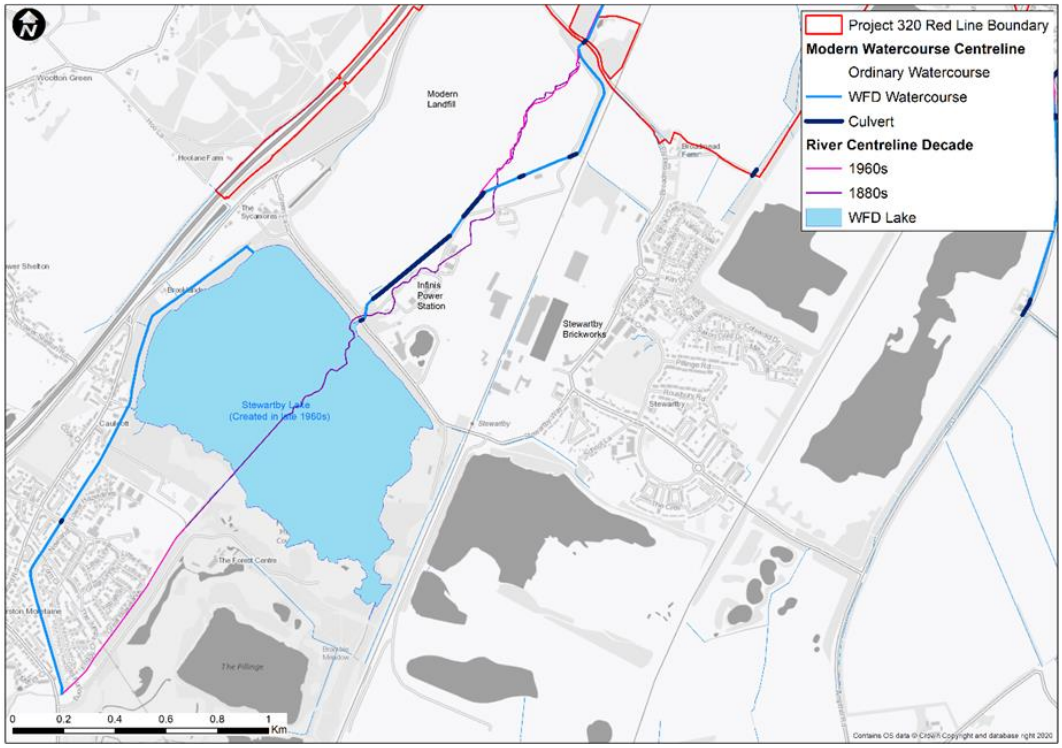
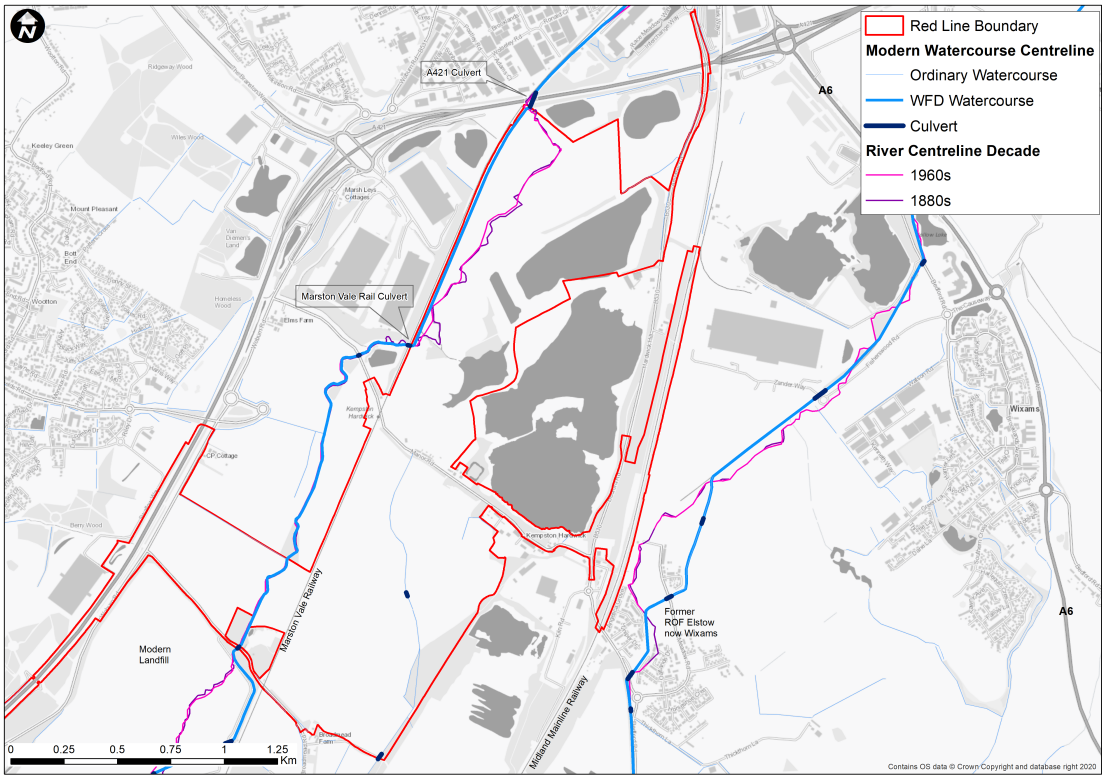


Figure 3-2 - Historic change in the Elstow and Harrowden Brook catchments. All Figures have been reproduced with the permission of the National Library of Scotland (2025)



3.3 BASELINE CHARACTERISTICS AGAINST WFD SURFACE WATER QUALITY ELEMENTS

BIOLOGICAL QUALITY ELEMENTS

Fish

Elstow Brook

3.3.1. Fish are currently assessed as being of Poor status in the Elstow Brook (US Shortstown) water body. The reason for the fish element not achieving Good status is listed as physical modification from land drainage.

3.3.2. No information from the last 10 years was available for fish communities within Elstow Brook, in the boundary of the Proposed Development. However, a search of the Environment Agency's Ecology and Fish Data Explorer returned data from Environment Agency catch depletion electric fishing surveys in Elstow Brook, approximately 1.2 km downstream of the proposed crossing point of Elstow Brook (NGR TL 02424 45035), on 24 March 2011.

3.3.3. A total of seven fish species were recorded in the survey, with the most abundant species recorded being spined loach *Cobitis taenia*. The detailed results of this survey are reported below in Table 3-2.

Table 3-2 - Environment Agency fish survey data from Elstow Brook (NGR TL 02424 45035) conducted on 24/03/2011

Common Name	Latin Name	Number of Individuals
Spined loach*	*Cobitis taenia*	32
European bullhead*	*Cottus gobio*	28
Stone loach	*Barbatula barbatula*	21
Roach	*Rutilus rutilus*	10
Gudgeon	*Gobio gobio*	5
Perch	*Perca fluviatilis*	2
Roach x common bream hybrid	*Rutilus rutilus x Abramis brama*	1
	Total	99

***Note: Species marked with an * are legally protected species**

3.3.4. Spined loach and European bullhead Cottus gobio are both listed under Annex II of The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (HMSO, 2019), where they are a designated feature of a Special Area of Conservation (SAC).

3.3.5. No invasive non-native species (INNS) nor any other fish species of conservation interest were recorded in the survey.

3.3.6. The e-DNA of 10 species of fish were detected in the sample taken from Elstow Brook in November 2024. The species detected and the relative proportion of the sequences found in the sample are detailed in Table 3-3.

3.3.7. The e-DNA of one species of conservation interest, European eel *Anguilla anguilla*, was recorded in the sample. European eel is a species of conservation interest and is listed under Section 41 of the NERC Act 2006 as a species of principal importance (SPI). The species is also listed on the IUCN Red List of Threatened Species as being critically endangered. Additionally, the movement and safe passage of European eel is protected under The Eels (England and Wales) Regulations 2009.

Table 3-3 - Fish species identified in the e-DNA sample from Elstow Brook obtained in November 2024

Common Name	Latin Name	Percentage Composition (%)
Perch	*Perca fluviatilis*	85.66
-	*Cottus* sp.	4.47
Roach	*Rutilus rutilus*	3.96
Chub	*Squalius cephalus*	1.64
Common dace	*Leuciscus leuciscus*	1.55
Stone loach	*Barbatula barbatula*	1.37
Northern pike	*Esox lucius*	0.59
European eel*	*Anguilla anguilla*	0.32
Minnow	*Phoxinus phoxinus*	0.25
Common bream	*Abramis brama*	0.19

Note: Species marked with an * are species of conservation interest.

3.3.8. For full fish e-DNA sampling results refer to Appendix 6.17: Aquatic Ecology Survey Report (Volume 3).

Harrowden Brook

3.3.9. The fish element is not currently assessed within the Harrowden Brook water body. Additionally, there are no proposed direct works to the brook which is located outside of the Site.

3.3.10. A search of the Environment Agency's Ecology and Fish Data Explorer returned no fish survey data records from Harrowden Brook within 2 km of the Proposed Development RLB within the last 10 years.

Invertebrates

Elstow Brook

3.3.11. Invertebrates are currently assessed as being of Good status in the Elstow Brook (US Shortstown) water body.

3.3.12. A search of the Environment Agency's Ecology and Fish Data Explorer returned data from Environment Agency aquatic macroinvertebrate surveys on Elstow Brook (NGR TL 02489 45099), approximately 1.3 km downstream of the proposed crossing of Elstow Brook.

3.3.13. One INNS, the New Zealand mud snail *Potamopyrgus antipodarum*, was recorded in both spring and autumn 2014. No legally protected or otherwise notable species were recorded in either survey.

3.3.14. Aquatic macroinvertebrate sampling was conducted in Elstow Brook in spring and autumn 2024. No INNS nor any legally protected species were recorded in either sample. However, one species of note under Community Conservation Index scoring was recorded. One individual of the beetle *Anacaena bipustulata* was identified in the autumn sample in the Elstow Brook. This beetle has a conservation score of 7 and as such is Notable (scare in Great Britain but not of Red Data Book Status).

3.3.15. For full aquatic macroinvertebrate sampling results refer to Appendix 6.17: Aquatic Ecology Survey Report (Volume 3).

Harrowden Brook

3.3.16. Invertebrates are currently assessed as being of Good status in the Harrowden Brook water body.

3.3.17. A search of the Environment Agency's Ecology and Fish Data Explorer returned no aquatic macroinvertebrate survey data records from Harrowden Brook within 2 km of the Proposed Development RLB within the last 10 years.

Macrophytes

Elstow Brook

3.3.18. Macrophytes are currently assessed as being of Poor status in the Elstow Brook (US Shortstown) water body. The reasons for the macrophytes and phytobenthos combined element not achieving Good status are physical modification from land drainage, diffuse source pollution from poor soil management and contaminated land.

3.3.19. A search of the Environment Agency's Ecology and Fish Data Explorer did not return any records of Environment Agency macrophyte surveys conducted within the last 10 years in Elstow Brook within the Proposed Development Boundary.

3.3.20. No macrophyte species were recorded during the macrophyte survey of Elstow Brook conducted in August 2024.

3.3.21. Within the site boundary, Elstow Brook was recorded as being a heavily re-shaped and homogenous channel, with steep banks. It was noted that management of the watercourse had been carried out along the full length of the watercourses within the Site boundary, prior to the macrophyte survey, in which the riparian vegetation, including common reed Phragmites australis, had been cut back and/or removed.

3.3.22. During the macrophyte survey, dried specimens of an invasive waterweed Elodea sp., were noted within the spoil, likely from the management of the watercourse, that has been discarded on the bank top.

Harrowden Brook

3.3.23. The macrophytes and phytobenthos combined element is currently assessed as being of Bad status in the Harrowden Brook water body. The macrophytes sub element is assessed as being of Moderate status, whilst the phytobenthos sub element is currently assessed as being of Bas status. The reasons for the macrophytes and phytobenthos combined element not achieving Good status are physical modification from land drainage, diffuse source pollution from poor livestock management and poor nutrient management.

3.3.24. A search of the Environment Agency's Ecology and Fish Data Explorer returned no macrophyte survey data records from Harrowden Brook within 2 km of the Proposed Development RLB within the last 10 years.

Phytobenthos (diatoms)

Elstow Brook

3.3.25. The phytobenthos sub element is currently assessed as being of Moderate in the Elstow Brook (US Shortstown) water body. The reasons for the macrophytes and phytobenthos combined element not achieving Good status are physical modification from land drainage, diffuse source pollution from poor soil management and contaminated land.

3.3.26. A search of the Environment Agency's Ecology and Fish Data Explorer did not return any records of Environment Agency phytobenthos surveys conducted within the last 10 years in Elstow Brook within the Proposed Development Boundary.

Harrowden Brook

3.3.27. The phytobenthos sub element is currently assessed as being of Bad status. The reasons for the macrophytes and phytobenthos combined element not achieving Good status are physical modification from land drainage, diffuse source pollution from poor livestock management and poor nutrient management.

3.3.28. A search of the Environment Agency's Ecology and Fish Data Explorer returned no phytobenthos survey data records from Harrowden Brook within 2 km of the Proposed Development RLB within the last 10 years.

3.4 PHYSICO-CHEMICAL QUALITY ELEMENTS

THERMAL CONDITIONS

3.4.1. Temperature is currently assessed as being of High status in the Elstow Brook (US Shortstown) water body.

3.4.2. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between January and December 2019, water temperature within Elstow Brook (US Shortstown) water body at the Elstow Brook Outflow Stewartby Lake monitoring location (NGR TL 01100 42699), varied seasonally, ranging between 4.80 °C and 20.30 °C.

3.4.3. Temperature is currently assessed as being of High status in the Harrowden Brook water body.

3.4.4. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between April and December 2019, water temperature within Harrowden Brook water body at the Elstow Brook Tributary Ouse Harrowden Brook monitoring location (NGR TL 06720 47255), varied seasonally, ranging between 3.00 °C and 20.40 °C.

OXYGENATION CONDITIONS

3.4.5. Dissolved oxygen is currently assessed as being of High status in the Elstow Brook (US Shortstown) water body.

3.4.6. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between January and December 2019, the dissolved oxygen concentration within Elstow Brook (US Shortstown) water body at the Elstow Brook Outflow Stewartby Lake monitoring location (NGR TL 01100 42699), ranged between 7.42 mg/l and 15.70 mg/l.

3.4.7. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between January and December 2019, the percentage of dissolved oxygen saturation within Elstow Brook (US Shortstown) water body at the Elstow Brook Outflow Stewartby Lake monitoring location (NGR TL 01100 42699), ranged between 75.7 % and 130.4 %.

3.4.8. Dissolved oxygen is currently assessed as being of High status in the Harrowden Brook water body.

3.4.9. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between April and December 2019, the dissolved oxygen concentration within Harrowden Brook water body at the Elstow Brook Tributary Ouse Harrowden Brook monitoring location (NGR TL 06720 47255), ranged between 6.34 mg/l and 14.60 mg/l.

3.4.10. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between April and December 2019, the percentage of dissolved oxygen saturation within Harrowden Brook water body at the Elstow Brook Tributary Ouse Harrowden Brook monitoring location (NGR TL 06720 47255), ranged between 59.5 % and 123.6 %.

SALINITY

3.4.11. No information regarding salinity was available for Elstow Brook (US Shortstown) water body.

3.4.12. No information regarding salinity was available for Harrowden Brook water body.

ACIDIFICATION STATUS

3.4.13. pH is currently assessed as being of High status in the Elstow Brook (US Shortstown) water body.

3.4.14. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between January and December 2019, the pH within Elstow Brook (US Shortstown) water body at the Elstow Brook Outflow Stewartby Lake monitoring location (NGR TL 01100 42699), ranged between 7.85 and 8.86.

3.4.15. pH is currently assessed as being of High status in the Harrowden Brook water body.

3.4.16. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between April and December 2019, the pH within Harrowden Brook water body at the Elstow Brook Tributary Ouse Harrowden Brook monitoring location (NGR TL 06720 47255), ranged between 7.78 and 8.12.

NUTRIENT CONDITIONS

3.4.17. Phosphate is currently assessed as being of Good status in the Elstow Brook (US Shortstown) water body.

3.4.18. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between January and December 2019, the orthophosphate concentration within Elstow Brook (US Shortstown) water body at the Elstow Brook Outflow Stewartby Lake monitoring location (NGR TL 01100 42699), ranged between 0.01 mg/l and 0.18 mg/l.

3.4.19. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between January and December 2019, the phosphorous concentration within Elstow Brook (US Shortstown) water body at the Elstow Brook Outflow Stewartby Lake monitoring location (NGR TL 01100 42699), ranged between 0.026 mg/l and 0.210 mg/l.

3.4.20. Phosphate is currently assessed as being of Good status in the Harrowden Brook water body.

3.4.21. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between April and December 2019, the orthophosphate concentration within Harrowden Brook water body at the Elstow Brook Tributary Ouse Harrowden Brook monitoring location (NGR TL 06720 47255), ranged between 0.014 mg/l and 0.133 mg/l.

3.4.22. Ammonia is currently assessed as being of High status in the Elstow Brook (US Shortstown) water body.

3.4.23. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between January and December 2019, the ammonia concentration within Elstow Brook (US Shortstown) water body at the Elstow Brook Outflow Stewartby Lake monitoring location (NGR TL 01100 42699), ranged between 0.03 mg/l and 0.19 mg/l.

