



UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks
and adjoining land, Bedford

Flood Resilience Scheme

CONDITION 57 – FLOOD RISK

Revision Number: 01
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APPENDICES

APPENDIX A – FLOOD MAPS AND PLANS

GLOSSARY OF ABBREVIATIONS

- AEP – Annual Exceedance Probability
- AOD – Above Ordnance Datum
- CC – Climate Change
- CEMP – Construction Environmental Management Plan
- DG/SSG DCG – Sewer Sector Guidance / Design & Construction Guidance
- EA – Environment Agency
- ES – Environmental Statement
- ESTRY – 1D hydraulic modelling software (part of TUFLOW suite)
- FEH – Flood Estimation Handbook
- FWMA – Flood and Water Management Act
- HEC-RAS – Hydraulic Engineering Centre – River Analysis System
- IDB – Internal Drainage Board
- LiDAR – Light Detection and Ranging (elevation data)
- LLFA – Lead Local Flood Authority
- MML – Midland Main Line
- NRFA – National River Flow Archive
- OS – Ordnance Survey
- QBar / QMed – Baseline/median greenfield runoff rates
- SDO – Special Development Order
- SuDS – Sustainable Drainage Systems
- SSHCLG – Secretary of State for Housing, Communities and Local Government

1.0 INTRODUCTION

- 1.1 This Flood Resilience Scheme (referred to as the “Scheme”) is submitted for endorsement to the Secretary of State for Housing, Communities and Local Government under Condition 57 (Flood Risk) of the Town and Country Planning (Entertainment Resort Complex, Bedford) Special Development (No. 2) Order 2025 (SI 2025/1322).
- 1.2 The Scheme sets out the changes and mitigation measures required to address flood risk identified through the detailed flood modelling. These include changes to ground levels, the allocation of development to areas at the lowest flood risk, proposed sustainable drainage systems, and measures to manage residual flood risk.
- 1.3 The Scheme includes:
1. a non-technical overview of the flood modelling process, including the key assumptions and limitations on which the mitigation measures are based (Section 4); and
 2. OS Plans in Appendix A, together with Sections 5 and 7, identifying those parts of the Order land likely to be affected by fluvial and pluvial flood risk and indicating the annual probability for the “design flood event” using the classification in Table 10 of the Order, reproduced in this Scheme as Table 5.1 - Table 10, Classification of Flood Zones (from Condition 57 of the Order).
 3. mitigation measures (Section 6) to manage flood risk, including changes to ground levels, the allocation of development to areas at lowest flood risk, proposed sustainable drainage systems, and measures to manage residual flood risk, to support authorised Mass Grading (Condition 13) works;
- 1.4 This Scheme (including the supporting appendices) has been led, overseen, and authored by [REDACTED] and [REDACTED].
- 1.5 Flood Risk and Drainage is led by [REDACTED] BSc Civil Engineering, an Associate Director with over 20 years’ experience who leads the Surface Water Management Infrastructure Package for the project. [REDACTED] has completed several projects designing Sustainable Drainage Systems using AutoCAD Civil 3D, Navisworks, Micro Drainage, and PDS, across varying sectors including residential, commercial, education, healthcare, defence, hospitality, and technology infrastructure.
- 1.6 Flood Modelling is led by [REDACTED] BSc MCIWEM C.WEM CSci CEnv, a Technical Director with 18 years’ experience who leads the WSP Fluvial and Pluvial Modelling Team. [REDACTED] has completed hundreds of flood modelling projects using Flood Modeller, ESTRY and TUFLOW for various applications including planning applications, Development Consent Orders, Flood Alleviation

Schemes, flood mapping for the Environment Agency and large infrastructure schemes (road, rail, energy).

- 1.7 The modelling assessment has been carried out in accordance with current national planning policy, relevant Environment Agency guidance and recognised industry best practice. The methods and data relied on for the assessment are, to the best of our ([REDACTED] [REDACTED] and [REDACTED] [REDACTED]) knowledge, accurate, appropriate, and proportionate to the nature of the development. The conclusions regarding flood risk to the site represent our professional judgement based on the evidence available.

2.0 DOCUMENT REGISTER

2.1 The following documents are included in this Scheme and are for endorsement:

- Appendix A Flood Map and Plans:
 - Condition 57 Flood Risk Scheme Location Plan
 - Flood Map 1 – Existing Baseline Fluvial Table 10 of The Order
 - Flood Map 2 – Existing Baseline Fluvial Design Flood Event 1% Annual Exceedance Probability + 20% Climate Change
 - Flood Map 3 – Existing Baseline Pluvial Table 10 of The Order
 - Flood Map 4 - Existing Baseline Pluvial Design Flood Event 1% Annual Exceedance Probability + 40% Climate Change
 - Flood Map 5 – Future Scenario Fluvial Table 10 of The Order
 - Flood Map 6 - Future Scenario Fluvial Design Flood Event 1% Annual Exceedance Probability + 20% Climate Change
 - Flood Map 7 - Future Scenario Pluvial Table 10 of The Order
 - Flood Map 8 - Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability + 40% Climate Change
 - Exceedance Plan 1 Existing Baseline Pluvial Design Flood Event 1% Annual Exceedance Probability +40% Climate Change
 - Exceedance Plan 2 Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability +40% Climate Change
 - Condition 57 Flood Risk Scheme Flood Modelling Node Locations Plan
 - Condition 57 Flood Risk Proposed Strategic Surface Water Drainage Plan