3.4.24. Ammonia is currently assessed as being of High status in the Harrowden Brook water body.

3.4.25. Data obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) show that, between April and December 2019, the ammonia concentration within Harrowden Brook water body at the Elstow Brook Tributary Ouse Harrowden Brook monitoring location (NGR TL 06720 47255), ranged between 0.03 mg/l and 0.18 mg/l.

SPECIFIC POLLUTANTS

3.4.26. Specific pollutants are currently assessed as being of High status in the Elstow Brook (US Shortstown) water body.

3.4.27. No data was obtained from the Environment Agency Water Quality Archive (Environment Agency, 2025c) with respect to specific pollutants in the Elstow Brook (US Shortstown) water body.

3.4.28. Specific pollutants are not currently assessed in the Harrowden Brook water body.

INVASIVE NON-NATIVE SPECIES

3.4.29. No invasive non-native species were identified during the WFD walkover survey. One species of non-native invasive plants, which may impact the geomorphological characteristics of the Elstow Brook (US Shortstown), was noted within the wider study area, during the desk-based element of the assessment; Japanese Knotweed *Fallopia japonica*. The exact extent of coverage and location of the plant is unknown.

3.4.30. During the macrophyte survey, dried specimens of an invasive waterweed *Elodea* sp., were noted within the spoil, likely from the management of the watercourse, that has been discarded on the bank top.

3.5 HYDROMORPHOLOGY QUALITY ELEMENTS

QUANTITY AND DYNAMICS OF FLOW

3.5.1. The flows within the surveyed reaches were typical for the time of year and within bank. The reaches were structurally starved resulting in flows that were homogenously throttling, rapid and mostly smooth. Glides and runs were the other flow sequences observed throughout the study area. Where field drains and ditches flowed into the Elstow Brook, small marginal backwaters were observed, however these were localised to the watercourse confluences. The flows occupied the entre width of the channel. Variations in flow types were observed downstream of in-channel structures (i.e., pipe culverts, bridge abutments), and where the flow is constricted by bank slumping deposits, such as downstream of the Marston Vale Rail culvert.

CONNECTION TO GROUNDWATER

3.5.2. The Elstow Brook flows through a catchment with a poor connection to groundwater. The geology of the catchment comprises Kellaways Formation and Oxford Clays which are essentially productive and have no ground water. These clays confine underlying aquifers, Kellaways Sand near based yields small quantities of groundwater that is often brackish. Numerous water wells are present through the catchment, ranging from 0 – 30 m in depth.

RIVER CONTINUITY

3.5.3. Elstow Brook was observed as being disconnected from its floodplain across many of the surveyed reaches. The watercourse is heavily managed by the IDB, and subsequently likely to be disconnected from the floodplain. The Elstow Brook is laterally confined as a result of the riparian zone management and reprofiling of the channel, into a trapezoidal shape. The Elstow Brook is intercepted by single span bridge with abutments that are engaged in the flows.

3.5.4. Elstow Brook is culverted within a dual pipe culvert, to flow beneath the Marston Vale Railway Line. The dropped outlet of the culvert may present a barrier to fish migration with potential impacts for sediment continuity through the structure.

3.5.5. At the farthest point downstream of the Elstow Brook, within the Proposed Development's red line boundary, the watercourse flows through a large, approximately 4 m diameter pipe culvert, under the A421 dual carriageway. The culvert spans approximately 55 m in length.

RIVER WIDTH AND DEPTH VARIATION

3.5.6. Elstow Brook has a homogenous cross section throughout the surveyed locations. The absence of structural elements, riparian vegetation, and watercourse confluences has resulted in a watercourse with a largely homogenous width and depth, exhibiting little variation in its long profile. The riparian management of the watercourse has resulted in the trapezoidal cross section for much of the surveyed reaches. No deep pools, coarse bed features or coarse bed material were observed during the survey. The bank profiles were stable with localised areas of active bank toe erosion present.

3.5.7. Elstow Brook width was estimated to be around 1.5 – 2.5 m with a depth of between 0.2 – 0.5 m. No depositional or erosional features were observed and the fast flows through the channel suggested the reaches are transporting sediment, flows and debris, with few locations for storage or erosion. Remnant features of bank scars were observed however these were stable and heavily vegetated. These are likely to result from the management of the bank profiles not active fluvial processes.

STRUCTURE AND SUBSTRATE OF THE RIVER BED

3.5.8. The flows were turbid throughout the study area, suggesting a high suspended solids. These turbid flows obscured the channel bed, making observations of bed structure and substrate difficult. The bed of the Elstow Brook is likely to comprise fine sands, silts and clays. Fine silts, clays and earth are likely to be washed into the channel from the bank tops and surrounding floodplain, which is mostly tilled for agricultural use.

3.5.9. No significant coarse materials (i.e., gravels, cobbles, boulders) nor depositional features were observed throughout the study area. Artificial bed materials (i.e., bricks and building rubble) were observed and were likely sourced from the bank tops. The study area features large deposits of filled and made ground, reflecting the historical industrial land use. In some localised areas, these materials, appear to have been washed or slumped into the bed.

STRUCTURE OF RIPARIAN ZONE

3.5.10. The Elstow Brook was largely devoid of a riparian buffer throughout the study areas. The watercourse is regularly cleared of vegetation by the IDB to ensure the longitudinal continuity of flows. As a result, the bank faces are mostly scrapped of vegetation and feature only grasses and sedges. Some smaller stands of trees and scrub were observed however these are fragmented and not engaged with normal flows. Where present, the trees on the bank tops lack diversity in age and species. Limited aquatic vegetation was noted during the walkover survey.

3.6 CHEMICAL QUALITY ELEMENTS

PRIORITY SUBSTANCES

3.6.1. Priority substances classification were not required for the Elstow Brook (US Shortstown) or Harrowden Brook water bodies in 2022 by the Environment Agency. However, the last measurement (in 2019) shows that both water bodies held Good status for all Priority Substances.

PRIORITY HAZARDOUS SUBSTANCES

3.6.2. Priority Hazardous substances classification were not required for the Elstow Brook (US Shortstown) water body in 2022 by the Environment Agency. However, the last measurement (in 2019) shows that both water bodies held Good status for all Priority Hazardous Substances.

Harrowden Brook did not require assessment for Priority Hazardous Substance in 2022. However, the last measurement (in 2019) was Fail. The assessment failed for Perfluorooctane sulphonate (PFOS), and Polybrominated diphenyl ethers (PBDE).

4 WFD SCREENING AND SCOPING

4.1 STAGE 1: WFD SCREENING

4.1.1. The purpose of the WFD screening stage is to identify the extent to which the Proposed Development may affect WFD water bodies that lie within the Study Area of the Site.

SCREENING OF WATER BODIES

4.1.2. The Elstow Brook is split into two WFD water bodies, either side of Shortstown, before it confluences with the Great Ouse. The Elstow Brook (US Shortstown) (GB105033038050) WFD water body, the upstream of the two water bodies will be directly and indirectly impacted by the Proposed Development due to a range of activities. Therefore, this WFD water body is screened in for further assessment

4.1.3. The downstream water body is the Elstow Brook (DS Shortstown) (GB105033038110) WFD water body. This is 2.175 km downstream of the study area and is therefore considered sufficiently far downstream to avoid impacts of the Proposed Development and is therefore screened out of further assessment.

4.1.4. The activities associated with the Proposed Development will directly impact a tributary of the Harrowden Brook, within the Harrowden Brook WFD water body (GB105033038010). Therefore, the Harrowden Brook water body is screened in for further assessment.

4.1.5. The upstream water body is the Stewartby Lake (GB30539450) WFD water body. There will be no direct impacts from the Proposed Development on this water body and it is considered sufficiently far upstream to avoid indirect impacts of the Proposed Development hence, Stewartby Lake is therefore screened out of further assessment.

4.1.6. There are no groundwater bodies that underlie the study area, therefore assessment of impacts to groundwater is screened out of further assessment.

SCREENING OF PROTECTED AREAS

4.1.7. The Protected areas within the Elstow Brook catchment are:

- Nitrates Directive (Great Ouse NVZ (S391); and,
- Huntingdon River Gravels (G144)

4.1.8. Given the nature of the Proposed Development there is not anticipated to be significant amounts of fertiliser use during operation. As such the Proposed Development will not impact on Nitrate values within the catchment. Nor will there be an impact on groundwater given the lack of groundwater body underlying the site. Protected areas are therefore screened out of further assessment.

SCREENING OF ACTIVITIES

4.1.9. The Proposed Development comprises the key activities listed below, and the screening process is presented in Section 4.2.

4.1.10. Those activities screened in for further assessment in are carried forward to Stage 2: Scoping.

4.1.11. Those activities screened out of further assessment are not considered further.

Table 4-1 – WFD screening of activities

Activity	Description	Potential Impacts	Screening Outcome
Surface Water Bodies: Elstow Brook (US Shortstown) (GB105033038050), Harrowden Brook (GBGB105033038010)			
Enabling Works including reprofiling of ground levels, and site clearance	Works to re-profile the ground to accommodate the Proposed Development will include topsoil stripping and site clearance excavations, movement and storing of soils, dewatering of excavations, temporary drainage systems, and storage of material. By their very nature, enabling works facilitate construction works and thus would not occur during the operational phase once the Proposed Development is constructed. Therefore, no operational impacts are anticipated as part of the enabling works and thus they will have no long-lasting effects on water bodies during the operation	**Construction** Potential construction phase impacts are: ▪ Noise and vibration. ▪ Fine sediment and pollution risk. ▪ Alteration to flows, water quantity and/or quality. ▪ Loss of morphological diversity and habitat (including aquatic, riparian and floodplain); ▪ Alteration to shading; and, ▪ Alteration to the riparian zone	**In – Construction** **Out – Operation**
Surface water Drainage system and associated outfalls. This includes development of the Kempston Hardwick Clay Pits (north) and Coronation pits into SuDS features	The Coronation Pits are located upstream of the Site. There is currently no drainage from Coronation Pits into the Core Zone. Under the proposed pit restoration proposal, surface water will overflow via a proposed weir to an existing outfall watercourse located on the western side of the pits, however this is not expected to occur for 25 years when water levels within the restored Pits reach a level of 32.4m AOD. Topographic survey shows that existing watercourse falls from 31.97 m AOD to 30.49m AOD, and it is assumed that the relocated watercourse will maintain this gradient. Additionally, no control structures are proposed to be included in the design of the relocated ordinary watercourse, thus it is unlikely that surface water runoff from the Core Zone would back up into the Coronation Pits. The Kempston Hardwick Clay Pits (North) – are disused pits. The pits are in the north eastern area of the site and are not currently	**Construction** ▪ Noise and vibration; ▪ Fine sediment and pollution risk; ▪ Temporary loss of biological, longitudinal and lateral connectivity; ▪ Alteration to natural bed and/or bank; and ▪ Transfer and establishment of protected and/or invasive non-native species (INNS). **Operation** ▪ Fine sediment and pollution risk; ▪ Alteration to flows, water quantity and/or quality; ▪ Alteration to natural bed and/or bank;	**In – Construction** **In – Operation**

Activity	Description	Potential Impacts	Screening Outcome
	inter-connected or have points of discharge or any constructed overflows. They were emptied in 2018 but have refilled with overland flow as they are topographic low points below the existing agricultural fields to the north. The pits will be restored and enhanced, and reconnected to the Artificial lake, serving as strategic SUDS storing runoff volumes from both Core and Lakes District impermeable drained areas, resulting in a significant improvement of an existing low quality feature. In addition to the works on the pits, there will be works required on the of the Elstow Brook and on watercourses hydrologically connected to the Elstow Brook and Harrowden Brook to install drainage outfalls from newly formed SuDS. Works adjacent to and on the bank tops have the potential to impact the quality elements of the receiving water body. During operation, operational discharges from the SuDs Ponds would discharge to the water bodies via the newly constructed outfalls.	▪ Loss of morphological diversity and habitat (including aquatic, riparian and floodplain); and ▪ Transfer and establishment of protected and/or invasive non-native species (INNS).	
Supply of Potable Water to the Proposed Development via Manton Lane or Ampthill Reservoir	Manton Lane reservoir lies within the Ouse (Newport Pagnell to Roxton) Water Body WFD catchment, and Ampthill reservoir is located within the Harrowden Brook Catchment. Proposed water supply connections from the Anglian Water-operated reservoirs to the Proposed Development would involve underground pipeline infrastructure with a new connection point to the Proposed Development network. Increased abstraction from the reservoir or upstream sources to meet the new development's demand may alter the natural flow regime downstream. This can lead to reduced flow volumes and seasonal flow variability. Reduced flow and water level fluctuations can lead to habitat degradation in both the reservoir and downstream water bodies. This may result in a shift in biological communities.	**Operation** ▪ Alteration to flows, water quantity and/or quality. ▪ Alteration to natural bed and/or bank; and ▪ Loss of morphological diversity and habitat (including aquatic, riparian and floodplain). Based on Anglian Water identifying possible potable water supplies which are yet to be determined by further investigation and design development, the water supply solution, along with all other utility provisions, falls outside the Study Area. New water supply solutions will be subject to Anglian Water (or the relevant supplier) progressing their own procurement process,	**Construction – Out** **Operation – Out**

Activity	Description	Potential Impacts	Screening Outcome
		independent of the Proposed Development via statutory powers and permitted development. These processes will be subject to the necessary ecological assessments and, where required, a Water Framework Directive (WFD) Assessment undertaken by the relevant supplier. As the supply solution is yet to be confirmed by the undertaker and has a separate procurement process, potential effects on WFD waterbodies as a result of supplies from Manton Lane and Ampthill Reservoir are scoped out of the assessment.	
Surface Water Bodies: Elstow Brook (US Shortstown) (GB105033038050)			
Relocation, realignment, and enhancement of the Core Zone Watercourse. This is an IDB watercourse within the wider Elstow Brook (US Shortstown) catchment	As part of the channel realignment of the Core Zone watercourse, there will be a requirement for in-water working and either temporary flow diversion or over pumping/fluming to maintain downstream flows until flows can be released into the new channel alignment. During operation, poorly designed channel realignment/relocation can lead to increases in bed and bank erosion and destabilisation of hydromorphological features and processes which can have subsequent impacts on physico-chemical quality through increased turbidity and/or changes in flows with subsequent impacts of ecological receptors.	**Construction**: ▪ Noise and vibration; ▪ Fine sediment and pollution risk; ▪ Temporary loss of biological, longitudinal and lateral connectivity; ▪ Alteration to natural bed and/or bank; and ▪ Transfer and establishment of protected and/or invasive non-native species (INNS). **Operation** ▪ Fine sediment and pollution risk; ▪ Alteration to flows, water quantity and/or quality; ▪ Alteration to natural bed and/or bank; and ▪ Loss of morphological diversity and habitat (including aquatic, riparian and floodplain);	**In – Construction** **In – Operation**

Activity	Description	Potential Impacts	Screening Outcome
New clear span bridge structure on the Elstow Brook (US Shortstown)	Works will be required adjacent to the channel to construct the bridge deck (over the channel), and abutments within the floodplain. There may also be a requirement to dewater as a result of excavations for the bridge abutments. During operation, the bridge design indicates that the height of the structure is set to the 1 in 100yr event plus climate change and as such would not interact with flows below this return period.	**Construction**: ▪ Noise and vibration; ▪ Fine sediment and pollution risk; ▪ Alteration to flows, water quantity and/or quality; ▪ Alteration to natural bed and/or bank; ▪ Transfer and establishment of protected and/or invasive non-native species (INNS); and, ▪ Alteration to the riparian zone **Operation:** ▪ Fine sediment and pollution risk; ▪ Alteration to flows, water quantity and/or quality; ▪ Alteration to natural bed and/or bank; ▪ Alteration to the riparian zone	**In – Construction** **In – Operation**

4.2 STAGE 2: WFD SCOPING

4.2.1. The WFD scoping stage defines the level of detail required for further WFD assessment. This includes identifying risks to the WFD receptors from the Proposed Development's activities. The scoping stage assessment is presented in Table 4-2.

4.2.2. The WFD scoping stage identifies potential risks to receptors due to the Proposed Development and determines if a detailed WFD impact assessment is required. Where no residual risk is identified with mitigation in place, no further impact assessment is required.

4.2.3. Where there is potential for a residual impact at the water body scale, after proposed mitigation is in place, that may result in deterioration or prevent the WFD water body from achieving its status objectives, the assessment would be carried forward to a Stage 3 Impact Assessment.

4.2.4. For the purposes of the WFD assessment and to reduce repetition, a 'mitigation measure code' (i.e. a code that refers to each mitigation measure) has been generated for the proposed measures, which should be considered to minimise any impact of the Proposed Development.

4.2.5. The mitigation codes generated are prefixed with 'M' (for mitigation) and classified by receptor and a sequential number. The receptor abbreviations are:

- BD – Biodiversity
- WQ – Water Quality
- G – Geomorphology

4.2.6. Mitigation measures are written in full on first mention, and only the mitigation code used subsequently to reduce repetition.