3.0 SCOPE

- 3.1 Appendix A: Condition 57 Flood Risk Scheme Location Plan shows the extent of the Scheme within the Order land.
- 3.2 Detailed flood modelling relates to the Order land and where appropriate includes surrounding contributing catchments. Flood risk sources include fluvial and pluvial (surface water). The Existing Baseline and Future Scenario have been tested for a range of events consistent with Table 10 of The Order and the design flood event defined in Condition 57.
- 3.3 The Future Scenario is defined as the point at which the development on the Order Land has been completed to the proposed Site Levels. Site Levels are the proposed finished surface ground levels, which includes road corridors, parcel platforms, soft landscaping, strategic SuDS, and tie-in to existing site topography.
- 3.4 Flood modelling has been submitted to the Environment Agency and Bedford Group Internal Drainage Board and has been approved by both statutory bodies.
- 3.5 Sections 6.12 to 6.76 of this Scheme set out the proposed Strategic Surface Water Drainage measures that have been incorporated into, and tested through, the flood risk modelling. Where parts of the Order land are not yet subject to a detailed surface water drainage design, this Flood Resilience Scheme identifies the mitigation requirements with which future designs for those parts must comply. This approach is consistent with reference document 16 (Drainage Strategy). The flood modelling for the Existing Baseline considers the full extent of the Order land, including the East Gateway Zone parcel east of Ampthill Road. However, that parcel is excluded from this Scheme, as shown on Condition 57 Flood Risk Scheme Location Plan in Appendix A. A separate Flood Resilience Scheme, including proposed flood risk mitigation for the Future Scenario, will be submitted for that parcel before works commence in that location.
- 3.6 This Scheme only relates to catchments which drain to Elstow Brook, and does not include any surface water runoff to Harrowden Brook. The current WFD status of Harrowden Brook is therefore unaffected as no additional runoff will enter the tributary upstream of the Brook.
- 3.7 Flood risk is shown along Manor Road. This reflects surface water behaviour derived from the catchment-scale topographical model and does not include a detailed representation of the road's local highway drainage system. Topographical survey, drainage CCTV investigations, and available records indicate that existing Manor Road drainage discharges to an ordinary watercourse north of

Manor Road within the Elstow Brook catchment, and there is no hydraulic connectivity with Harrowden Brook.

- 3.8 For the purposes of the flood risk modelling, certain crossings have been represented using culvert arrangements as a cautious analytical assumption to test future flood risk and the performance of the mitigation measures within this Scheme. This Scheme does not define, justify, or seek agreement to the construction of any culvert. If culverts are subsequently considered necessary, any such proposal would be brought forward separately with the information required under the relevant condition.

4.0 FLOOD MODELLING

Overview

- 4.1 This section of the Scheme outlines the flood modelling process undertaken, including any key assumptions and limitations.

Flood Modelling

- 4.2 Existing hydraulic models (covering the Elstow Brook and some of its tributaries) from the Environment Agency and Internal Drainage Board were obtained and reviewed as part of the modelling process. It was determined that they were not fit for purpose for assessing flood risk within the Order land. This was due to a number of factors – the out-of-date hydrology, the need for updated survey data (e.g. the Elstow Brook is dredged by the IDB, so the bed levels need to be verified) and the fact that some watercourses (e.g. the Core Zone Watercourse) were not explicitly modelled in previous studies. As a result, site-specific flood modelling has been undertaken.
- 4.3 Two hydraulic models have been produced using industry-standard software (Flood Modeller-TUFLOW) to assess the risk of flooding to the Order land from fluvial sources (rivers overtopping their banks), pluvial sources (rainfall when the ground and drainage infrastructure do not have sufficient capacity), and reservoir flooding (usually as a result of a breach), both in the existing and future scenario.
- 4.4 The hydraulic model was developed to assess fluvial and pluvial flood risk and includes detailed representation of the geometry of the watercourses in the catchment (using site specific survey data) and the roughness of the channels based on the material of the channel and the presence of rocks and/or vegetation. The roughness of the channel has been determined using photos obtained from the watercourse surveys. Structures present along any of the watercourses have been represented using the watercourse survey data. Both hydraulic models (fluvial/pluvial plus reservoir) include representation of the floodplain in terms of ground levels (using LiDAR data and site-specific topographical data) and land use (applied as different roughness values where urban surfaces (e.g. roads) are generally represented as smoother than natural surfaces (such as grass)).
- 4.5 For the future scenario, design data has been used to represent the future watercourse diversions and flood storage areas. The future contours have also been used to update the ground levels within the model.
- 4.6 The hydrological assessment (carried out to determine river inflows to input into the fluvial model and rainfall profiles to input into the pluvial model) consisted of three main aims:

- Produce peak flow estimates and associated hydrographs (flow-time graphs) for the Elstow Brook and tributaries to use in the assessment of fluvial flood risk;
- Produce rainfall hyetographs (rainfall intensity against time) to use in the assessment of pluvial flood risk; and
- Produce dry day (when rivers are at normal levels) and wet day (when there is also flooding from rivers) hydrographs (flow-time graphs) downstream of Stewartby Lake to use in the assessment of reservoir flood risk.

4.7 The hydraulic model has been used to produce a range of outputs, including flood extents, the probability of flooding, the timing and duration of flooding during a storm event, and the depths, velocities and hazard of any flooding shown.

4.8 The results of the modelling have been used to determine design flood levels across the site in the Future Scenario for both fluvial and pluvial flooding. Flood depths and velocities from the pluvial model have been used to assess the existing surface water flow paths within the Order land (shown on Exceedance Plan 1 Existing Baseline Pluvial Design Flood Event 1% Annual Exceedance Probability +40% Climate Change in Appendix A). For the future scenario (shown on Exceedance Plan 2 Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability +40% Climate Change in Appendix A), a similar exercise has been undertaken to assess any impact of surface flow paths within the Order land. The results from the future scenario have been used to assess any change in floodplain storage and analyse the effectiveness of the future flood storage areas, watercourse diversions, and any modelled crossing arrangements. Key assumptions of the hydraulic modelling which has been carried out are provided below – where these could impact findings this is stated:

- 4m cell size (this splits the model into a grid of 4m x 4m squares). This was deemed appropriate based on the size of the area being studied – this is unlikely to impact predicted flood extents or flow paths;
- Roughness values in the surveyed watercourses have been assumed based on a selection of photos – checks were carried out against changes in this value, and no significant impacts to results were observed;
- The rainfall profiles applied within the surface water model have been determined using industry standard hydrological methods and software (ReFH2). No additional losses have been applied within the hydraulic model itself, so 100% of each rainfall depth value within the rainfall profile is applied to the model area;

- Reservoir geometry (elevation v plan area) for Stewartby Lake used within the EA model is still suitable for use. Winter operating rules for the Stewartby Lake gate have been used (supplied by the IDB);
- The LiDAR level of the road to the west of the Stewartby Lake gate has been used as the assumed location for any overtopping – this is a conservative assumption for assessing flood risk to the Order land;
- The dimensions and levels of the small connection between Kempston Hardwick Clay Pits (North) Artificial Lake and Kempston Hardwick Clay Pits (South) have been assumed based on LiDAR – this is a conservative assumption for assessing flood risk to the site and may provide an overestimate of flood risk to the Order land;
- For structures, the smallest cross-sectional area from the survey has been applied to both the upstream and downstream ends (if the survey showed them to be different). This approach is deemed to be the most conservative;

4.9 Key limitations of the hydraulic modelling which has been carried out have been provided below:

- The initial water level of Stewartby Lake has not been able to be set below 34.6m AOD, so as to align with the Winter operating rules provided (this is due to model stability issues);
- Lack of information regarding the location of any spillway/embankment around Stewartby Lake; and
- From the collected survey, some existing culverts show an increase in invert level at the outlet compared to the inlet. Some invert levels in the model have been adjusted to allow a positive gradient for model stability reasons.

4.10 In summary, hydraulic models have been produced for the purpose of analysing the risk to the Order land and surrounding area from fluvial, pluvial and reservoir flooding in both the existing and future scenarios. Reservoir flooding has been modelled as described, but is not included with the Baseline Flood Risk in Section 5 or the Future Scenario Flood Risk in Section 7, because Stewartby Lake is a below-ground former clay pit and is not treated as part of the baseline fluvial or pluvial flood risk affecting the Order land.

5.0 EXISTING BASELINE FLOOD RISK

Flood Risk Existing Baseline

- 5.1 Flood Risk Maps 1, 2, 3 and 4 for the Existing Baseline scenario are included in Appendix A: Flood Maps and Plans. Flood Map 1 – Existing Baseline Fluvial Table 10 of The Order, and Flood Map 3 – Existing Baseline Pluvial Table 10 of The Order show flood zones classified in accordance with Table 10, Classification of flood zones (from Condition 57 of the Order), which is replicated in Table 5.1 below. Flood Map 2 – Existing Baseline Fluvial Design Flood Event 1% Annual Exceedance Probability + 20% Climate Change and Flood Map 4 - Existing Baseline Pluvial Design Flood Event 1% Annual Exceedance Probability + 40% Climate Change, show flood zones for the design flood event.

Table 5.1 - Table 10, Classification of Flood Zones (from Condition 57 of the Order)

Probability	Description of Land within Zone
Low	Land with a less than 0.1 per cent annual probability of fluvial flooding
Medium	Land with between 0.1 per cent and 1 per cent annual probability of fluvial flooding
High	Land with a 1 per cent or greater annual probability of fluvial flooding
Very high	Land classified as functional floodplain

For pluvial flooding, “Very High” is defined as a greater than 3.3% annual probability of flooding, as “functional floodplain” is a term used for fluvial flood risk only.

Fluvial Flood Risk

- 5.2 A description of the existing baseline fluvial flood risk is set out below:
- 5.3 In the south-west corner of the Order land in the West Gateway Zone, where medium flood risk occurs, this originates from the West Gateway Zone Existing Watercourse which has a local low point in the top of bank and overtops onto the existing field. Where a narrow strip of Very High Probability flood risk is shown, this originates from West Gateway Zone Existing Watercourse and overtops onto land between Woburn Road and the A421 due to the existing culvert capacity restrictions.
- 5.4 Flooding occurs from two main locations on the Core Zone Existing Watercourse, towards the centre of the Zone where the watercourse enters an existing culvert and at the northern end of Core Zone where the watercourse enters another existing culvert under Manor Road. The flooding in both locations is due to the presence of undersized existing culverts.
- 5.5 In the Lake Zone, the existing Kempston Hardwick Clay Pits (North) - Artificial Lake contains Very High flood risk and provides storage capacity prior to overflowing into Elstow Brook via an existing

watercourse. Flooding of Very High Probability shown in the Kempston Hardwick Clay Pits (North) – disused pits is contained within the existing footprint and based on a surveyed permanent water level used for modelling purposes and does not hydraulically connect to the wider watercourse network, therefore this area represents an existing water body rather than fluvial flood risk. The area of medium probability flooding to the northwest corner of the Lake Zone results from the existing channel/culvert capacity restrictions and localised low levels near to the Elstow Brook top of bank, and upstream ordinary watercourse.

Pluvial Flood Risk

- 5.6 A description of the existing baseline pluvial flood risk is set out below:
- 5.7 In the West Gateway Zone, an area of medium, high, and very high probability flood risk is shown on the southwest boundary of the Zone, which is an accumulation of flows in a topographic low spot, originating from the West Gateway Zone Existing Watercourse. These flows also overtop onto land between Woburn Road and the A421 due to the existing culvert capacity restrictions in this area. There are also some small pockets of medium, high, and very high probability surface water flood risk in isolated, unlinked areas which align to low points in the topographic data and also within the channels of the Elstow Brook and Existing West Gateway Zone Watercourse.
- 5.8 Flooding occurs to the southwest of the Core Zone, where localised topography falls from north to south toward a local ordinary watercourse which discharges under Broadmead Road and outfalls to Elstow Brook. Further ponding of flows occurs along the western edge of the zone in isolated low points, not hydraulically connected to any watercourse. Flood risk is also shown adjacent to the Core Zone Existing Watercourse, which overtop and accumulate in topographical low points - a larger area can be seen towards the centre of the watercourse where there is an existing culvert which is undersized and restricts flows. Flood risk can also be seen within the channels of localised ordinary watercourses upstream of the Core Zone Existing Watercourse.
- 5.9 Flood risk is shown along Manor Road. This reflects surface water behaviour derived from the catchment-scale topographical model and does not include a detailed representation of the road's local highway drainage system. Topographical survey, drainage CCTV investigations, and available records indicate that existing Manor Road drainage discharges to an ordinary watercourse north of Manor Road within the Elstow Brook catchment, and there is no hydraulic connectivity with Harrowden Brook.
- 5.10 Lake Zone shows several isolated individual pockets of flood risk, which represents ponding of surface water flows and align with localised low points identified in the topographic data. The areas

within the Elstow Brook, associated tributaries and within the Clay Pits are also indicated as at risk. Similar to fluvial flood risk, Kempston Hardwick Clay Pits (North) – Artificial Lake provides storage capacity before overtopping to Elstow Brook via a watercourse overflow. At Kempston Hardwick Clay Pits (North) – Disused Pits, there is no hydraulic connectivity with the wider drainage network, and the pits only receive rain falling directly over the footprint with some localised contributing sloping areas.