Table 4-2 - WFD scoping of the Proposed Development's construction activities against WFD quality elements for the Elstow Brook (US Shortstown) (GB105033038050) and Harrowden Brook (GB105033038010) water bodies

WFD Quality Element Potentially Impacted	Potential Impact	Proposed Mitigation	Likely Adverse Residual Risk (Y/N)
Hydromorphological Quality Elements			
▪ Quantity and dynamics of flow ▪ River continuity ▪ River depth and width variation ▪ Structure and substrate of the riverbed ▪ Structure of the riparian zone	**Fine sediment and pollution risk** During enabling works, activities such as excavation and removal of topsoil to facilitate construction and plant movements over exposed more friable surfaces could lead to a temporary increase in sediment entering watercourses. Increased sediment loading could impact the following: ▪ Dynamics of the flow by increasing the potential of bed scour or sediment deposition. This could directly impact the river depth and width. Flow velocity was observed as low in the Elstow Brook on the day of the walkover survey. Further sediment deposition would likely occur were these conditions present during construction. ▪ The structure and substrate of the riverbed would also be impacted as existing bed sediment and features become smothered. ▪ Excess sediment that is not transported during higher flows can also reduce channel cross-sectional area, which may have an adverse impact upon flood risk. Given the size of the construction area and the size of the water bodies, any impact is expected to be temporary, localised and negligible at the water body scale.	**Fine sediment and pollution risk** **M-BD-1**: The riparian zone will be reinstated to replicate baseline conditions as far as practicable. **M-WQ-1**: Construction plant and equipment will be sufficiently maintained to limit environmental impacts. Wheel washes and road sweepers will also be utilised. **M-WQ-2**: Where reasonably practicable, static plant and machinery and soil storage areas will be located away from sensitive boundaries or receptors. Furthermore, the mixing and handling of materials will also be undertaken in designated areas and away from surface water drains. **M-WQ-3**: Best practice guidance and mitigation measures would be implemented to manage the risk of accidental spillages on site and potential conveyance to nearby water bodies via surface run off. Furthermore, the use of cut off drains, fabric silt fences, swales, stockpiles and bunds would be utilised to prevent uncontrolled release of sediment. **M-WQ-4**: Temporary drainage may be required, and various measures would be considered to prevent pollution and sediment loading. **M-WQ-5**: Water quality monitoring during works. With the relevant mitigation measures in place and the temporary nature of the construction activities, no deterioration is anticipated at the water body scale.	N
▪ River Continuity	**Temporary loss of lateral and longitudinal connectivity** There will be a temporary loss of lateral and longitudinal connectivity related to the diversion of the Core Zone watercourse which discharges to the Elstow Brook. There would be a temporary interruption to flows as the new watercourse diversion is created. Therefore, any loss in lateral and longitudinal connectivity of the core zone watercourse would be temporary and localised. In addition to the Core Zone watercourse realignment, there would be a temporary loss of lateral connectivity in relation to the new Bridge Structure on the Elstow Brook. However, this would be temporary over the construction period and only over the localised bridge footprint.	**M-G-2**: Construction phasing for the Core Zone watercourse relocation/realignment will take into account the creation of the new channel prior to diverting the existing. Therefore, the new channel should be created and then once complete flows should be diverted from the existing channel to the new channel. This will limit the time flow, and lateral and longitudinal connectivity will be impacted. With mitigation and due to the temporary nature of the construction activities, no deterioration is anticipated at the water body scale	N
▪ Quantity and dynamics of flow ▪ River continuity ▪ River depth and width variation ▪ Structure and substrate of the riverbed ▪ Structure of the riparian zone	**Alteration to flows, water quantity and/or quality, Loss of morphological diversity and habitat (including aquatic riparian and floodplain), Alteration of riparian zone** The construction of a new drainage system requires new outfalls to be constructed directly on the Elstow Brook, and on a number of hydrologically connected watercourses. A new outfall would also be required of a Tributary of the Harrowden Brook which directly discharges to the Harrowden Brook. Construction of new outfalls have the potential to impact the following: ▪ Excavation of the channel bank may impact the structure and substrate of the bed directly, and have a direct impact on the localised hydraulics, or indirectly through the release of sediment into the channel which alters hydraulics due to new areas of deposition.	**Alteration to flows, water quantity and/or quality, Loss of morphological diversity and habitat (including aquatic riparian and floodplain), Alteration of riparian zone** **M-BD-1:** See above **M-BD-2**: Proposed outfall construction should be carried out in such a way to keep the watercourse in as natural condition as possible. Specifically, the outfall construction should not have negative impacts on the following: ecology, habitat, flow dynamics and erosion. To do such, no part of the new structure should extend into the existing cross section, affecting flow conveyance and localised hydraulics. **M-BD-3**: Where practicable, construction works will avoid works on watercourses during high flow events to reduce the impact on biological continuity. Works will be carried out in the drier months where to possible to also reduce the risk of pollution propagating downstream. **M-WQ-1:** See above **M-WQ-2:** See above **M-WQ-3:** See above	N

WFD Quality Element Potentially Impacted	Potential Impact	Proposed Mitigation	Likely Adverse Residual Risk (Y/N)
	▪ Removal of riparian vegetation will also impact the lateral connectivity of the watercourse. Riparian zones also play a role in mitigating diffuse pollution, largely from agricultural, but also suburban settings, by reducing the concentrations and volumes of sediment laden runoff and diffuse pollution entering the watercourses. Therefore, reducing the riparian presence results in an increased volume of diffuse pollution reaching the watercourse. ▪ The need to overpump / flume or temporarily divert the Core Zone watercourse to construct the new watercourse alignment would temporarily alter flows over and downstream of the relocation/realignment footprint, impacting the longitudinal connectivity of the watercourse alongside changes in the quantity and dynamics of flow.	**M-WQ-4**: See above **M-WQ-5**: See above **M-WQ-6:** Use and design of oil separators in surface water drainage systems. **M-WQ-7:** Treatment and disposal of wastewater where there is no connection to the public foul sewer. **M-WQ-8:** Containment measures will be implemented in accordance with construction best practice and Pollution Prevention Guidelines (PPGs). **M-WQ-9:** Any works to over pump/flume the channel should be limited to as short a period as practicable, with works undertaken in periods of low flow where practicable. With the relevant mitigation measures in place and the temporary nature of the construction activities, no deterioration is anticipated at the water body scale.	
▪ Quantity and dynamics of flow ▪ River continuity ▪ River depth and Width variation ▪ Structure and substrate of the riverbed ▪ Structure of the riparian zone	**Alteration to natural bed and/or bank** The construction of the drainage network outfall will require excavation of the banks of the channel. This could create localised effects to: ▪ The river depth and width through potential increases in bank erosion and bank instability ▪ Lateral connectivity as a result of bank erosion and plant and machinery working on the bank top and within the riparian zone ▪ Structure and substrate of the bed through increased bank sediment deposition as a result of erosion; and, ▪ Alteration to the riparian zone.	**Alteration to natural bed and/or bank** **M-BD-1**: See above **M-BD-2**: See above **M-G-1**: Permanent outfalls should be designed and constructed to provide the conveyance needs as well as meeting the demands of the corresponding geomorphological processes. Due to the temporary nature of the construction activities, as well as mitigation measures in place, no deterioration is anticipated at the water body scale.	N
Biological and Physico-Chemical Quality Elements			
▪ Fish	**Noise and vibration** The construction phase of the Proposed Development has the potential to Impact Biological quality Elements related to fish through: ▪ Delay or impede fish migration (e.g. brown trout, lamprey, European eel and salmon) due to noise and vibration generated from the construction of the headwalls, New Bridge structure and ordinary watercourse diversion. Noise and vibration can also have an impact on the behaviour and movement of non-migratory fish species such as impacting upon their normal movements to find food. Subsequently, this can lead to an impact on their survival.	**Noise and vibration** **M-BD-4-:** To comply with the Salmon and Freshwater Fisheries Act 1975 and the EA standard rules for environmental permitting, construction works should be avoided between 1st October to 31st May (inclusive) for salmonids and 15th March to 15th June (inclusive) for coarse fish. Should any work be required within these periods, consent will need to be sought from the EA. **M-BD-5:** A fish rescue should be carried out prior to the construction of the headwalls to minimise any impacts to species within the area. Authorisation to use fishing instruments other than rod and line must be obtained prior to the works commencing (FR2 application form). **M-BD-6**: It is currently understood that piling will only be needed to install the proposed new Bridge crossing on Elstow Brook (US Shortstown) which would be a clear-span structure. Any piling should be vibration where possible utilising soft-start techniques should be used to minimise the acoustic impact on fish in the vicinity. Due to the temporary nature of the construction activities, as well as mitigation measures in place, no deterioration is anticipated at the water body scale.	N
▪ Macrophytes and Phytobenthos ▪ Macroinvertebrates ▪ Fish ▪ Oxygenation conditions ▪ Nutrient conditions	**Alteration to Shading** Any reduction in riparian shading could minimally affect foraging habitat and refugia, as well as slightly impact water temperature, but these changes would be confined to a limited area mainly in the vicinity of the Proposed Elstow Brook bridge structure.	**Alteration to Shading** **M-BD-1:** See above Due to the temporary nature of the Proposed Developments construction, as well as mitigation measures in place, no deterioration is anticipated at the water body scale.	N
▪ Macrophytes and Phytobenthos	**Transfer and establishment of protected and/or invasive non-native species (INNS)**	**Transfer and establishment of protected and/or invasive non-native species (INNS)**	N

WFD Quality Element Potentially Impacted	Potential Impact	Proposed Mitigation	Likely Adverse Residual Risk (Y/N)
▪ Macroinvertebrates ▪ Fish	The construction of the headwalls has the potential to introduce INNS through the use of construction equipment and vehicles. If INNS are introduced to watercourses within the site through construction activities, then they could subsequently be spread downstream to watercourses which are hydrologically connected. As a result, this could impact upon native aquatic species of macroinvertebrates, fish and macrophytes.	**M-BD-7**: Biosecurity measures should be implemented during the construction phase of the Proposed Development to prevent the introduction and spread of INNS. Measures should include: ▪ The briefing and training of workers on good biosecurity practices appropriate to their role; ▪ Equipping workers with the necessary equipment, PPE and substances to implement biosecurity control measures; ▪ Ensuring that Defra's "Check, Clean, Dry" principles are followed; and ▪ Where possible, contractors should park their vehicles on hard-standing areas and check/clean tyres prior to entering and leaving the site. With the relevant mitigation measures in place and the temporary nature of the construction activities, no deterioration is anticipated at the water body scale.	
▪ Macrophytes and Phytobenthos ▪ Macroinvertebrates ▪ Fish	**Alteration to the natural bed and/or bank** While the excavation of channel banks may temporarily impact the structure and substrate of the riverbanks, the scale of the works is highly localised. As a result, any potential effects on sensitive life-cycle dependent habitats, flow refugia and cover for aquatic receptors are expected to be minimal and restricted to the immediate area.	**Alteration to the natural bed and/or bank** **M-BD-1:** See above With the relevant mitigation measures in place and the temporary nature of the construction activities, no deterioration is anticipated at the water body scale.	N
▪ Macrophytes and Phytobenthos ▪ Macroinvertebrates ▪ Fish ▪ Thermal conditions ▪ Oxygenation conditions ▪ Salinity ▪ Acidification status ▪ Nutrient conditions	**Alteration to flows, water quantity and/or quality** The construction of the headwall and removal of riparian vegetation may lead to an alteration in flows, water quantity and/or quality. These activities could result in adverse impacts to the aquatic receptors present within the watercourses. Altered flows, whether increases or decreases can impact aquatic receptors through changes in their habitat. Fish may be particularly impacted as a result of changes to their access routes to areas of rivers and potential food sources. This can subsequently alter their energy expenditure needed to reach habitats, particularly for migratory fish.	**Alteration to flows, water quantity and/or quality** **M-WQ-1:** See above **M-WQ-8:** See above **M-BD-2**: See above **M-BD-3**: See above With the relevant mitigation measures in place and the temporary nature of construction activities, no deterioration is anticipated at the water body scale	N
▪ Macrophytes and Phytobenthos ▪ Macroinvertebrates ▪ Fish ▪ Thermal conditions ▪ Oxygenation conditions ▪ Salinity ▪ Acidification status ▪ Nutrient conditions	**Fine Sediment and pollution risk** A temporary increase in sediment entering the watercourse because of construction activities has the potential to lead to a temporary increase in turbidity changes to flow and degradation of water quality. Excess fine sediment can alter the baseline physical habitat characteristics of the channel bed and as a result, adversely affect food and habitat availability for aquatic receptors. An increase in turbidity can lead to a reduction of sunlight reaching the channel bed, causing stratification and reducing the dispersion of dissolved oxygen impacting fish, macroinvertebrates and aquatic macrophytes. Furthermore, any releases of construction associated pollutants and/or fine sediments into the watercourses may be toxic to aquatic life resulting in direct and indirect mortality and/or injury. Subsequently, this could have a temporary adverse impact on the biological quality elements within the Elstow Brook.	**Fine sediment and pollution risk** **M-WQ-2**: See Above **M-WQ-3:** See Above **M-WQ-4:** See Above **M-WQ-5**: See Above With the relevant mitigation measures in place and the temporary nature of construction activities, no deterioration is anticipated at the water body scale.	N

Table 4-3 - WFD scoping of the Proposed Development's operation activities against WFD quality elements for the Elstow Brook (US Shortstown) (GB105033038050) and Harrowden Brook (GB105033038010) water bodies

WFD Quality Element Potentially Impacted	Potential Impact	Proposed Mitigation	Likely Adverse Residual Effect (Y/N)
Hydromorphological Quality Elements			
▪ Quantity and dynamics of flow ▪ River continuity ▪ River depth and width variation ▪ Structure and substrate of the riverbed ▪ Structure of the riparian zone	**Loss of morphological diversity and Fine sediment and pollution risk** Multiple permanent outfalls could have an impact on the natural river depth and width, flow dynamics and river continuity impacting on morphological diversity within the channel. The impact on river continuity is dependent upon the extent to which the new structure extends into the existing channel cross section. A new outfall could also create localised scour as a result of focussed discharge falling onto the channel bed. Additionally, sediment laden runoff, which is captured from across the drainage catchment could be discharged to the watercourse from a single outfall, rather than draining naturally distributed along reaches. The new drainage system will serve the Proposed Development and as such, there should be no/negligible pollutants discharging into the Elstow Brook Harrowden Brook and surrounding watercourses through the operation of the drainage system. Furthermore, the drainage system will include gullies and catchpit chambers and retention ponds (former clay pits) to collect sediment. The drainage system would discharge at green field runoff rates and would not change the hydrology of the existing catchment.	**Loss of morphological diversity and Fine sediment and pollution risk** No mitigation measures are required as the new drainage system is unlikely to lead to permanent changes in baseline flows and water quantity or quality entering the Elstow or Harrowden Brook. Water quality is expected to improve as a result of the proposed SuDs and use of the existing clay pits as part of the treatment train. As a result, no significant impacts are anticipated at the water body scale.	N
▪ Quantity and dynamics of flow ▪ River continuity ▪ River depth and width variation ▪ Structure and substrate of the riverbed ▪ Structure of the riparian zone	**Alteration to natural bed and/or bank** The operational presence of the headwall will lead to a localised area of riverbank alteration. However, the loss of bankside will be minimal in comparison to that available within the Elstow Brook and Harrowden Brook water bodies and therefore the presence of the headwall is unlikely to lead to a significant loss of bank face. Therefore, the loss of bank face is unlikely to lead to significant impacts on WFD quality elements at the water body scale.	**Alteration to natural bed and/or bank** **M-G-1**: Permanent outfalls should be designed and constructed to provide the conveyance needs as well as meeting the demands of the corresponding geomorphological processes. With the relevant mitigation measures in place, no deterioration is anticipated at the water body scale	N
Biological Quality Elements			
▪ Macrophytes and Phytobenthos ▪ Macroinvertebrates ▪ Fish	**Alteration to the natural bed and/or bank** The operational presence of the headwall will lead to a localised area of riverbank habitat loss which may have an impact on aquatic receptors. However, the loss of bankside will be minimal in comparison to that available within the Elstow Brook water body and therefore the presence of the headwall is unlikely to lead to a significant loss of bank face. Therefore, the loss of bank face is unlikely to lead to significant impacts on WFD quality elements at the water body scale.	**Alteration to the natural bed and/or bank** No mitigation measures are required as the headwall will only lead to the loss of a small and localised area of river bankside and therefore is unlikely to lead to significant impacts at the water body scale.	N
▪ Macrophytes and Phytobenthos ▪ Macroinvertebrates ▪ Fish ▪ Thermal conditions ▪ Oxygenation conditions	**Alteration to flows, water quantity and/or quality and Fine sediment and pollution risk** The operation of new outfall discharges may lead to an alteration in flows, water quantity and/or quality and fine sediment and pollution within the receiving watercourse. These activities could result in adverse impacts to the aquatic receptors present within the watercourses. Altered flows, whether increases or decreases can impact aquatic	**Alteration to flows, water quantity and/or quality and Fine sediment and pollution risk** **M-BD-2:** See above **M-BD-8**: Detailed design of permanent outfalls to be prepared in consultation with the IDB and Environment Agency under the Land Drainage Consent (see Section 5 Appendix 12.3 – Drainage	N

WFD Quality Element Potentially Impacted	Potential Impact	Proposed Mitigation	Likely Adverse Residual Effect (Y/N)
▪ Salinity ▪ Acidification status ▪ Nutrient conditions	receptors through changes in their habitat. Fish may be particularly impacted as a result of changes to their access routes to areas of rivers and potential food sources. This can subsequently alter their energy expenditure needed to reach habitats, particularly for migratory fish. Fine sediment can smother aquatic habitats and clog the gills of fish leading to mortality. In addition, changes in water quality via outfall discharges can also lead to habitat degradation and mortality of aquatic species. The new drainage system will serve the Proposed Development and as such, there should be no/negligible pollutants discharging into the Elstow Brook, Harrowden Brook and surrounding watercourses through the operation of the drainage system. Furthermore, the drainage system will include gullies and catchpit chambers and retention ponds (former clay pits) to collect sediment. The drainage system would discharge at green field runoff rates and would not change the hydrology of the existing catchment.	Strategy (Volume 3)) to consider the exclusion of fish migration pathways and prevention of entrapment of fish species. The new drainage system is unlikely to lead to permanent changes in baseline flows and water quantity or quality entering the Elstow or Harrowden Brook. Water quality is expected to improve as a result of the proposed SuDS and the use of the existing clay pits as part of the treatment train. As a result, no significant impacts are anticipated at the water body scale.	
▪ Macrophytes and Phytobenthos ▪ Macroinvertebrates ▪ Fish	**Transfer and establishment of protected and/or invasive non-native species (INNS)** The operation of the proposed surface water drainage system has the potential to lead to the transfer of INNS between the Site and hydrologically connected watercourses, including Elstow Brook. Any spread of INNS could impact upon native aquatic species of macroinvertebrates, fish and macrophytes.	**Transfer and establishment of protected and/or invasive non-native species (INNS)** **M-BD-9:** An INNS management strategy would be implemented during the Operational Phase, to avoid or appropriately manage areas of INNS, e.g. during treatment of water, landscaping and operational activities. This would include measures for the control of relevant INNS. Section 4.4 of Appendix 6.5: OLEMP (Volume 3) sets out the principles which will be adopted for the management and control of invasive species.	N

4.3 WFD SCOPING SUMMARY

4.3.1. No residual effect has been identified with the proposed mitigation in place; therefore, no further detailed WFD impact assessment is required. The proposed mitigation, which is set out in the Environmental Statement (as shown in **Appendix E**) and secured by the **Environmental Controls** (**Document Reference 1.16.0**), is considered sufficient to manage potential impacts during both construction and operation to ensure no deterioration in the status of WFD quality elements, of overall WFD status. Consequently, no impact assessment or site-specific mitigation is required to ensure WFD compliance. As set out in **Appendix D**, the Environment Agency has reviewed the assessment and agree that the approach to, and outcomes of the WFD Screening and Scoping Assessment is considered appropriate.