- 5.11 Exceedance Plan 1 - Existing Baseline Pluvial Design Flood Event 1% Annual Exceedance Probability +40% Climate Change in Appendix A: Flood Maps and Plans shows the overland flow routes for the Existing Baseline, together with existing ground level contours, flow path arrows, and the pluvial design flood event. This map shows surface water following existing contours within the Order land and collecting in topographic low points, with no off-site surface water flow routing through or accumulating within the Order land.
- 5.12 Based on the pluvial and fluvial flood risk shown in Appendix A: Flood Maps and Plans and described in this section, mitigation is required - Flood Risk Mitigation measures are described in Section 6.

6.0 FLOOD RISK MITIGATION MEASURES

Overview

- 6.1 This section summarises the measures to manage flood risk, which include changes to ground levels, proposed strategic surface water drainage systems, and the allocation of development to areas at lowest flood risk.

Changes to Ground Levels

- 6.2 As stated in Section 7 of reference document 14 (Flood Risk Assessment) *“finished site levels will be designed to provide positive drainage, prevent ponding, and channel flows away from the Proposed Development during exceedance events.”* Site levels refer to the Future Scenario proposed finished surface ground levels, which includes road corridors, parcel platforms, soft landscaping, strategic SuDS, and tie-in to existing site topography. Site levels for the Future Scenario, which Condition 13 Mass Grading is based on, are summarised below.

West Gateway Zone

- 6.3 West Gateway Zone will include a road corridor through the centre of the parcel, a bridge crossing over Elstow Brook and the A421 overpass and associated embankment, and complimentary ERC uses described in the SDO (retail, dining and entertainment, visitor accommodation and associated services for any operational or administrative functions of the ERC, such as office buildings and warehouse/storage facilities, Highway Service Area). Site levels will be reshaped and reprofiled falling from south to northeast, to achieve the following:
- Remove the low point where existing fluvial and pluvial flood risk is located to the north west of the Zone.
 - Provide a watercourse diversion conveying offsite flows along the western and northern perimeter of the Zone.
 - Create the SuDS Enhancement Basin to store the existing fluvial and pluvial flood risk volumes for the design flood event.
 - Create a Strategic SuDS basin in the centre of the Zone to attenuate the Zone surface water runoff which drains to it.
 - Site levels will generally fall towards Strategic SuDS.
 - No level changes will be made within the riparian zone 10m distance offset from the top of the Elstow Brook bank.

Core Zone

6.4 Core Zone will include the Theme Park ERC, Public Roads, and complementary uses mentioned in the SDO. Site levels will be reshaped and reprofiled to achieve the following:

- Remove the existing low point where existing fluvial and pluvial flood risk is located in the centre of the site, associated with the Core Zone Existing Watercourse.
- Diversion of the Core Zone Existing Watercourse to the eastern and northern boundary of the Zone.
- Existing redundant watercourses will be filled in and abandoned as they are replaced by the Watercourse Diversion and surface water drainage conveyance systems.
- Site levels will generally fall towards the Watercourse Diversion, which routes from south east to north west via gravity to Lake Zone and stored in the strategic SuDS.
- Site levels will be raised in the southern part of the zone creating a high point and lowered in the northern part of the zone, creating a low point, which ties-into existing ground levels at Manor Road.
- Site levels will tie in at the existing boundary levels on the west, south and eastern boundaries and tie into the New Manor Road levels in the north.

Lake Zone

6.5 Lake Zone will include the Utility Compound, Public Roads, complementary uses, and certain ERC uses defined in the SDO (conference centre and/or convention centre, sports complex with indoor and/or outdoor playing fields, camping and caravanning accommodation and the Habitat Area). Site levels will be reshaped and reprofiled to achieve the following:

- Site levels in the southern part of the zone will generally fall from south to north.
- Public Road B will be set 600mm above the maximum design flood event.
- The parcel of land located east of Public Road B toward the northern part of zone will be lowered and grade from west to east to the Lake Zone Clay Pits Wetlands Basins.
- Kempston Hardwick Clay Pits (North) – Artificial Lake ground levels will broadly remain unchanged, with creation of inlets outlets and overflows as part of the drainage system.
- Kempston Hardwick Clay Pits (North) - disused pits will be reshaped to form the Lake Zone Clay Pits Wetlands Basins.
- Existing ground levels will remain unchanged in the Habitat Area located north of Public Road B, where existing fluvial and pluvial flood risk is shown and will remain.

East Gateway Zone

- 6.6 In this Scheme, East Gateway Zone includes New Manor Road up to the Ampthill Road junction. Site levels will generally fall from east to west, with longitudinal rise and fall resulting in finished road high and low points.

Minimum Site Levels

- 6.7 As stated in Paragraph 7.3.1 of reference document 14 (Flood Risk Assessment): “...road levels are proposed to be set at a minimum of 600mm above the maximum anticipated flood levels for surface water and fluvial sources in the 1 in 100-year probability event plus climate change and above the maximum 1 in 1,000-year modelled flood level within each Zone.”
- 6.8 This section summarises the minimum site levels which includes finished road levels and finished floor levels (uppermost surface of a floor once construction has been completed but prior to application of any finishes), required to be set above modelled flood level values. Details of water levels for the Future Scenario flood events are shown below in Table 6.1 and flood model node locations are shown in the Condition 57 Flood Risk Scheme Flood Modelling Node Locations Plan in Appendix A Flood Maps and Plans. For all Zones, Future Scenario road levels are set greater than 600mm above the design flood event 1% AEP plus Climate Change, and also above the 0.1% AEP. In addition to flood modelling, minimum site levels are also influenced by the Strategic Surface Water Drainage top of bank levels, freeboard, and maximum attenuated water levels for the 1 in 100 year event plus climate change.

Table 6.1 - Flood Modelling Water Levels

Location	Future Scenario Flood Risk Max Water Levels (m AOD)				Strategic Surface Water Drainage Max Water Level (m AOD)	Minimum Site Levels (m AOD)
	Fluvial		Pluvial			
	1%AEP +CC	0.1% AEP	1%AEP +CC	0.1% AEP		
					1% AEP +CC	
WEST GATEWAY ZONE						

Location	Future Scenario Flood Risk Max Water Levels (m AOD)				Strategic Surface Water Drainage Max Water Level (m AOD)	Minimum Site Levels (m AOD)
	Fluvial		Pluvial		1% AEP +CC	
	1%AEP +CC	0.1% AEP	1%AEP +CC	0.1% AEP		
1. Watercourse Diversion	32.82	33.60	31.99	32.03	33.25	33.85
2. SuDS Enhancement Basin	32.72	33.39	32.89	32.96	33.25	33.85
3. Strategic SuDS Basin	32.37	32.65	32.36	32.39	33.70	34.30
4. Elstow Brook	32.54	32.80	31.97	32.13	N/A	33.14 (road bridge soffit level for the crossing Elstow Brook)
CORE ZONE AND EAST GATEWAY ZONE (NEW MANOR ROAD TO AMPTHILL ROAD JUNCTION)						
5. Watercourse Diversion (Upstream)	31.67	31.70	31.88	31.92	33.19	33.79
6. Watercourse Diversion (Downstream)	30.76	30.92	30.71	30.78	31.89	32.49
7. Manor Road Box Culvert	30.38	30.53	30.32	30.40	31.75	32.05
LAKE ZONE						
8. Elstow Brook (Upstream)	30.34	30.58	29.78	29.94	N/A	30.94

Location	Future Scenario Flood Risk Max Water Levels (m AOD)				Strategic Surface Water Drainage Max Water Level (m AOD)	Minimum Site Levels (m AOD)
	Fluvial		Pluvial			
	1%AEP +CC	0.1% AEP	1%AEP +CC	0.1% AEP		
	1% AEP +CC					
9. Elstow Brook (Downstream)	29.45	29.70	28.79	28.92	N/A	30.05
10. Lake Zone Clay Pits Wetlands Basins (Pit 1)	24.97	24.98	24.74	24.76	26.50	27.00
11. Lake Zone Clay Pits Wetlands Basins (Pits 2 & 3)	23.50	23.75	23.32	23.37	24.50	25.00

- 6.9 Table 6.1 demonstrates that the minimum site levels will be set above the design flood event and, where relevant, above the 1 in 1,000-year modelled flood level.
- 6.10 This complies with Paragraph 7.3.2 of reference document 14 (Flood Risk Assessment) which includes access and egress routes within the Order land and use of Manor Road and Amphthill Road.
- 6.11 Notwithstanding the minimum site levels set out above, it is recognised that a very limited proportion of the development (not exceeding 1% of the Core Zone area) may require localised areas to be set below these levels to accommodate specific design elements. In such instances, any residual flood risk will be managed through appropriate localised mitigation measures, including pumped drainage systems designed in accordance with relevant standards. These measures are designed to ensure that there is no increase in flood risk within or beyond the Order land and no adverse impact on the operation of the Strategic Surface Water Drainage Systems. Accordingly, these localised departures do not affect the overall integrity, performance or compliance of the flood resilience strategy or the minimum site levels established within this Scheme.

Proposed Strategic Surface Water Drainage Systems

- 6.12 The Proposed Strategic Surface Water Drainage system has been developed in accordance with reference document 16 (Drainage Strategy) to support compliance with Condition 57 (Flood Risk) and applies a consistent set of design principles across all development zones of the Order land. The design principles are in accordance with National SuDS Standards and include mimicking natural drainage processes by limiting Future Scenario discharge rates to greenfield runoff rates and providing sufficient storage for critical storm events including climate change allowances to reduce downstream flood risk and environmental impact. Drainage features are designed to provide multi-functional benefits that deliver amenity, biodiversity, and water quality improvements to manage pollutants and protect receiving water bodies.
- 6.13 Where culverts are referred to in the drainage strategy, they are included as a cautious worst-case representation for the purposes of the flood risk modelling, and alternative methods of conveyance may also be suitable. If culverts are subsequently considered necessary, any such proposals will be submitted separately to the Secretary of State under the relevant condition.
- 6.14 Surface water runoff from development areas will be managed through strategic SuDS attenuation storage features prior to controlled discharges into the watercourse network. Due to the Order land's relatively impermeable geology and shallow groundwater, surface water cannot be effectively managed via soakaways or infiltration systems. The discharge of surface water to the watercourse network therefore follows the next appropriate stage in the National SuDS Standards surface water drainage hierarchy.
- 6.15 If the Proposed Strategic Surface Water Drainage system were not to be implemented this would result in an increase in surface water flooding due to increased runoff rates from Future Scenario impermeable surfacing.
- 6.16 The Proposed Strategic Surface Water Drainage system comprises a series of interconnected components; the West Gateway Zone includes a watercourse diversion, strategic SuDS basin and SuDS enhancement; the Core Zone incorporates a watercourse diversion and improvements to the existing box culvert beneath Manor Road; and the Lake Zone includes the Strategic Clay Pits Wetland Basins, which provide downstream storage and flow control for the overall drainage network. Appendix A Flood Maps and Plans: Condition 57 Flood Risk Proposed Strategic Surface Water Drainage Plan shows the Proposed Strategic Surface Water Drainage Plan.
- 6.17 Where areas of Medium to Very High Flood Risk are present within the West Gateway Zone and Lake Zone, the Strategic Surface Water Drainage system is sized to safely accommodate, convey

and attenuate surface water flows prior to controlled release to Elstow Brook via the Exceedance Channel Basin.

6.18 Flood risk mitigation in relation to Condition 57 has been assessed through detailed hydraulic modelling using parameters that accord with reference document 16 (Drainage Strategy). In addition to flood risk mitigation, the drainage system incorporates SuDS features providing water quality mitigation ensuring runoff quality is appropriately managed prior to discharge into the receiving water environment.

6.19 Surface water drainage details for each zone are described in the sections below.

West Gateway Zone

6.20 West Gateway Zone proposed Strategic Surface Water Drainage is shown on Condition 57 Flood Risk Proposed Strategic Surface Water Drainage Plan in Appendix A: Flood Maps and Plans.

Watercourse Diversion

6.21 For the purposes of the flood risk modelling, the proposed diversion of the existing watercourse is represented by a combination of open-channel and culverted sections. It extends from the existing highway culvert beneath the A421, to the east of the West Gateway Zone near Broadmead Road, and reconnects with Elstow Brook to the west of the West Gateway Zone via a short length of existing watercourse.

6.22 For the purposes of the flood risk modelling, the watercourse diversion is represented as comprising an initial 100m long, 2.0m deep open-channel section, enhanced with a 2m wide bed and side slopes constructed at a gradient of 1 in 3 to ensure stability, accessibility, and safe integration within the surrounding landscape. This section also conveys highway runoff from a National Highways Pond. Surface water flows then enter the first of three culverted sections represented in the model.