5 ASSESSMENT OF THE PROPOSED DEVELOPMENT AGAINST WFD OBJECTIVES

5.1.1. The WFD compliance assessment for the Proposed Development is summarised in Table 5-1

Table 5-1 - Compliance Assessment of the Proposed Development

Water Body ID	WFD Compliance
Deterioration in the status/potential of the water body	**Hydromorphological:** If suitable mitigation measures are followed, it is not anticipated that the Proposed Development would cause deterioration of the current hydromorphological status of the water bodies. **Biological:** The Proposed Development will have no impact on the biological quality elements of the Elstow Brook (US Shortstown) or Harrowden Brook after the implementation of mitigation measures. **Physico-chemical**: The Proposed Development is anticipated to have no impact on the physico-chemical quality elements of the Elstow Brook (US Shortstown) or Harrowden Brook water bodies It is assumed that any impacts arising from the construction phase will be mitigated by the implementation of and adherence to an approved CEMP.
Ability of the water body to achieve Good Ecological Potential/Status	The Proposed Development will have no adverse impact on contribution to the water bodies achieving a Good Ecological Status.
Impact on the WFD objectives of other water bodies within the same River Basin District	The Proposed Development will have no adverse impact on contribution to other water bodies within the same River Basin District.
Ability to contribute to the delivery of the WFD objectives	The Proposed Development will have no adverse impact on contribution to the delivery of the WFD objectives

6 CONCLUSION

6.1.1. This WFD Screening and Scoping Assessment, prepared by WSP on behalf Universal Destinations and Experiences, evaluates potential impacts and determines whether further detailed assessment is required to confirm the Proposed Development's compliance with WFD regulations.

6.1.2. The proposed mitigation measures are deemed sufficient to manage the potential risks to water and aquatic environments, ensuring there will be no deterioration in WFD quality elements or the overall WFD status during the construction and operation phase.

6.1.3. Furthermore, the Proposed Development will not hinder the River Basin Management Plan from achieving its objectives.

7 REFERENCES

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Appendix A

APPENDIX A - PROPOSED DEVELOPMENT

500000

250000

0 1 2 3 4 5 km

Do not scale - Use only figured dimensions
The contractor is to check all dimensions on site and report any discrepancies to the site Supervisor
This drawing is to be read in conjunction with other standard documentation

N o t e :
This plan is furnished as a general guide only and the Statutory Undertakers concerned state that no warranty as to its correctness is given or implied. It must not be relied upon in the excavations or other works made in the vicinity of each utilities service.

Key:

- Site boundary
- 1km Buffer of Red Line Boundary

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	18/06/2025	LS	FIRST ISSUE	JV	HP

DRAWING STATUS:
A - AUTHORISED AND ACCEPTED

wsp
Matrix House, Basing View, Basingstoke, RG21 4FF
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wsp.com

CLIENT:
UDX

PROJECT:
Universal Destinations and Experiences UK Project

TITLE:
Site Location

DRAWN:	CHECKED:	APPROVED:
LS	MJ	HP

PROJECT No:	SCALE @A3:	DATE:
70116516	1:50,000	18/06/2025

DRAWING No: 70116516-LOC-001 REV: A

Created by: UKLXS779 - 2025-06-18 10:47:37 - C:\Users\UKLXS779\OneDrive - WSP O365\Documents\320\320_Screening_and_scoping.qgz

500000

505000

245000

Lake Zone

East Gateway Zone

West Gateway Zone

Core Zone

0 1 2 3 4 5 km

Do not scale - Use only figured dimensions
The contractor is to check all dimensions on site and report any discrepancies to the site Supervisor
This drawing is to be read in conjunction with other standard documentation

N o t e :
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Key:

Site boundary

1km Buffer of Red Line Boundary

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	18/06/2025	LS	FIRST ISSUE	JV	HP

DRAWING STATUS:
A - AUTHORISED AND ACCEPTED

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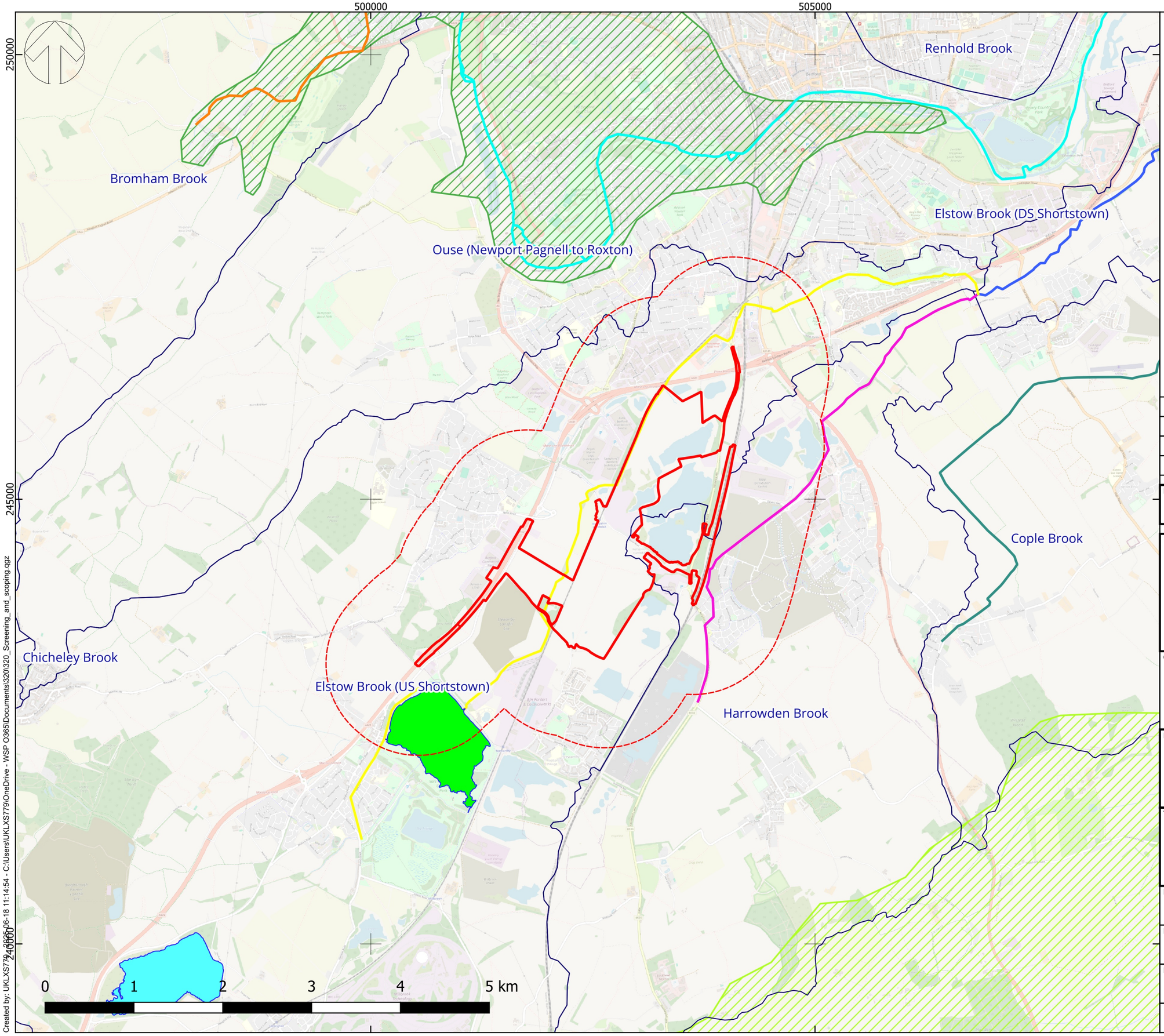
wsp.com

CLIENT:
UDX

PROJECT:
Universal Destinations and Experiences UK Project

TITLE:
Site Location and zones

DRAWN:	CHECKED:	APPROVED:
LS	MJ	HP
PROJECT No: 70116516	SCALE @A3: 1:30,000	DATE: 18/06/2025
DRAWING No: 70116516-LOC-002		REV: A



Do not scale - Use only figured dimensions
The contractor is to check all dimensions on site and report any discrepancies to the site Supervisor
This drawing is to be read in conjunction with other standard documentation

Note:
This plan is furnished as a general guide only and the Statutory Undertakers concerned state that no warranty as to its correctness is given or implied. It must not be relied upon in the excavations or other works made in the vicinity of each utilities service.

- Site boundary
- 1km Buffer of Red Line Boundary

WFD River Water Bodies

- Bromham Brook
- Cople Brook
- Elstow Brook (DS Shortstown)
- Elstow Brook (US Shortstown)
- Harrowden Brook
- Ouse (Newport Pagnell to Roxton)
- WFD River Water Body Catchments

WFD Lake Water Bodies

- Brogborough Lake
- Stewartby Lake
- Upper Bedford Ouse Principal Oolite 2 GW Body
- Upper Bedford Ouse Woodburn Sands GW Body

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	18/06/2025	LS	FIRST ISSUE	JV	HP

DRAWING STATUS:
A - AUTHORISED AND ACCEPTED

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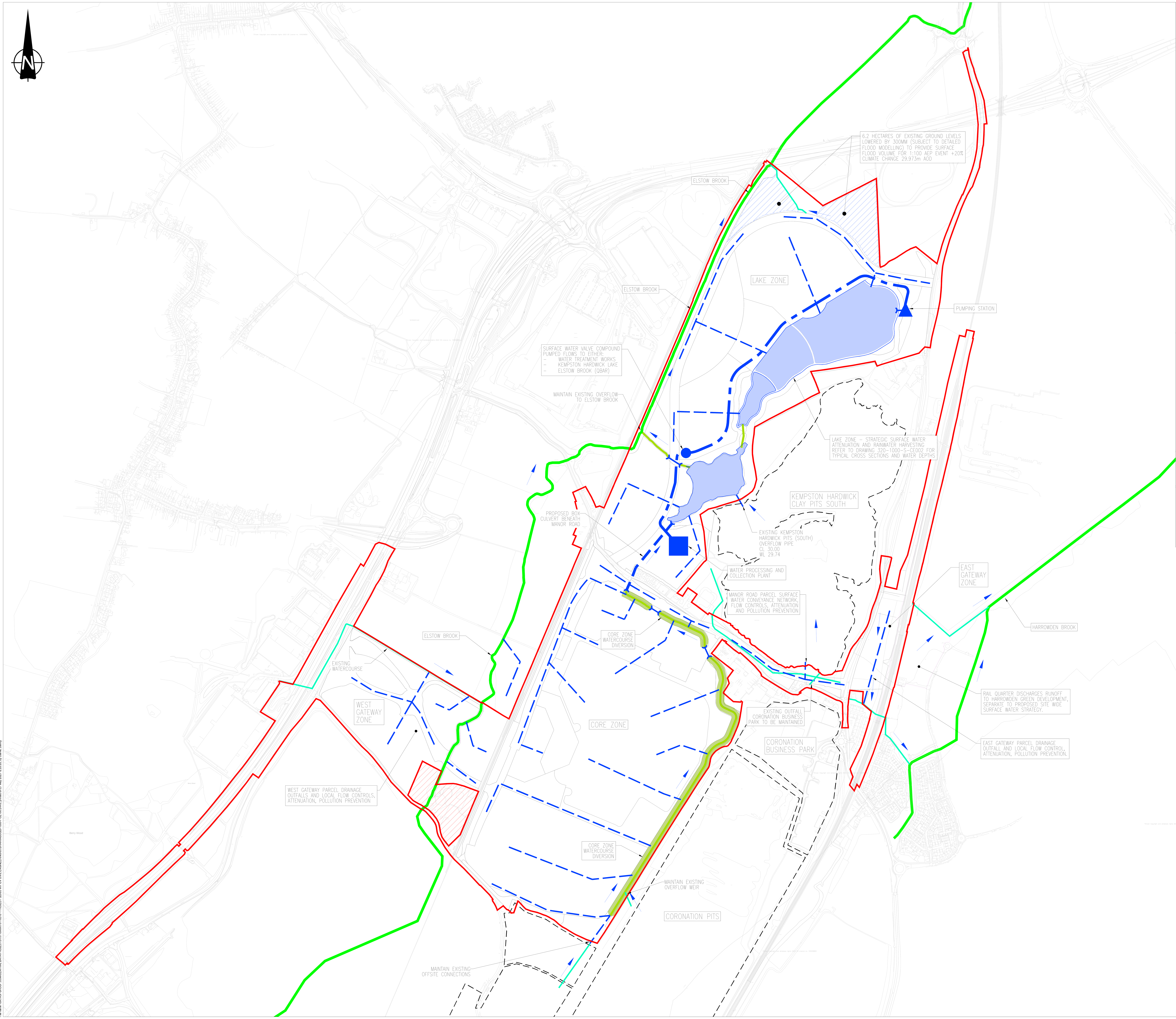
CLIENT:
UDX

PROJECT:
Universal Destinations and Experiences UK Project

TITLE:
WFD Waterbodies

DRAWN:	CHECKED:	APPROVED:
LS	MJ	HP
PROJECT No: 70116516	SCALE @A3: 1:40,000	DATE: 18/06/2025
DRAWING No: 70116516-WFD-001		REV: A



NOTES:

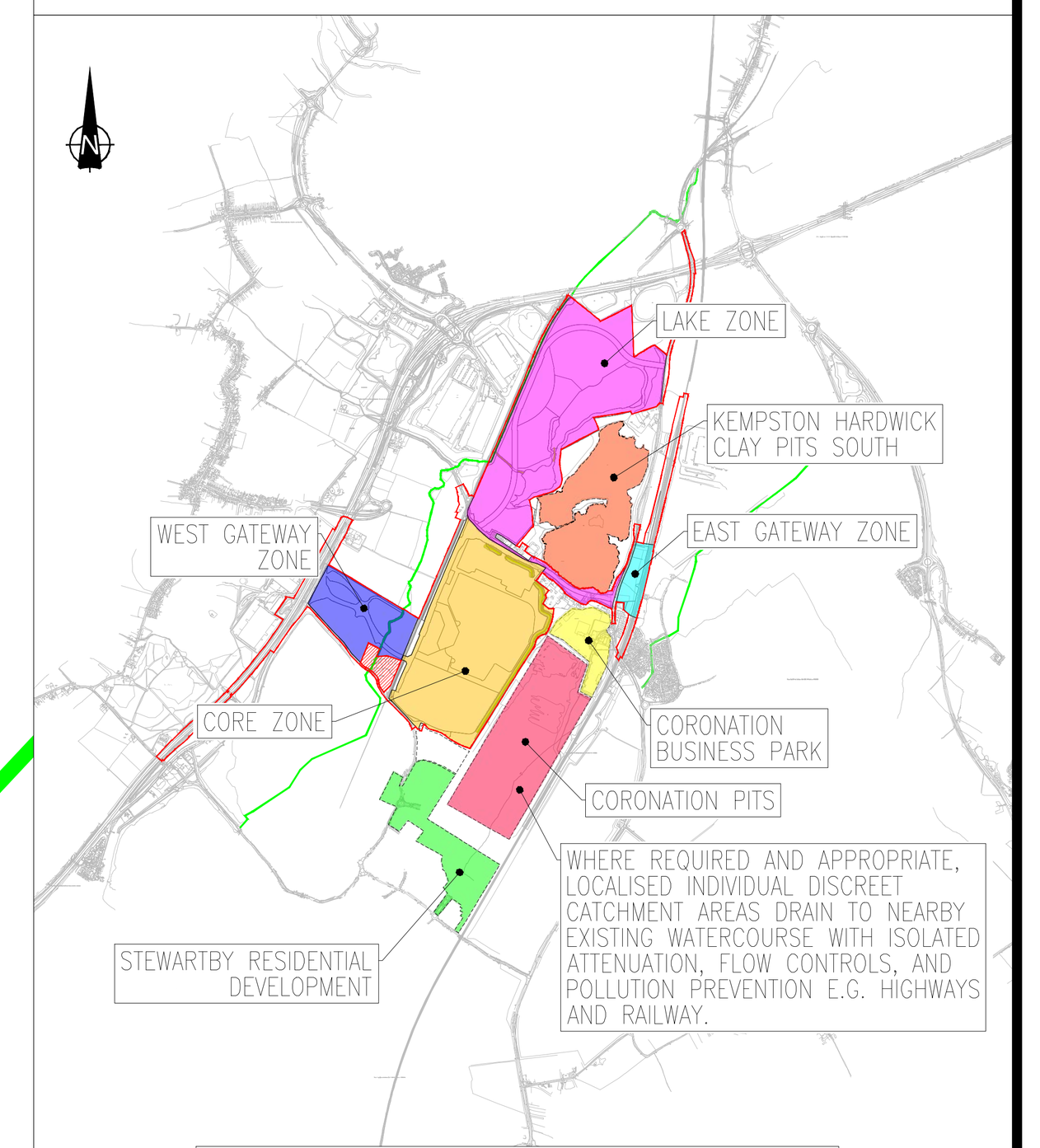
1. THIS DRAWING IS FOR CONCEPT PURPOSES ONLY. NOT FOR PRICING, CONSTRUCTION OR TENDERING.
2. ALL LEVELS ARE IN METRES AOD UNLESS OTHERWISE SPECIFIED
3. MASTERPLAN BASED ON X320-MP-DRAINAGE_BASE BY UDX RECEIVED 23/05/2024.
4. REFER TO WSP DRAWING NO. 320-1000-S-CE001 AND 002 FOR TYPICAL CROSS SECTIONS AND VOLUMES.

LEGEND

- SITE BOUNDARY
- DIRECTION OF SURFACE WATER FLOW
- EXISTING MINOR RIVER
- EXISTING WATERCOURSE
- PROPOSED SURFACE WATER NETWORK
- PROPOSED WATERCOURSE
- PROPOSED WATERCOURSE CORRIDOR
- PROPOSED SURFACE WATER RISING MAIN
- PROPOSED HEADWALL
- EXCLUDED FROM SITE BOUNDARY
- FLOOD COMPENSATION AREA

DRAINED AREA SUMMARY

LOCATION	CATCHMENT AREA	LEGEND
WEST GATEWAY ZONE	26 HA	
EAST GATEWAY ZONE	6.9 HA	
CORE ZONE	93.4 HA	
LAKE ZONE	102.1 HA	
STEWARTBY RESIDENTIAL DEVELOPMENT	29 HA	
CORONATION PITS	59 HA	
CORONATION BUSINESS PARK	12 HA	
KEMPSTON HARDWICK CLAY PITS SOUTH	48 HA	



DRAINED CATCHMENT AREAS TO STRATEGIC SUDS
SCALE 1:50,000

ARCHITECT/ENGINEER STAMP:

Approved by: JG | Drawn by: YJ

Latest Revision Date: 27/05/2025

Issuance and Revision History

Rev.	Date	Issuance and Revision Description
0	04/09/2024	First Issue
1	18/10/2024	UPDATED SITE BOUNDARY. ISSUED FOR APPROVAL.
2	04/04/2025	DRAINED AREA SUMMARY INCLUDED. ISSUED FOR APPROVAL
3	12/05/2025	UPDATED SITE BOUNDARY
4	27/05/2025	UPDATED TITLE FRAME

Project Name: Universal Destinations & Experiences UK Project

Site Address: Former Kempston Hardwick Brickworks and adjoining land, Bedford

Scale: 1:5000 @ A0

Project Locator: 320 – 100 – SDO

Sheet Name: PROPOSED SITE WIDE SURFACE WATER STRATEGY

Sheet No.: 320-1000-P-CE100

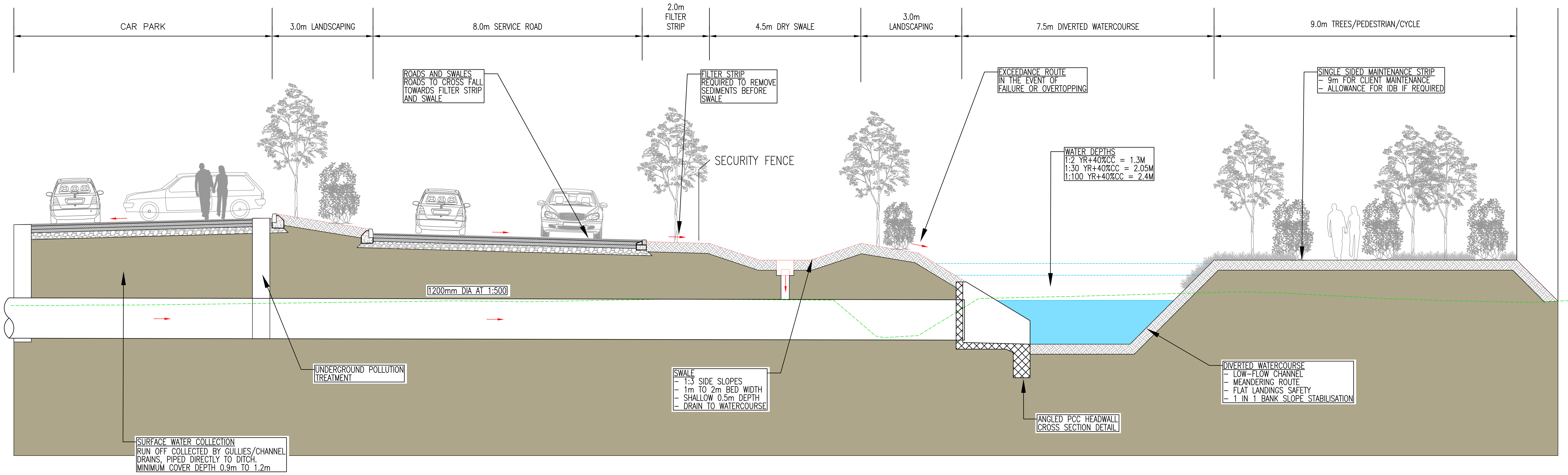
Rev #: 4

NOTES:

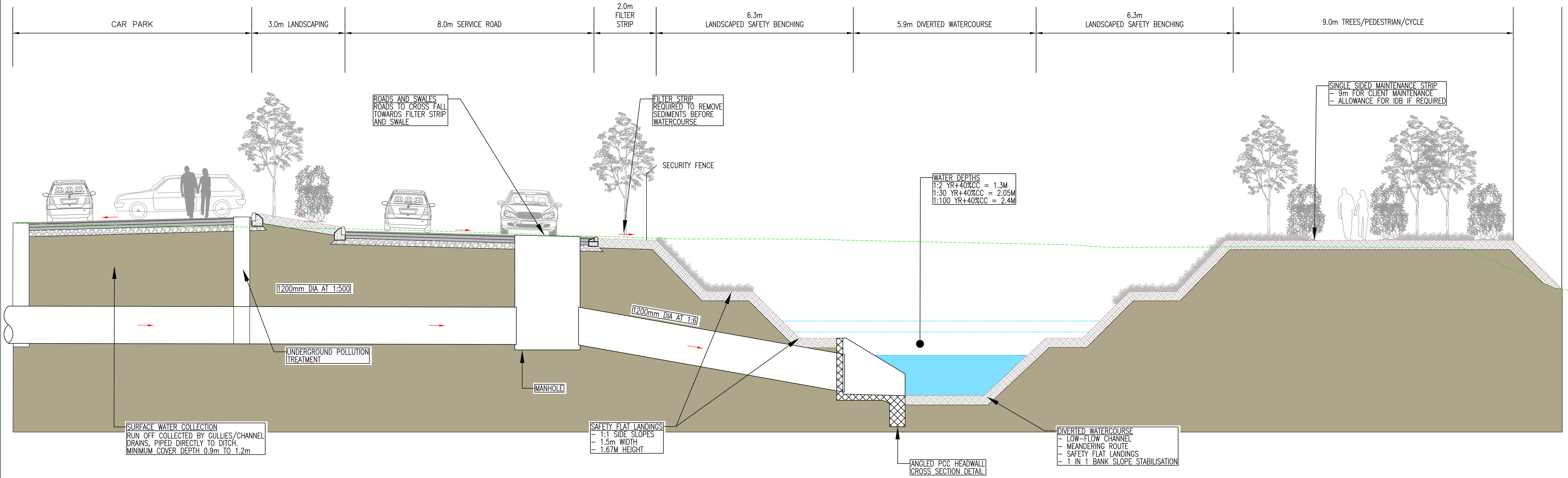
1. THIS DRAWING IS FOR CONCEPT PURPOSES ONLY. NOT FOR PRICING OR PLANNING, CONSTRUCTION OR TENDERING.
2. ALL LEVELS ARE IN METRES AOD UNLESS OTHERWISE SPECIFIED
3. MASTERPLAN BASED ON XREF_226817A_OS_MASTER BY SLR RECEIVED 08/02/2024.

KEY

— — — — — (green)	EXISTING SURFACE PROFILE
— — — — — (blue)	PROPOSED WATER LEVEL



PROPOSED TYPICAL LAKE SECTION – SOUTH EAST
SCALE 1:50



SCALE BAR 1:50
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ARCHITECT/ENGINEER STAMP:

Approved by: JG | Drawn by: CB

Latest Revision Date: 18/10/2024

Issuance and Revision History

Rev.	Date	Issuance and Revision Description
1	16/05/2024	First Issue
2	04/07/2024	FRAME AND SHEET NAME REVISED
3	16/08/2024	UPDATED DRAWING FRAME
4	18/10/2024	ISSUED FOR APPROVAL

Drawing Status: For Approval

Project Name: Universal Destinations & Experiences UK Project

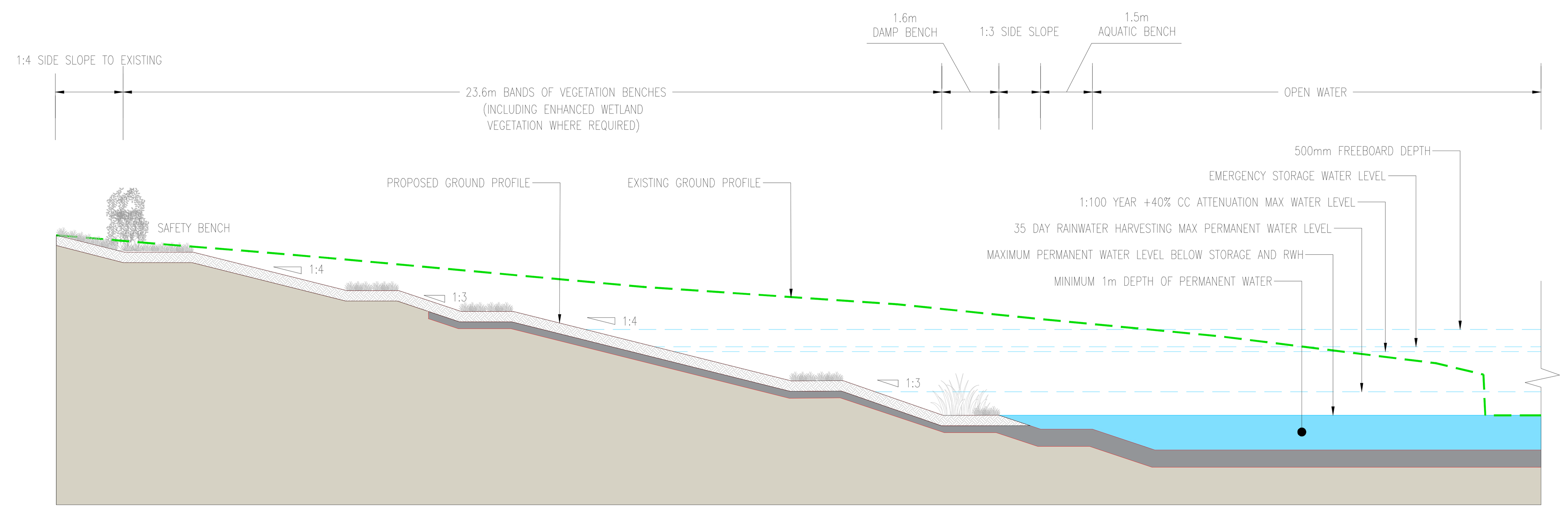
Site Address: Former Kempston Hardwick Brickworks and adjoining land, Bedford

Project Locator: 320 – 100 – 000

Sheet Name: PROPOSED SURFACE WATER STRATEGY TYPICAL CROSS SECTIONS SHEET 1 OF 2

Sheet No.: 320–1000–S–CE001

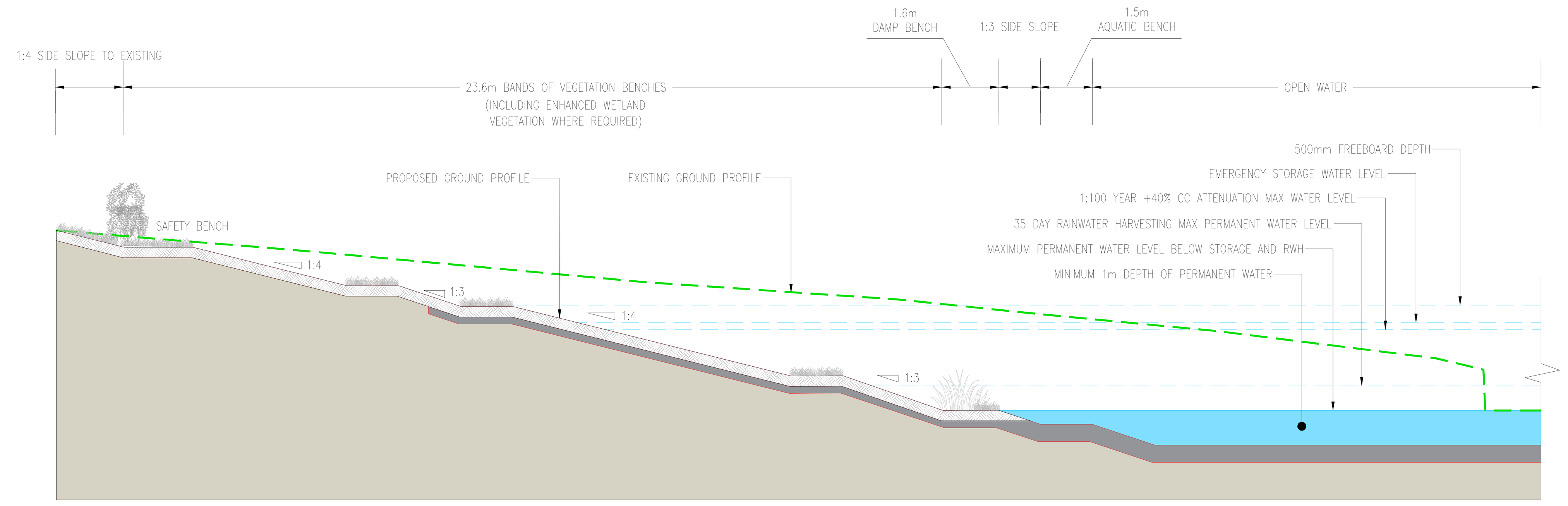
Rev #: 4



KEMPSTON HARDWICK (NORTH) DISUSED PITS
STRATEGIC ATTENUATION AND RAINWATER HARVESTING
TYPICAL CROSS SECTION
STAGE 1: INITIAL BUILDOUT
SCALE 1:100

TOTAL IMPERMEABLE AREA	121.2	HA	STORAGE DEPTH (M) BASE AREA 109,800M2	PROCESS WATER SUPPLY M3/D	DAYS DEMAND (DRY PERIOD) @ 721M3/D
DISCHARGE RATE (GREENFIELD QBAR) 2.5 L/S/HA	303	L/S	N/A	1,381	67
1:100 YEAR +40%CC ATTENUATION VOLUME	127,025	M3	1.16		
35 DAY RAINWATER HARVESTING VOLUME	48,335	M3	0.68 (PIT 3 ONLY BASE AREA 71,000M2)		
PUMP FAILURE EMERGENCY STORAGE VOLUME	15,150	M3	0.14		
TOTAL STORAGE VOLUME	190,510	M3	1.98		

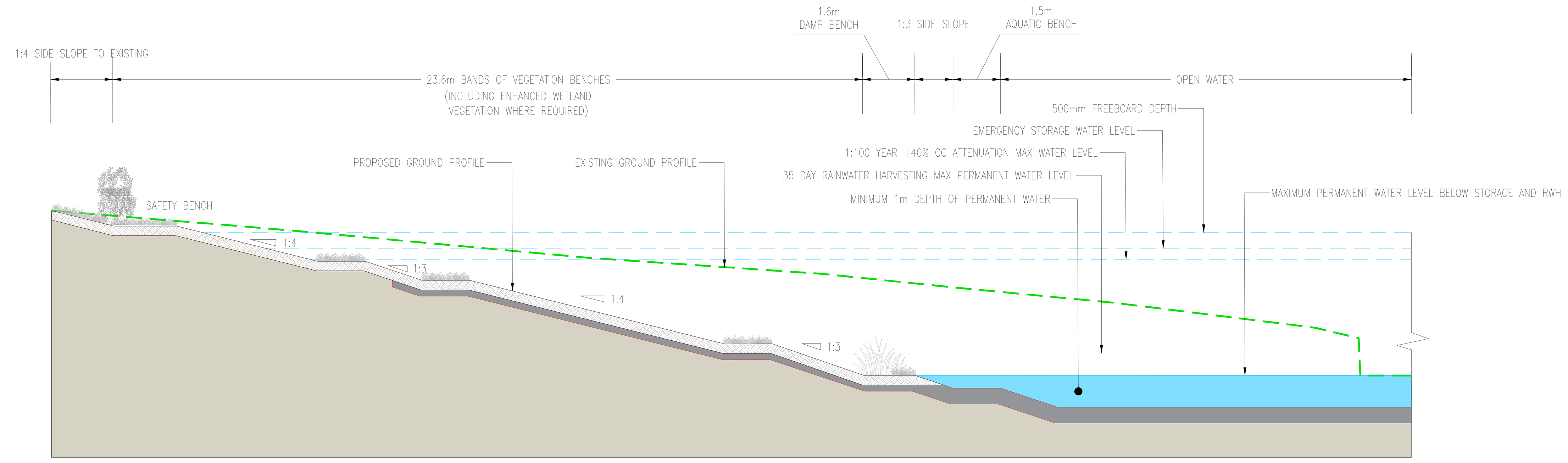
1. INITIAL BUILDOUT STAGE			
CATCHMENT	CATCHMENT AREA (HA)	PERCENTAGE IMPERMEABLE	IMPERMEABLE AREA (HA)
CORE ZONE	93.6	90%	84.2
MANOR ROAD IMPROVEMENT WORKS	5	90%	5
LAKES SELF AREA	23	100%	23
LAKE ZONE CONSTRUCTION COMPOUND	10	90%	9



KEMPSTON HARDWICK (NORTH) DISUSED PITS
STRATEGIC ATTENUATION AND RAIN WATER HARVESTING
TYPICAL CROSS SECTION
STAGE 2: FULL BUILDOUT
SCALE 1:100

TOTAL IMPERMEABLE AREA	171.2	HA	STORAGE DEPTH (M) BASE AREA 109,800M2	PROCESS WATER SUPPLY M3/D	DAYS DEMAND (DRY PERIOD) @ 1,568M3/D
DISCHARGE RATE (GREENFIELD QBAR) 2.5 L/S/HA	428	L/S	N/A	1,442	32
1:100 YEAR +40%CC ATTENUATION VOLUME	179,500	M3	1.63		
35 DAY RAINWATER HARVESTING VOLUME	50,470	M3	0.71 (PIT 3 ONLY BASE AREA 71,000M2)		
PUMP FAILURE EMERGENCY STORAGE VOLUME	21,400	M3	0.2		
TOTAL STORAGE VOLUME	251,370	M3	2.54		

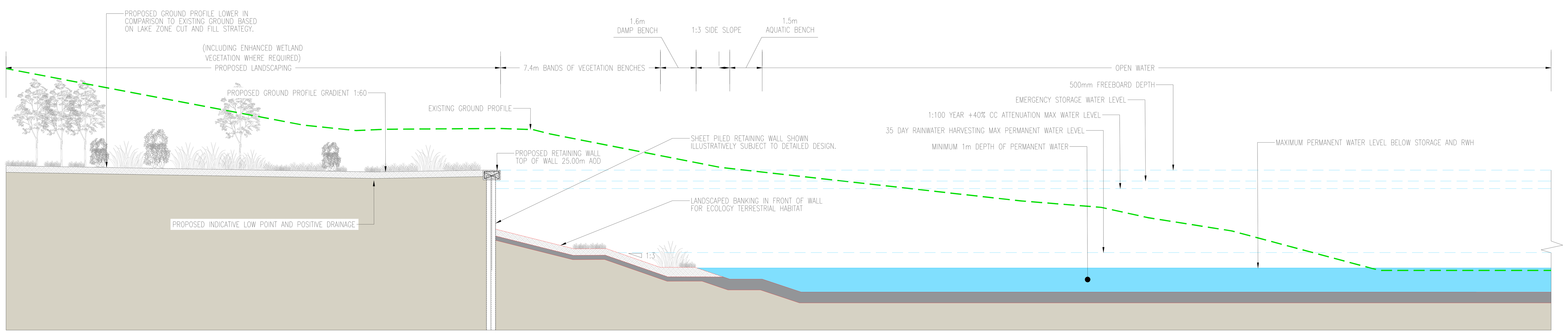
2. FULL BUILDOUT STAGE			
CATCHMENT	CATCHMENT AREA (HA)	PERCENTAGE IMPERMEABLE	IMPERMEABLE AREA (HA)
INITIAL BUILDOUT STAGE	131.6	N/A	121.2
LAKE ZONE	56	90%	50



KEMPSTON HARDWICK (NORTH) DISUSED PITS
STRATEGIC ATTENUATION AND RAINWATER HARVESTING
TYPICAL CROSS SECTION
STAGE 3: FULL BUILDOUT + OVERFLOWS
SCALE 1:100

TOTAL IMPERMEABLE AREA	309.2	HA	STORAGE DEPTH (M) BASE AREA 109,800M2	PROCESS WATER SUPPLY M3/D	DAYS DEMAND (DRY PERIOD) @ 1,568M3/D
DISCHARGE RATE (GREENFIELD QBAR) 2.5 L/S/HA	773	L/S	N/A	1,442	32
1:100 YEAR +40%CC ATTENUATION VOLUME	323,950	M3	2.95		
35 DAY RAINWATER HARVESTING VOLUME	50,470	M3	0.71 (PIT 3 ONLY BASE AREA 71,000M2)		
PUMP FAILURE EMERGENCY STORAGE VOLUME	38,650	M3	0.35		
TOTAL STORAGE VOLUME	413,070	M3	4.01		

3. FINAL BUILDOUT + CORONATION PIT OVERFLOW STAGE			
CATCHMENT	CATCHMENT AREA (HA)	PERCENTAGE IMPERMEABLE	IMPERMEABLE AREA (HA)
FINAL BUILDOUT STAGE	187.6	N/A	171.2
KEMPSTON HARDWICK CLAY PITS SOUTH	48	100%	48
CORONATION BUSINESS PARK	12	90%	11
CORONATION PIT	59	100%	59
STEWARTBY DEVELOPMENT	29	70%	20



KEMPSTON HARDWICK (NORTH) DISUSED PITS
STRATEGIC ATTENUATION AND RAINWATER HARVESTING
TYPICAL CROSS SECTION - RETAINING WALL
STAGE 3: FULL BUILDOUT + OVERFLOWS
SCALE 1:100

NOTES:

1. THIS DRAWING IS FOR CONCEPT PURPOSES ONLY. NOT FOR PRICING OR PLANNING, CONSTRUCTION OR TENDERING.
2. ALL LEVELS ARE IN METRES AOD UNLESS OTHERWISE SPECIFIED
3. MASTERPLAN BASED ON XREF_226817A_OS_MASTER BY SLR RECEIVED 08/02/2024.

KEY

- EXISTING SURFACE PROFILE
- PROPOSED WATER LEVEL

SCALE BAR 1:100

0 10

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ARCHITECT/ENGINEER STAMP:

Approved by: JG | Drawn by: CB

Latest Revision Date: 25/10/2024

Issuance and Revision History

Rev.	Date	Issuance and Revision Description
1	16/05/2024	First Issue
2	23/05/2024	WATER LEVELS UPDATED TO REFLECT LATEST SITE MASTERPLAN
3	19/06/2024	PROPOSED RETAINING WALL SECTION ADDED
4	16/07/2024	RAINWATER HARVESTING VOLUMES UPDATED
5	16/08/2024	RAINWATER HARVESTING VOLUMES UPDATED
6	28/08/2024	"(INCLUDING ENHANCED WETLAND VEGETATION WHERE REQUIRED)" TEXT ADDED TO CROSS SECTIONS
7	25/10/2024	WATER LEVELS AND RAINWATER HARVESTING VOLUMES UPDATED. ISSUED FOR APPROVAL.

Drawing Status: For Approval

Project Name: Universal Destinations & Experiences UK Project

Site Address: Former Kempston Hardwick Brickworks and adjoining land, Bedford

Project Locator: 320 - 100 - 000

Sheet Name:
PROPOSED SURFACE WATER STRATEGY
TYPICAL CROSS SECTIONS
SHEET 2 OF 2

Sheet No.: 320-1000-S-CE002 | Rev #: 7

Appendix B

WFD WATER BODY DATA

Table B-1 - WFD data for Elstow Brook (US Shortstown) Water Body (GB105033038050) surface water body potentially impacted by the Proposed Development

Water body ID	GB105033038050
Water Body Name	Elstow Brook (US Shortstown)
Water Body Type	River
Water Body Area (km^2)	53.747
Hydromorphological Designation	Heavily modified
Current Overall Status / Potential	Moderate (2019)
Status Objective (overall)	Good (2063)
Justification for not Achieving Good Status by 2015	Measures delivered to address the reason (awaiting recovery) relating to Polybrominated diphenyl ethers (PBDE). Diffuse sources of pollution from contaminated land from industry and poor soil management from agricultural and land management impacting the macrophytes and phytobenthos quality element. Physical modification due to land drainage from agricultural and rural sources are impactful to the fish quality element.
Protected Area Designation	Nitrates Directive (Great Ouse NVZ (S391), Huntingdon River Gravels (G144), Stewartby Lake Eutrophic Lake NVZ(EL111))
Overall Ecological Status / Potential	Moderate (2022)
Overall Ecological Status Objective	Good (2027; low)
Overall Biological Status	Poor (2022)
Fish	Poor (2022)
Invertebrates	Good (2022)
Macrophytes and Phytobenthos	Moderate (2022)
Physico-chemical Quality Elements	
Ammonia (Phys-Chem)	High (2022)
Dissolved oxygen	High (2022)
pH	High (2022)
Phosphate	Good (2022)
Temperature	Good (2022)
Specific pollutants	Moderate (2014)

Water body ID	GB105033038050
Triclosan	High (2022)
Copper	High (2022)
Iron	High (2014)
Zinc	Does not require assessment (2022)
Overall Chemical Status	Good (2063)
Overall Chemical Quality Element Status Objective	Does not require assessment (2022)
Priority substances	Does not require assessment (2022)
Priority hazardous substances	Supports good (2022)
Hydromorphology Supporting Elements Status	Supports good (2022)
Hydrological regime	Moderate (2022)
Supporting Elements (Surface Water)	Moderate or less (2022)
Mitigation Measures Assessment	Moderate (2014)

Water Body Name	Harrowden Brook
Water Body Type	River
Water Body Area (km^2)	24.668
Hydromorphological Designation	Heavily modified
Current Overall Status / Potential	Bad (2022)
Status Objective (overall)	Good (2063)
Justification for not Achieving Good Status by 2015	Measures delivered to address the reason (awaiting recovery) relating to Polybrominated diphenyl ethers (PBDE). Diffuse sources of pollution from poor nutrient and livestock management from from agricultural and rural land management impacting the phosphate and macrophytes and phytobenthos quality element. Physical modification due to land drainage from agricultural and rural sources are impactful to the macrophytes and phytobenthos quality element. An investigation is

	pending to find the activity and sector relating to Perfluorooctane sulphonate (PFOS)
Protected Area Designation	Nitrates Directive (Great Ouse NVZ (S391), Huntingdon River Gravels (G144)
Overall Ecological Status / Potential	Bad (2022)
Overall Ecological Status Objective	Good (2027; low)
Overall Biological Status	Bad (2022)
Invertebrates	Good (2022)
Macrophytes and Phytobenthos	Moderate (2022)
Macrophytes sub element	Moderate (2022)
Phytobenthos sub element	Bad (2022)
Physico-chemical Quality Elements	
Ammonia (Phys-Chem)	High (2022)
Biochemical Oxygen Demand (BOD)	Bad (2022)
Dissolved oxygen	High (2022)
Phosphate	Good (2022)
Temperature	Good (2022)
pH	High (2022)
Hydromorphology Supporting Elements Status	Supports good (2022)
Hydrological regime	Supports good (2022)
Supporting Elements (Surface Water)	Moderate (2022)
Mitigation Measures Assessment	Moderate or less (2022)
Overall Chemical Status	Does not require assessment (2022)
Overall Chemical Quality Element Status Objective	Good (2063)
Priority hazardous substances	Does not require assessment (2022)
Priority substances	Does not require assessment (2022)
Other pollutants	Does not require assessment (2022)

Appendix C

PHOTOGRAPHIC RECORDS

Survey Locations
Site boundary
Watercourse
Ordinary Watercourse
WFD Watercourse

A421 Culvert
Marston Vale Rail Culvert
Modern Landfill
Marston Vale Railway
Midland Mainline Railway
A6
A6

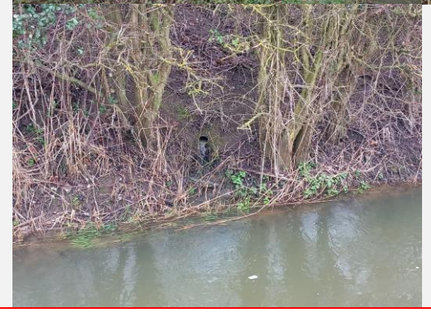
0 0.3 0.6 0.9 1.2 1.5 Km

Sites listed from upstream to downstream by waterbody

Reference ID	Grid Reference	Notes	Photographs
Stewartby Lake			
60	TL0106342635 W3W: ///moderated.emails.pokers Flow within the watercourse is to the northeast Photographs taken from Green Lane Road Bridge	Upstream of Green Lane, the first three photographs show Stewartby Lake, while the following two photographs show the self-cleaning trash screen, which sits between the wooden footbridge and Green Lane Road Bridge. Debris from the trash screen is emptied into a skip via a conveyor. There is a structure on the upstream of the footbridge, which is potentially a gauge which measures lake water levels.	    
61	TL0107542654 W3W: ///bloodshot.inflamed.effort Flow within the watercourse is to the northeast Photographs taken from Green Lane Road Bridge, and the right bank	Downstream of the road bridge, there is a potential river level gauge on the left bank of the watercourse. The watercourse is spanned by a steel box, which likely contains utilities. The banks are composed of a vertical brick wall on the left bank and the right bank is capped with concrete slabs which support the steel box. There are two additional pipe crossings upstream of the steel box.	  

Elstow Brook – WFD Waterbody (

5	TL0201843893 W3W: ///natively.narrating.headings Flow within the watercourse is to the north Photographs taken from the left bank	The Elstow Brook flows under Broadmead Road and continues north with a very straight alignment as it passes a small area of deciduous woodland on the left bank top. The right bank top is at least 2.5m above water surface, creating almost complete floodplain disconnection, however, this is not exacerbated by embankments. The right floodplain is an arable field, which extends to the bank top, and the right bank face is composed of what appears to be a monoculture of long grasses. The left bank top is only 1.5m above the water surface and is composed of a consistent strip of short grasses which stretch from the deciduous woodland and arable field to the bank toe. The channel cross-section is trapezoidal, with a consistent wetted width of 1.5m. Flows in the channel fast, with a rippled surface with some upwellings. The turbidity of the flow means that estimation of a flow depth along this reach was not possible.	
6	TL0207143999 W3W: ///spaceship.angle.pills Flow within the watercourse is to the north Photographs taken from the left bank	Approximately 100m further downstream, the channel alignment is slightly sinuous, meandering to the east between two mature deciduous trees, which lean slightly across the channel from each bank face. The bank faces remain steep, and arable crops extend to each bank top. There is more hydraulic diversity in this section of channel, with unbroken standing waves present along the thalweg through this meander.	

7	TL0211144075 W3W: ///suckle.suspended.swan Flow within the watercourse is to the north Photographs taken from a footbridge over the watercourse	The Brook flows under a small single span footbridge constructed from concrete sleepers placed upon two large concrete block abutments. The abutments are approximately 1.25m apart, slightly narrower than the wetted width which is just over 1.75m here. The bank angles and land cover are consistent with upstream, with the exception that a large deciduous hedge is present on the right bank face, approximately 10m downstream of the bridge.	    
8	TL0215844113 W3W: ///grazed.mows.croutons Flow within the watercourse is to the north Photographs taken from the left bank	Channel is slightly sinuous and bends to the west. The left bank top is slightly lower than upstream, 1m above the water surface. Silt is visible in the margins on the inside bend of the meander. No larger bed sediment sizes are visible. The right toe appears to drop away steeply beneath the fast flow, preventing safe access into the channel.	
9	TL0215644158 W3W: ///covenants.voted.fiery Flow within the watercourse is to the north Photographs taken from the left bank	A drainage ditch joins the Brook from the west. While this ditch does contain a shallow depth of water, this water has a negligible flow velocity. A small field drain outfall is present on the right bank face of the Elstow Brook upstream of the confluence. In this area the bank face is overgrown with small shrubs and dense hedge. Downstream of the confluence, deciduous woodland extends to the left bank top, while deciduous woodland is set back approximately 5m from the right bank top. This is the location of fluvial audit survey sheet 1.	   