6.23 For the purposes of the flood risk modelling, the first culverted section is represented as a 74m box culvert measuring 2100mm wide by 1500mm high, to test the hydraulic arrangement associated with highway access to the Zone. Downstream of the culvert headwall, flows transition in the model into a 36m open channel which also conveys highway runoff from another National Highways Pond.

6.24 For the purposes of the flood risk modelling, the second culverted section is represented as a 110m box culvert measuring 2100mm wide by 1500mm high, to test the hydraulic arrangement associated with the active travel route crossing. Downstream of the culvert headwall, flows transition in the model into a 92m long three-stage basin (SuDS Enhancement). The basin is

represented as providing watercourse enhancement through the filtration and settlement of fine sediments and trace contaminants from receiving waters. The stages are separated by raised earth bunds approximately 2m wide and 0.5m high, with low-level conveyance pipes represented to maintain hydraulic continuity between stages. This basin also receives runoff from the Strategic SuDS Basin..

- 6.25 For the purposes of the flood risk modelling, the third culverted section is represented as a 63m long, 1350mm diameter pipe culvert, to test the hydraulic arrangement where the diverted watercourse reconnects with the existing watercourse and Elstow Brook. Downstream of the headwall, flows transition in the model into a 75m long, 2m deep section of existing open channel, represented with a 1.4m wide bed and side slopes at a gradient of 1 in 1. The longitudinal fall is represented as being re-graded from 1:500 to 1:1000 to reduce flow velocity and tie in with existing levels before rejoining Elstow Brook.
- 6.26 Channel erosion protection comprising of a stone bed and a structured vegetated slope system will be provided at headwall locations to mitigate scour risk, control flow velocities, and protect the integrity of the channel.

Strategic SuDS Basin

- 6.27 The Strategic SuDS Basin will comprise a 1.17 hectare landscaped dry detention basin designed to provide strategic surface water attenuation and water quality treatment. The basin will be formed with a minimum top of bank level of 34.00m AOD and a bed level of 32.00m AOD to provide the required storage volume during storm events. Although the basin will typically remain dry during normal conditions, specific areas will be excavated below the bed level to enable localised temporary ponding and interception of everyday rainfall events in accordance with the National SuDS Standards. These areas will also enhance biodiversity. The basin side slopes will be constructed at a gradient of 1 in 3 to ensure stability, accessibility, and safe integration within the surrounding landscape. A freeboard of 300mm will be provided giving a maximum storage depth of 1.70m.
- 6.28 The basin is designed to accommodate the 1 in 100-year annual exceedance probability rainfall event plus a climate change allowance of 40% in accordance with Paragraph 5.3.18 of reference document 16 (Drainage Strategy). The surface water discharge rate is based on a QBar greenfield runoff rate of 3.13 l/s/ha, which has been derived using HR Wallingford Greenfield Runoff Rate Estimation Tool (FEH Statistical method) in accordance with Paragraph 5.2.3 and Table 5-3 of reference document 16 (Drainage Strategy).

- 6.29 Surface water will enter the basin from two highway headwalls and the basin will also receive surface water from the development via a headwall. Each headwall will discharge surface water to a sediment forebay designed to slow incoming flows, promote early settlement of sediment and associated pollutants, protecting the storage capacity, hydraulic performance, and long-term operation of the main basin while concentrating maintenance in an accessible location.
- 6.30 Flows from the basin are conveyed to the SuDS Enhancement. The connection between the two comprises the vortex flow control chamber (Hydro-Brake® or similar) and an emergency shutoff valve chamber to enable emergency pollution control if required in the event of a spill from a vehicle or fire on the highway, or contamination from vandalism. In this event, the network would be locked down within the Order land and flows would not enter Elstow Brook, until remediation takes place which includes removal and disposal outside the Order land of soils and reinstatement of the Strategic SuDS Basin.
- 6.31 The maximum attenuation volume of the basin is 14,310m³. The surface water discharge rate will be regulated to 53 l/s based on draining an impermeable area of 17.04ha ($17.04\text{ha} \times 3.13\text{l/s} = 53.34\text{l/s}$). This impermeable area of 17.04ha includes parcel development and local highway connections. The regulated discharge of surface water is required to reduce the impact upon downstream storage components whilst also ensuring each SuDS component has sufficient time to support pollutant removal.

SuDS Enhancement

- 6.32 The SuDS Enhancement will comprise a 0.73 hectare landscaped dry detention basin designed to provide strategic surface water attenuation, flood risk mitigation, and environmental enhancement. It will form part of the watercourse diversion and also receives surface water from the development.
- 6.33 The basin is formed with a minimum top of bank level of 33.70m AOD and a bed level of 30.95m AOD and incorporates three stages, separated by raised earth bunds with low-level conveyance pipes, a low-flow channel and localised over-excavated ponded areas beneath the basin floor to enable passive conveyance and water quality benefits.
- 6.34 Basin side slopes are constructed at a gradient of 1 in 3 to ensure stability, accessibility, and safe integration within the surrounding landscape. A freeboard allowance of 300 mm is provided between the top of bank and the maximum design water level, resulting in a maximum storage depth of 2.45m.

- 6.35 The basin will provide a total attenuation volume of approximately 12,500 m³ and is sized to accommodate the 1 in 100-year rainfall event plus allowance for climate change. For the purposes of the flood risk modelling, outflows are represented as being conveyed through a culverted connection, enabling existing off-site flows from upstream catchments to the east of the A421 to pass through the basin and maintain flow continuity to Elstow Brook.

National and Local Highways Drainage Strategy

- 6.36 National Highways proposed slip roads serving the A421, and a small area of proposed Woburn Road, will include a conveyance system to drain surface water runoff, attenuate flows, and control runoff to QBar greenfield runoff rates of 3.13 l/s/ha, before releasing to the diverted watercourse. The final form of the drainage systems will be completed as part of future design submissions under Condition 28 (Detailed designs: class 3 and class 6 authorised works) for National and Local Highways road packages. However, the output parameters stated in Section 6.71, including catchment area, discharge rates and attenuation volume, will not be exceeded.

Land between Elstow Brook and Marston Vale Railway

- 6.37 The parcel developer will include a conveyance system to drain surface water runoff, attenuate flows, and control runoff to QBar greenfield runoff rates of 3.13 l/s/ha before release to Elstow Brook. The final form of the drainage systems will be completed under the individual parcel package, however the output parameters stated in Section 6.72 will not be exceeded including Catchment Area, Discharge Rates and Attenuation Volume.