10	TL0222644185 W3W: ///beads.airtime.catchers Flow within the watercourse is to the north Photographs taken from the right bank	Similar to upstream, woodland stretches to the left bank top, while the right bank top and face is composed of short grasses. As the channel meanders to the west slightly, the right bank face appears to have slumped down into the flow and there is a small length of submerged earth bank toe, and a small area of bare earth at the water margin.	
11	TL0221644248 W3W: ///grounded.chainsaw.advising Flow within the watercourse is to the north Photographs taken from the right bank	Similar to upstream	
12	TL0221344259 W3W: ///sports.retain.adjuster Flow within the watercourse is to the north Photographs taken from the right bank	A single piece of large wood across the channel and a collection of organic matter	
13	TL0222744302 W3W: ///bonds.cookers.hiked Flow within the watercourse is to the north Photographs taken from the right bank	Area of sinuosity at the downstream end of the small deciduous woodland, and approximately 100m upstream of a public footpath crossing. There are a few areas of evidence of bank slumping and narrowing of the wetted width to the presence of vegetated bank toes.	

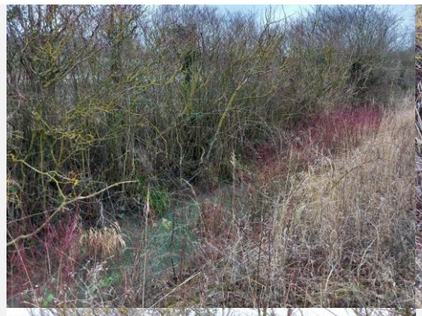
14	TL0226144410 W3W: ///forensic.vanished.ladders Flow within the watercourse is to the north Photographs taken from the public footpath bridge	Public footpath, single span footbridge, which is constructed from a concrete slab, which does not constrict flows by reducing the channel width. Upstream of the bridge, there is a small area of submerged bank toe, from bank slumping. The channel alignment is very straight both upstream and downstream of the bridge, and the cross-section shape is trapezoidal.	   
30	TL0276545147 W3W: ///catapult.shirtless.titles Flow within the watercourse is to the east, before bending to the north Photographs taken from the right bank	The upstream of this survey reach is marked by a dual arch railway culvert, where each arch is approximately 1m in diameter, separated by a 0.5m wide pier. It was not possible to observe whether the bed within the culvert is a continuation of the brick arch or a natural bed. Flows within the culvert appear to be approximately 0.2m deep, but the turbidity of the flow make an estimation difficult. There is a small, 0.2m drop at the culvert outlet. Downstream of the outlet, unbroken and broken standing waves are visible, especially on the right half of the channel. Juvenile deciduous woodland stretches to the left bank top, while the right bank top appears to have been recently cleared, and is completely unvegetated, and bricks are packed into the earth on the bank top. The left bank face has been scraped back, while on the right bank face there is a section of brick wall which is falling into the flow. There are approximately 100 further bricks along the channel bed and along the right bank face. The wetted width around this meander varies from 2.5m to 1.5m. A strong artificial detergent smell, and consistent areas of foam on the flow surface was also noticeable at this location.	     
31	TL0278245185 W3W: ///curl.whisk.paints Flow within the watercourse is to the north Photographs taken from the right bank	Approximately 50m further downstream, a 5m section of the right bank top, containing bricks and other waste has slumped into the channel bank slump pinching channel into 1.5m max width. This constriction results in unbroken standing waves.	 

32	TL0280845218 W3W: ///upstairs.shorthand.desktops Flow within the watercourse is to the north Photographs taken from the right bank	A ditch joins from the west and is connected to the Brook via a 0.5m diameter plastic conduit, with a stone headwall. Similarly to upstream the structure surrounding the culvert and bank tops are constructed of earth mixed with bricks, which are falling into the channel.	
33	TL0287245386 W3W: ///crab.crab.seat Flow within the watercourse is to the north Photographs taken from the right bank	The channel alignment is very straight and is parallel with the railway line. The left bank top is composed of juvenile deciduous trees and shrubs which extend to the bank top, while on the right bank short grasses extend to the water margin, with trees and other vegetation entirely absent. The channel cross section shape, and dimensions are consistent along this 1.2km reach, with a wetted width of 1.5m. Flows are rapid and turbid, with a smooth surface with limited upwellings.	
34	TL0290745460 W3W: ///family.that.fend Flow within the watercourse is to the north Photographs taken from the right bank		
35	TL0301345715 W3W: ///hotel.cherry.finely Flow within the watercourse is to the north Photographs taken from the right bank	A potential area of bank slumping on the right bank top	
36	TL0305245806 W3W: ///strike.money.posed Flow within the watercourse is to the north Photographs taken from the right bank	A small area of bank slumping on the right bank	

37	TL0316146052 W3W: ///signal.fries.rungs Flow within the watercourse is to the north Photographs taken from the right bank		
38	TL0318846100 W3W: ///bricks.fills.shine Flow within the watercourse is to the north Photographs taken from the right bank	An unnamed drainage ditch joins the Elstow Brook from the west through a 1m wide, square, box culvert.	
39	TL0330246255 W3W: ///universally.yours.keep Flow within the watercourse is to the north Photographs taken from the right bank	At the downstream end of the very straight reach, the channel widens to approximately 5m wide, where an additional ditch also joins from the east. Under the A421, the Brook is contained within a 4m wide, corrugated steel arch culvert, with concrete wingwalls. It is not possible to observe whether the bed is composed of natural or artificial material such as a concrete armament, due to the high turbidity. Where the channel is over wide there are large accumulations of silt at the right bank toe.	
62	TL0395946806 W3W: ///flip.solar.lied Flow within the watercourse is to the east Photographs taken from the access road bridge into Interchange retail park	Approximately 1km further downstream, the Brook is contained between two large commercial units, and the associated car parks. The cross section remains trapezoidal in shape, with a mown grass left bank top and a smooth slow surface.	

Unnamed Ditch, - Ordinary Watercourse - which drains north to Manor Road, within the Red Line Boundary and the Elstow Brook WFD Catchment

24	TL0278843737 W3W: ///roadways.walked.motivator Flow within the watercourse is to the north Photographs taken from the left bank	Upstream limit of what was surveyable on the unnamed ditch which drains north towards Manor Road. While the ditch is wet, flow velocities along almost much of the reach are negligible and are very turbid. At this upstream limit two channels merge downstream of deciduous woodland. A large mass of Starwort is present.	
23	TL0278943774 W3W: ///flag.schooling.ratty Flow within the watercourse is to the north Photographs taken from the left bank	The ditch is overgrown with terrestrial macrophytes trailing into the channel	
22	TL0278343792 W3W: ///beamed.enclosing.cookie Flow within the watercourse is to the north Photographs taken from the left bank		
21	TL0277543869 W3W: ///condiment.dazzling.lollipop Flow within the watercourse is to the north Photographs taken from the left bank	A small field drainage pipe drains into the channel from the left bank	

20	TL0273943961 W3W: ///sweetly.ferried.conquests Flow within the watercourse is to the north Photographs taken from the left bank	The bank tops are overgrown with dense stands of juvenile deciduous trees	  
19	TL0273043988 W3W: ///labels.abundance.suspends Flow within the watercourse is to the north Photographs taken from the left bank	The watercourse is hidden with a culvert which is approximately 20m long an allows machinery access between the two adjacent fields.	  
18	TL0273144110 W3W: ///padding.dispensed.renovated Flow within the watercourse is to the north Photographs taken from the left bank		 

17	TL0271744205 W3W: ///fruitcake.exists.pulsing Flow within the watercourse is to the north Photographs taken from the left bank	The water depth is along this reach is consistent. It is difficult to accurately estimate the exact depth due to the turbidity but is likely approximately 0.3m. The channel is consistently incised, with the water surface up to 2.5m below the floodplain. The channel width varies between 1-1.5m and the bank angles are steep between 45-80 degrees. The channel was visible during winter, but during summer would be heavily shaded by brambles and juvenile deciduous trees. Lots of moss is present on the bank top in places, with no bare earth observed. Flows have negligible velocity and a very turbid. In channel macrophytes include water parsnip / fools watercress, as well as some reeds. No erosional or depositional features were observed along the reach.	
16	TL0271644217 W3W: ///saturate.thank.resonates Flow within the watercourse is to the north Photographs taken from the left bank		
15	TL0268544247 W3W: ///attracts.clearly.bookshelf Flow within the watercourse is to the north Photographs taken from the left bank		

53	TL0265044366 W3W: ///hatter.sideboard.cabbage Flow within the watercourse is to the north Photographs taken from the left bank	 
54	TL0267144464 W3W: ///fenced.rewarding.shuttling Flow within the watercourse is to the north Photographs taken from the left bank	
55	TL0269344522 W3W: ///urban.surcharge.counts Flow within the watercourse is to the north Photographs taken from the left bank	 

New Lake connection areas – located to the north of the former brick works

49	TL0299544676 W3W: ///sushi.maybe.joins Photographs taken facing north	Large Hedgerow along the Red Line Boundary	
48	TL0303144853 W3W: ///strike.grades.edges Photograph taken facing north	Photograph shows lake in distance and barrier along edge of Brick works initial construction preparation area	
47	TL0302944860 W3W: ///chain.nation.united Photograph taken facing east	Vehicle tracks on bare earth	
46	TL0310544923 W3W: ///knee.cheat.trunk Photographs taken facing north then south	potential existing connection between lakes. The ground surface includes bricks	 
45	TL0326045017 W3W: ///shells.slices.early Photograph taken facing east	View of lake to the east, outside of Red Line Boundary Area	

40	TL0296845086 W3W: ///drape.wide.volume Photographs taken from bridge facing east and then west	A drainage ditch connects drains into a lake from the west. The flow has a non-perceptible velocity. The Structure which spans this channel appears to be a single clear span concrete bridge.	   
41	TL0315845205 W3W: ///judges.nobody.hooks Photograph taken facing north	Vehicle tracks with view of lakes to the north	
42	TL0323745232 W3W: ///ledge.matter.split Photograph taken facing north then south	Vehicle tracks in area where a connection is planned between lakes to the north and south. The southern lake is significantly lower than the plateau of land on which the photograph was taken.	 
43	TL0323345244 W3W: ///nurse.pipes.fallen Photograph taken facing north	View of the rectangular lake to the north. The land on which the photograph was taken is approximately 5m above the lake surface.	 

44	TL0323445245 W3W: ///fuel.incomes.tiles Photograph taken facing south	Vehicle tracks in area between lakes to north and south	

Harrowden Brook – WFD Watercourse

27	TL0382943657 W3W: ///bandaged.bumping.adults Flow within the watercourse is to the north Photographs taken from the right bank	The Harrowden Brook flows north parallel to the B530, before it is culverted under the road in a north easterly direction. The Brook emerges from a 1m diameter, brick arch culvert and this marks the limit of the survey reach. The rapid flow emerging from the culvert drops down over two steps, the first a larger drop of approximately 0.25m. A second channel joins from the right bank, emerging from an additional culvert. Both channels have a trapezoidal cross section, with steep banks angles of 45º, however the channel joining from the right is reinforced with a concrete revetment. The bank tops are composed of short mown grasses, while there is a gravel footpath running along the right bank top between the watercourse and residential properties. An outfall is present on the right bank, and a short distance downstream of this there is a short drop in the bed, where it appears there is a utility crossing contained inside geotextile protection, which results in some unbroken standing waves.	     
28	TL0384143673 W3W: ///cocktail.baroness.aquatics Flow within the watercourse is to the north Photographs taken from the right bank	The channel alignment between the residential properties is straight, with a consistent wetted width of approximately 1.25m. The water surface remains at least 1.5m below the floodplain, and a large embankment, which is approximately 1.5m tall is set back on the left bank top. The cross section is consistently trapezoidal with 45º bank angles.	
29	TL0386643715 W3W: ///nightcap.woven.strongman Flow within the watercourse is to the north Photographs taken from the right bank		
26	TL0384943917 W3W: ///humid.charge.deputy Flow within the watercourse is to the east Photographs taken from the left bank	The watercourse appears to have been realigned, as main flow is to the north-east rather than following the mapped WFD line to the north. Where the Harrowden Brook bends east, the area to the north drains south back into the Harrowden Brook, through a 0.5m diameter circular conduit and then under a 1.25m diameter circular conduit, which is surrounded by sandbags.	 

Tributaries draining into Harrowden Brook

52	TL0297844160 W3W: ///tuck.loose.poem	View of waterlogged arable fields to the west of a drainage ditch which is mapped as draining north towards Manor Road.	
51	TL0311644158 W3W: ///cotton.decide.shadow	View of waterlogged arable fields to the west of British car auctions site. This is location where it is proposed that an unnamed ditch is due to be realigned to	   
56	TL0325044293 W3W: ///facing.gentle.ballots Flow within the watercourse is to the east Photographs taken from the right bank along Manor Road	Drainage ditch which runs parallel along the south side of Manor Road, adjacent to Cemex.	
57	TL0329144261 W3W: ///hurt.trend.humans Flow within the watercourse is to the east Photographs taken from the right bank along Manor Road	Drainage ditch to the north of Manor Road is not visible or safely accessible through the dense scrub	 

50	TL0345644209 W3W: ///farms.ally.verge	Drainage ditch to the south of Manor Road, to the North of British Car Auctions site. Water within the ditch looks to be heavily polluted, opaque and black.	 
59	TL0358644217 W3W ///juices.showed.living	Drainage ditch which appears to flow south through juvenile woodland towards Manor Road.	
58	TL0360844167 W3W: ///wipes.friday.copies Flow within the watercourse is to the east Photographs taken from the right bank along Bedford Road	Drainage ditch which is located along the eastern side and runs parallel with the B530. There is negligible flow velocity, and it is not clear which direction flow would drain towards as the gradient is very flat.	 

Appendix D

ENVIRONMENT AGENCY ENGAGEMENT RESPONSE

WSP UK Limited
70 Chancery Lane
London
WC2A 1AF

Our ref: XA/2024/100102/03-L01
Your ref: P320/Project Nectarine

Date: 23 May 2025

FAO [redacted]

Dear [redacted]

Universal UK Project Approximately 476-acre (192-hectare) Parcel of land for a potential New park and resort experience
Land South of Bedford

Thank you for providing the Water Framework Directive (WFD) Assessment for us to consider in support of the above project.

We have reviewed the assessment and agree that the approach to, and outcomes of the WFD Screening and Scoping Assessment is considered appropriate.

We can also provide the following comments on the assessment, that should be considered as part of the Special Development Order.

Water Quality
The Water Quality aspects have been appropriately considered.

Groundwater
There are no groundwater bodies beneath the site so we agree that they have been excluded from the assessment.

Water resources
Hydrological regime WFD element assessment

Whilst hydrogeomorphological form and function of waterbodies is included in the WFD assessment, the Hydrological regime element itself is not referred to. This element evaluates Q95 flows scenarios which are able to sustain aquatic ecology with recent actual Q95 flow scenarios resulting from artificial influences such as abstraction and discharges in order to establish compliance as a supporting element to overall WFD status.

Direct impact assessment

No waterbodies in the Bedford Ouse operational catchment are non-compliant for the hydrological regime supporting element under the WFD (including the Elstow brook upstream of Shortstown and the Harrowden brook). This means that at Q95 (low flows), current levels of abstraction are not deemed to be a risk to ecological elements.

The catchment is discharge rich, meaning that low flows are augmented by artificial inputs of water such as from water recycling works elsewhere in the upper catchment, maintaining compliance.

Most WFD river catchments which are impacted upon by water company groundwater abstraction are dependent on water from Chalk aquifers further east in the region. This site is located within the South Ruthamford supply zone operated by Anglian Water Services Ltd (AWS) where the geology is predominantly clay. The source of water for this supply zone comes from Rutland, Grafham and Pittsford reservoirs which abstract water from surface water bodies.

It is not anticipated from the documents reviewed to date that there will be any reductions in flow which will affect the compliance of the Elstow brook. However, it is also acknowledged that the Elstow Brook is hydrologically connected to the drainage and lake system on the site.

Any further conceptualisation of the site or outcomes of modelling undertaken should also screen this connectivity in for potential WFD impact assessment, therefore. If an abstraction licence is required for the consumptive uses of water described (irrigation and water features), part of the licence determination would depend on this WFD compliance.

Indirect impact assessment

Anglian Water Services (AWS), who supply the region of this development, is subject to licence reductions (caps) on its groundwater licences to manage the risk of deterioration of associated water bodies, according to the principles set out in the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD Regulations). The company's 2024 water resources management plan (WRMP24) has set out that it will be reliant on seeking to defer some licence reductions until new strategic supplies can be developed (e.g. via strategic schemes; see Section 4.4.3 Time-limited and permanent licences in WRMP). This means that until these new sustainable supplies are available, supplies to existing customers and those to supply growth will be as a result of deferring some licence changes under Regulation 19 of the Water Framework Regulations. This means that deterioration is possible if overall volumes from AWS supply network increase.

AWS are heavily reliant on the success of demand management measures to maintain customer supplies until new strategic sustainable supplies of water can be developed. Our advice, is for planning applications to seek to achieve greater water efficiency and re-use in their designs (beyond the standards within current adopted local plan policies) wherever possible to help the companies meet their water efficiency targets.

Mitigation

We are very encouraged by the treatment and re-use of water for the non-potable demands described to date. For non-potable demands, we would recommend that any development should be as water efficient as possible using the BREEAM standards; specifically targeting the “Outstanding” level. We are pleased to see commitment to a

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comparable building standard in LEEDA ‘Gold” has been adopted.

Fisheries

Table 4-2, Alteration to flows and water quantity

Specific mitigation for fish an aquatic ecology is not present for any impacts associated with changes in flow and water quantity. Any changes in flow and water quantity may reduce connectivity for fish, disturb feeding behavior, lead to increased predation pressure and loss of spawning habitat. Any mitigation should be specific for changes in flow and water quantity not just water quality mitigation.

Table 4-3, new outfall discharges

No mitigation is proposed to stop flow from outfall discharges become an attractant flow for fish and become a new migratory path for European eel, leading to entrapment into outfalls. The impact is fish may congregate at outfalls and become more vulnerable to predation, as well their use of upstream and downstream habitat use being hindered. Furthermore, European and other species may become entrapped into the outfalls. Mitigation should be provided specific to fish as well as further design detail to ensure that there is no impact from this issue.

Table 4-3

The transfer of INNS and fish pathogens should be assessed in the WFD status of waterbodies. It is noted that still waterbodies on site will be used to store water, become sinks for water and discharge into the Elstow Brook. There is the risk of creating pathways and spreading INNS and fish pathogens between waterbodies, which could lead to a deterioration in WFD status. Mitigation should be provided in any design details and an INNS management plan will ensure that there is no impact to waterbodies due to a new pathway for INNS spreading.

Table 5-1

Should the previous comments be addressed the conclusion in this table for the Biological Quality Element will be met.

Geomorphology

To enhance the WFD status of the waterbodies concerned, any design should aim to de-culvert where possible and eliminate “drops” at the downstream ends of existing culverts. Consideration should be given to allow the Elstow Brook to be de-culverted and returned to its former 1880s-1960s channel planform.

Should you require any additional information, or wish to discuss these matters further, please do not hesitate to contact me on the number below.

Yours faithfully

[redacted]
Account Manager
National Infrastructure Team
Team e-mail NIteam@environment-agency.gov.uk

Appendix E

MITIGATION MEASURES COMPARISON TABLES

Table E-1 - WFD mitigation location within the Environmental Statement

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
Construction			
M-BD-1	**Fine sediment and pollution risk** The riparian zone will be reinstated to replicate baseline conditions as far as practicable.	The extent of vegetation clearance should be limited as far as practicable near to watercourses. Where possible, any vegetation removed should be managed carefully to limit the extent of bare soil on Site at any given time, to limit the potential for sediment run-off during wet weather.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51, bullet 4
		Impacts to vegetation within the riparian zone during the enabling works and Construction Phase should be monitored for recovery and suitably reinstated.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51, bullet 5
		A construction exclusion zone from the water's edge of at least 10m on Elstow Brook, will be enforced to reduce potential impacts to watercourses/water bodies.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51, bullet 9
M-WQ-1	**M-WQ-1**: Construction plant and equipment will be sufficiently maintained to limit environmental	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3)

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
	impacts. Wheel washes and road sweepers will also be utilised.	leaving the Site where reasonably practicable).	Paragraph 3.6.1 Measures specific to track out, bullet 7
		All machinery will be regularly checked for oil leaks or similar, which, if found, must be prevented from entering the drainage ditches or watercourses either through immediate repair of the machinery or through use of a drip tray/spill kit or similar.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.2, bullet 7
M-WQ-2:	Where reasonably practicable, static plant and machinery and soil storage areas will be located away from sensitive boundaries or receptors. Furthermore, the mixing and handling of materials will also be undertaken in designated areas and away from surface water drains.	Avoidance of storage of plant and materials on areas of potential foraging habitat (e.g., retained grassland).	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.18 bullet 2
		Location of high risk activities placed away from water bodies and drainage systems 10m e.g. mixing of materials, hazardous storage materials, fuel storage tanks.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 11
		Fuel, oil and chemicals will be stored in secondary containment and located a minimum of 10m from any watercourse. The secondary containment system must provide	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.2, bullet 10

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		storage of at least 110% of the tank's maximum capacity and ensure that any valves, filters, sight gauges, vent pipes or other ancillary equipment are also situated within the secondary containment system and arranged so that any discharges are contained.	
		Subsoil shall be stockpiled immediately upon excavation to reduce the degradation of the material to a minimum. Subsoil shall be sealed daily to prevent ingress of moisture.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 3
		When construction activities, including stock-piling and plant and vehicle washing, occur near a watercourse they should be separated from the watercourse with barriers (e.g. sediment fences) to prevent surface runoff from these Sites entering the watercourse. Construction activities should be as far from the bank top of a watercourse and/or connected hydrological pathways as practicable. Works within 8m of watercourses require an environmental permit from the Environment Agency (or relevant	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51 bullet 3

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		authority), which will be obtained prior to commencement of works.	
		Activities such as concrete pouring will be carried out in line with industry best practice, such as use of concrete washout points to avoid lorries and pumps runoff contamination and temporary works procedures to avoid spillages.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51 bullet 7
M-WQ-3:	Best practice guidance and mitigation measures would be implemented to manage the risk of accidental spillages on site and potential conveyance to nearby water bodies via surface run off. Furthermore, the use of cut off drains, fabric silt fences, swales, stockpiles and bunds would be utilised to prevent uncontrolled release of sediment.	Waste fuels and other fluid contaminants will be collected in leak-proof containers prior to removal from Site to an approved processing facility.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 310.2 bullet 11
		During the detailed design for the Drainage Strategy consideration will be given to scheduling early provision of proposed SuDS infrastructure so this can serve a construction mitigation function wherever practicable.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 27
		Management of stockpiles, avoiding proximity to waterbodies and drainage systems e.g. 10m.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 5

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		Wash out of any cement or concrete lorries will not be discharged to receiving water environment or foul water sewer.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.2, bullet 12
		There should be no uncontrolled run-off of water or mud from the Site - runoff should be directed and captured in sacrificial Sustainable Drainage Systems (SuDS) for settlement and retention	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.2, bullet 6
M-WQ-4:	Temporary drainage may be required, and various measures would be considered to prevent pollution and sediment loading.	Sediment laden water generated on Site will be appropriately treated before discharge. This may be through the use of silt fences, silt traps, filter bunds (possibly straw bales or gravel bunds), settlement ponds and/or proprietary units such as a 'siltbuster'. Discharges will not be direct to any watercourse, but will be made to ground (where appropriate).	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 24
		During the detailed design for the Drainage Strategy consideration will be given to scheduling early provision of proposed SuDS infrastructure so this can serve a construction mitigation function wherever practicable.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 27

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		Management of stockpiles, avoiding proximity to waterbodies and drainage systems e.g. 10m.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 5
		Bunded areas, concrete aprons, and contained drainage areas where the risk of pollutant entering and contaminating the watercourse is high.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 10
		Location of high risk activities placed away from water bodies and drainage systems 10m e.g. mixing of materials, hazardous storage materials, fuel storage tanks.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 11
		For temporary foul drainage systems, include and maintain septic tanks or temporary connections to existing public foul system to prevent risk of contamination to groundwater and Elstow Brook.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 13

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		Suitable management of surface water runoff to prevent both on and off-Site flood risk and pollution effecting the drainage network, the Coronation Pits. the Lake and Kempston Hardwick Clay Pits (North) – disused pits.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 16
M-WQ-5	Water quality monitoring during works.	Sediment management and water quality monitoring would be implemented during any construction works with the potential to affect watercourses.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51, bullet 1
M-G-2	Construction phasing for the Core Zone watercourse relocation/realignment will take into account the creation of the new channel prior to diverting the existing. Therefore, the new channel should be created and then once complete flows should be diverted from the existing channel to the new channel. This will limit the time flow, and lateral and longitudinal connectivity will be impacted.	All relevant consents will be sought from the EA for temporary discharges and in-stream works.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 28
M-BD-2	Proposed outfall construction should be carried out in such a way to keep the watercourse in as natural condition as possible. Specifically, the outfall construction should not have negative impacts on the following: ecology, habitat, flow dynamics and erosion. To do such, no part of	Where drainage design requires approvals and consent e.g. Land Drainage Consent, Water Framework Directive (WFD), Discharge Permits, this will be sought through engagement with and approval from other bodies	Appendix 12.3: Drainage Strategy, Paragraph 1.2.3

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
	the new structure should extend into the existing cross section, affecting flow conveyance and localised hydraulics.	such as the Bedford Group of Internal Drainage Boards (IDB) and/or the Environment Agency (EA) prior to submission of detailed drainage design proposals to MHCLG.	
M-BD-3	Where practicable, construction works will avoid works on watercourses during high flow events to reduce the impact on biological continuity. Works will be carried out in the drier months where to possible to also reduce the risk of pollution propagating downstream.	Local weather forecasts will be monitored and works scheduled accordingly.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.2, bullet 8
M-WQ-6	Use and design of oil separators in surface water drainage systems.	PPG 3: Choosing and using Oil Separators (EA, 2006).	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.4, bullet 3
M-WQ-7	Treatment and disposal of wastewater where there is no connection to the public foul sewer.	The Principal Contractor(s) and all Sub-contractor(s) must take precautions during the Construction Phase to protect the entire drainage system from siltation or pollution. During the Construction Phase, water supplies are required for Site staff, sanitary facilities, wheel washing, and concrete mixing. Used water will discharge into the receiving public foul water network. Anglian Water have advised that expected water supplies	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.5

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		required for Construction Phase can be provided	
		For temporary foul drainage systems, include and maintain septic tanks or temporary connections to existing public foul system to prevent risk of contamination to groundwater and Elstow Brook.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 13
M-WQ-8	Containment measures will be implemented in accordance with construction best practice and Pollution Prevention Guidelines (PPGs).	All construction activities will be undertaken in accordance with legislation and the following EA Pollution Prevention Guidance (PPG). ▪ PPG 1: General Guide to the Prevention of Pollution of Water Resources (EA , reviewed July 2013); ▪ PPG 2: Choosing and using Storage Tanks (EA, April 2014); ▪ PPG 3: Choosing and using Oil Separators (EA, 2006); ▪ PPG 6: Working at Construction and Demolition Sites (EA, April 2014); ▪ PPG 7: Operating Refuelling Facilities (EA, August 2011);	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.4

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		▪ PPG 13: Vehicle Washing and Cleaning (EA, July 2007); ▪ PPG 21: Pollution Incident Response Planning (EA, 2004); and ▪ PPG 22: Dealing with Spills (EA, April 2011).	
M-WQ-9	Any works to over pump/flume the channel should be limited to as short a period as practicable, with works undertaken in periods of low flow where practicable.	It is anticipated that some of the excavations will encounter groundwater (perched or otherwise). Water ingress has the potential to be contaminated and will require management through either dewatering and/or disposal under Duty of Care to dispose appropriately of excavated water or discharge to a surface water lake within the Site under an appropriate surface water discharge consent. Measures should be taken to ensure that when emptying and/or excavating such structures, contaminated liquids do not contaminate the surrounding soil or other materials or enter groundwater or any surface water feature.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.9.10, bullet 17
		Dewatering of excavations into temporary SuDS and ponds allowing interception, settlement and mitigation	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3)

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		of pollutants before entering the receiving watercourse.	Paragraph 3.10.3, bullet 15
		At the detailed design stage if any works are deemed to require significant dewatering (groundwater control) operations further consideration will be given to potential impacts and requisite mitigation. At present, the requirement for significant dewatering is considered very unlikely however, where long-term dewatering operations (>6 consecutive months) are proposed this will be subject to licensing consent through the EA.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.10.3, bullet 26
M-G-1	Permanent outfalls should be designed and constructed to provide the conveyance needs as well as meeting the demands of the corresponding geomorphological processes.	Where drainage design requires approvals and consent e.g. Land Drainage Consent, Water Framework Directive (WFD), Discharge Permits, this will be sought through engagement with and approval from other bodies such as the Bedford Group of Internal Drainage Boards (IDB) and/or the Environment Agency (EA) prior to submission of detailed drainage design proposals to MHCLG.	Appendix 12.3: Drainage Strategy, Paragraph 1.2.3

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M-BD-4	To comply with the Salmon and Freshwater Fisheries Act 1975 and the EA standard rules for environmental permitting, construction works should be avoided between 1st October to 31st May (inclusive) for salmonids and 15th March to 15th June (inclusive) for coarse fish. Should any work be required within these periods, consent will need to be sought from the EA.	Salmon and Freshwater Fisheries Act 1975 Permit required from the Environment Agency Required in advance of any substantial works to watercourses and water bodies supporting fish populations, to enable capture and removal	As set out in the Summary of Agreed Position with the Environment Agency (submitted as Appendix 4 to the Planning Statement (Document Reference 6.1.0) and the Other Consents and Licences (Document Reference 1.19.0)
M-BD-5	A fish rescue should be carried out prior to the construction of the headwalls to minimise any impacts to species within the area. Authorisation to use fishing instruments other than rod and line must be obtained prior to the works commencing (FR2 application form).	Should any part of a watercourse need to be impounded during the works, then a fish translocation exercise may need to be carried out. Fish translocation operations will require a permit from the EA. A fish translocation method statement to accompany the permit application will be prepared. Any such operation will need careful co-ordination with the Principal Contractor(s) to set-up and drain any coffer dam or impounded areas.	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51, bullet 10
M-BD-6	It is currently understood that piling will only be needed to install the proposed new Bridge crossing on Elstow Brook (US Shortstown) which would be a clear-span structure. Any piling should be vibration where possible utilising soft-start techniques should be used to minimise the acoustic impact on fish in the vicinity.	Sensitivity (to noise and vibration) of those fish species present should be considered to implement appropriate construction methods to minimise and avoid disturbance. Construction will comply with measures set out in the Section 3.7 of Appendix 2.3: Outline Construction Environmental	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.51, bullet 8

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		Management Plan. Should sheet piling be required in close proximity to a watercourse then a soft-start piling method should be implemented. Timing of construction activities near watercourses should allow for fish dispersion.	
M-BD-7	Biosecurity measures should be implemented during the construction phase of the Proposed Development to prevent the introduction and spread of INNS. Measures should include: ▪ The briefing and training of workers on good biosecurity practices appropriate to their role; ▪ Equipping workers with the necessary equipment, PPE and substances to implement biosecurity control measures; ▪ Ensuring that Defra's "Check, Clean, Dry" principles are followed; and ▪ Where possible, contractors should park their vehicles on hard-standing areas and check/clean tyres prior to entering and leaving the site.	To address the risk of spreading invasive non-native plant and animal species a detailed invasive species strategy would be produced by the Principal Contractor(s) alongside the CEMPs. This strategy would include and develop the following measures: ▪ A pre-construction survey for Invasive non-native plant species would be completed in the active growing season (approximately April to August inclusive) prior to vegetation and Site clearance commencing in any part of the Site; ▪ Measures to prevent the spread of any invasive species across and beyond the Site will include exclusions zones around identified areas of invasive species where no	Appendix 2.3: Outline Construction Environmental Management Plan (Volume 3) Paragraph 3.2.61

WFD mitigation ID	WFD mitigation text	Mitigation text as it appears in the Environmental Statement or reference to alternative securing measure	Location of mitigation within the Environmental Statement or other securing measure
		works are to take place with. Invasive species removal carried out by a specialist contractor; ▪ Briefing and training of workers on good biosecurity practices appropriate to their role; ▪ Equipping workers with the necessary equipment, Personal Protective Equipment (PPE) and substances to implement biosecurity control measures, including effective hygiene and sanitation practices. This will most frequently comprise disinfectant tablets, sprayers and brushes to clean and disinfect equipment and PPE prior to leaving Site; ▪ Ensure that Defra's "Check, Clean, Dry" principles are followed and aim that all PPE and survey equipment is clean and dry (and if necessary, disinfected) prior to going to and from Site; and ▪ Survey for mink presence to assess the risk of Water Vole predation, and measures to avoid incidental movement of other non-native species such	

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		as signal crayfish (Pacifastacus leniusculus) prior to any translocation activities, if required	
Operation			
M-G-1	Permanent outfalls should be designed and constructed to provide the conveyance needs as well as meeting the demands of the corresponding geomorphological processes. With the relevant mitigation measures in place, no deterioration is anticipated at the water body scale	Where drainage design requires approvals and consent e.g. Land Drainage Consent, Water Framework Directive (WFD), Discharge Permits, this will be sought through engagement with and approval from other bodies such as the Bedford Group of Internal Drainage Boards (IDB) and/or the Environment Agency (EA) prior to submission of detailed drainage design proposals to MHCLG	Appendix 12.3: Drainage Strategy (Volume 3) Paragraph 1.2.3

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