Core Zone

- 6.38 Core Zone proposed Strategic Surface Water Drainage is shown on Condition 57 Flood Risk Proposed Strategic Surface Water Drainage Plan in Appendix A Flood Maps and Plans.

Watercourse Diversion

- 6.39 As outlined in reference document 16 (Drainage Strategy), Paragraph 5.3.7, to allow for the Future Scenario, the watercourse in the Core Zone is to be diverted along the eastern boundary of the Order land and the form, shape and appearance will be enhanced. Thus, the watercourse diversion has been designed as an enhanced landscaped feature, approximately 1.7km in length, incorporating a defined low-flow channel and an upper floodplain to improve hydraulic performance, ecological value, and visual amenity.
- 6.40 The watercourse is designed with a typical depth of approximately 1.7m from top of bank to bed level and an overall top width of approximately 4.4m, with localised over-excavation to create permanent water within the channel bed to support aquatic habitat. The upper floodplain section

typically extends to approximately 13m in width and 0.8m in depth, subject to local variation, allowing exceedance flows to be safely conveyed.

- 6.41 Under the 1 in 100 year plus climate change event, the total water depth within the channel is less than 2.5m. The longitudinal gradient of the diverted watercourse is approximately 1 in 1000, providing a balance between conveyance, attenuation, and ecological function.
- 6.42 For the purposes of the flood risk modelling, permanent road crossings of the diverted watercourse within the Core Zone have been represented using box culvert arrangements to test hydraulic continuity and the conveyance of both low and high flows without increasing flood risk.
- 6.43 For the purposes of the flood risk modelling, the connection between the existing watercourse and the diverted watercourse has been represented by a 375mm diameter, 22m long pipe culvert.
- 6.44 The watercourse diversion is represented in the model as comprising an initial 680m long open channel section which receives development surface water runoff from six headwalls and surface water overflow from the Coronation Pits restoration scheme, which has a consented discharge of 4l/s/ha. The total impermeable area from the pits and upstream Stewartby Residential site is 97.05ha, resulting in a controlled flow of 388 l/s. Surface water from this channel then enters the first of four culverted sections represented in the model.
- 6.45 In the model, the first culverted section is represented as a box culvert 21m in length and 3300mm wide x 1800mm high.
- 6.46 Downstream of the culvert headwall, flows transition in the model into an approximately 650m open channel which receives development surface water runoff from five headwalls before entering the second culverted section, represented as a 65m long box culvert measuring 3300mm wide x 2100mm high.
- 6.47 Downstream of the headwall, flows transition in the model into an approximately 265m long open channel which receives development surface water runoff from two headwalls and highway water before entering the third culverted section, represented as a 71m long box culvert measuring 3300mm wide by 2100mm high.
- 6.48 Downstream of the headwall, the open channel section receives development surface water runoff from two headwalls prior to entering the Manor Road Culvert which conveys flows to Kempston Hardwick Clay Pits South Artificial Lake.
- 6.49 Channel erosion protection comprising of a stone bed and a structured vegetated slope system will be provided at headwall locations to mitigate scour risk, control flow velocities, and protect the

integrity of the channel. Where steep retaining banks cannot be avoided due to local constraints, a TerraMesh (or equivalent reinforced earth system) will be used to provide structural support and ensure the long-term stability and integrity of the watercourse.

Inner Core Zone Surface Water Drainage System

6.50 The Inner Core Zone surface water drainage network will capture rainfall runoff and discharge flows by gravity to the Core Zone diverted watercourse. For the purposes of the drainage design, the diverted watercourse has been sized on the basis that 90% of the development area within the Inner Core Zone will be impermeable. This is a cautious worst-case assumption carried forward from reference document 16 (Drainage Strategy). It applies to the developable area only and not to the entirety of the Order land, reflecting an allowance of 10% for areas such as landscaping and informal drainage arrangements that would not discharge directly to the strategic drainage network. The Inner Core Zone drainage network will be sized to accommodate the critical 1 in 100-year rainfall event plus a 40% climate change allowance.

6.51 The Lake Zone Clay Pits Wetland Basins will provide the principal downstream water quality treatment for runoff from the Inner Core Zone. In addition, standard gullies will be incorporated within the local drainage network to allow suspended silt, soil, and debris particles to settle out, preventing further transport downstream and therefore protecting watercourses.

Manor Road Culvert

6.52 As outlined in reference document 16 (Drainage Strategy), Paragraph 5.2.2, the surface water drainage system within the Order land includes a culvert beneath Manor Road that directs runoff from the Core Zone towards the Kempston Hardwick Clay Pits (North), an Artificial Lake within the Lake Zone. This culvert runs beneath Manor Road on a south-east to north-west alignment and acts as an important downstream control point, maintaining flow continuity and hydraulic connectivity between the upstream watercourse and the receiving lake.

6.53 The existing Manor Road culvert will be upgraded and replaced with a larger culvert as part of the baseline drainage network, with the Proposed Strategic Surface Water Drainage system designed to maintain greenfield runoff rates and not increase discharge flows conveyed through this structure.

6.54 Surface water generated within the Core Zone will be attenuated through a series of strategic and local SuDS located in the Lake Zone, prior to controlled discharge to the New Waterbody "P" watercourse upstream of the Manor Road culvert. This will ensure that peak flows through the

Manor Road culvert to Elstow Brook do not exceed existing conditions and that the long term drainage function, maintenance access, and flood risk performance are not adversely affected.

Lake Zone

- 6.55 Lake Zone proposed Strategic Surface Water Drainage is shown on the Drainage Plan (Appendix A Flood Maps and Plans: Condition 57 Flood Risk Proposed Strategic Surface Water Drainage Plan).
- 6.56 The Lake Zone will form a key component of the Order land and will incorporate strategic landscaped attenuation features associated with the Kempston Hardwick Clay Pits (North), which will receive upstream flows conveyed via the Manor Road culvert.
- 6.57 In accordance with reference document 16 (Drainage Strategy), paragraph 5.3.11, the strategic attenuation will comprise wetland features with a permanent water level, capacity for attenuation storage of the greenfield runoff from the Core and Lake Zones, plus adequate storage for rainwater harvesting and emergency storage in the event of pump failure.
- 6.58 Flows from the Manor Road culvert will first enter the Artificial Lake, which will in turn convey surface water via an open-cut channel connection to the Lake Zone attenuation which will comprise 3 interconnected wetlands.
- 6.59 The Artificial Lake is an existing feature. However, the water level will be reduced to 28.27m AOD to return to its 2023 survey level. The water level will increase to 29.50m AOD temporarily during the 1 in 100-year climate change event when outfalling to the clay pits in normal conditions.
- 6.60 There will be two outfalls from the Artificial Lake; the open cut channel which leads to the Lake Zone attenuation and an Exceedance Channel. The Exceedance Channel will convey flows to Elstow Brook in the event of a blockage / pump failure within the clay pit wetlands or in the event the attenuation volume of the Artificial Lake has been exceeded.
- 6.61 For the purposes of the flood risk modelling, the Exceedance Channel has been represented as an open channel with culverted crossings in two locations to test access arrangements and hydraulic performance. In the model, the upstream culverted crossing is represented as being fitted with a weir gate. The weir gate is assumed to remain closed under normal conditions, including rainfall events up to the 1 in 100-year event plus climate change. In the model, the weir gate is assumed to open in two scenarios where rainfall exceeds normal conditions. The first is when the maximum water level in the clay pit wetlands reaches 24.50m AOD, in which case the Artificial Lake outfall closes and the Artificial Lake Exceedance Channel opens. The second is when the Artificial Lake water level reaches 30.00m AOD, based on the lowest top of bank in the south-eastern area of the

lake and assuming that the clay pit wetlands are full, in which case the Artificial Lake outfall closes and the Artificial Lake Exceedance Channel opens. In the model, the second culverted crossing provides the main access route between the Core Zone and the Lake Zone.

- 6.62 The open-cut channel leading to the Lake Zone attenuation incorporates a weir wall, control gate, retaining structures and a waterfall, providing a controlled hydraulic connection while dissipating energy and allowing regulated transfer of flows into the downstream Lake Zone. This arrangement ensures that flows released from the Artificial Lake are appropriately managed and distributed to the wetlands, maintaining both hydraulic control and environmental integration within the landscape design.
- 6.63 The waterfall and associated hydraulic controls are located within the Lake Zone attenuation system rather than a natural fish-bearing watercourse and are not expected to act as a barrier to fish movement within the natural watercourse network. The implications for fauna and flora will be addressed further through the relevant ecological and detailed design submissions, where required.
- 6.64 The wetlands will provide the principal surface water storage for the Order land. Wetland 1 provides a maximum attenuation storage volume of 25,119 m³, Wetland 2 provides 36,606 m³, and Wetland 3 provides 165,213 m³, as noted on the Drainage Plan.
- 6.65 In addition, allowance has been made in the design to store the 35-day rainwater harvesting volume of 51,900m³ and emergency storage volume of 42,000m³ in the event of pump failure, resulting in a total storage volume of 320,838m³.
- 6.66 This storage volume is within the gross storage estimates set out in Tables 5-9, 5-10 and 5-11 of reference document 16 (Drainage Strategy), which defines the required volumes for the 1 in 100-year plus climate change event, rainwater harvesting provision and emergency storage. As expected, the storage volumes are lower than those identified within the reference document 16 (Drainage Strategy) as the original storage volume estimates were based on an upper end estimate using the gross developable site area for proof-of-concept design purposes. This approach did not make allowance for any open landscaped areas which have now been appropriately excluded from the impermeable drainage area and detailed design storage volume requirements. The open landscaped areas are excluded as these surfaces are considered permeable and do not directly contribute to runoff which needs to be provided for by the principal surface water storage features. The subsequent advancement of the detailed design of the drainage network also enables the attenuation capacity provided within the pipe network to be properly accounted for, resulting in a

more efficient and technically robust and representative assessment of on-site storage requirements.

- 6.67 Wetland 1 will have a top of bank level of 27.00m AOD, and a bed level 4m below this. For the purposes of the flood risk modelling, Wetland 1 is represented as discharging to Wetland 2 via a box culvert arrangement. On its western edge, it will be connected to the ecological enhancement area via channelled bund openings allowing overflow from the wetland. The maximum water level will be 26.34m. It will receive development surface water runoff from one headwall.
- 6.68 Wetland 2 will discharge to Wetland 3 via three channel connections. The maximum attenuation water level is 24.14m. It receives development surface water runoff from two headwalls.
- 6.69 Wetland 3 will have a top of bank level of 25.00m AOD and an emergency pump activation level of 24.50m AOD, which is 0.36m above the maximum water level of 24.14m AOD. It receives development surface water runoff from two headwalls. During rainfall events, and when maximum rainwater harvesting water levels are reached, flows are pumped from Wetland 3 towards the New Waterbody “P”, as gravity outfall from the pits is not achievable. Discharge is managed via a pumping station, with flows conveyed to a water processing and collection plant within a utility compound in the southern part of the Lake Zone. A telemetry-controlled valve system directs water either for reuse within the Order land or, when there is no reuse demand, for controlled discharge to the New Waterbody “P” before outfalling to Elstow Brook via the existing channel confluence. Where flows are discharged to the water environment, they will be controlled so as to preserve and protect the natural hydrological and ecological systems on site. The suitability of the existing channel confluence, and the need for any local improvements, will be confirmed through the relevant detailed design stage.
- 6.70 The New Waterbody “P” will have a minimum top of bank level of 30.50m AOD and a maximum attenuation volume of 16,850m³ for the 1 in 100 year plus climate change event. The permanent water level will be set to 28.61m AOD with a minimum freeboard of 300mm. Discharge from the basin will enter the Exceedance Channel prior to discharging to Elstow Brook at a rate not exceeding the greenfield QBar runoff rate for the contributing catchment.
- 6.71 The side slopes for the Lake Zone Clay Pits Wetland Basins will be designed to be 1 in 4.6 average with wet and dry safety landings and aquatic benches.
- 6.72 As set out in reference document 16 (Drainage Strategy), the identified wetland volumes exceed the minimum flood attenuation requirements when considered in combination, with storage calculated above the level of permanent water and incorporating a minimum 500 mm freeboard.

This confirms that the Lake Zone Clay Pits Wetland Basins provide sufficient storage volume to accommodate design flood events without increasing flood risk elsewhere.

Runoff Rates and Attenuation Storage Volumes

6.73 Table 6.2 and Table 6.3 summarise peak discharge rates and attenuation volumes for the 1 in 100-year critical rainfall event plus 40% climate change, for West Gateway Zone, Core Zone, and Lake Zone.

Table 6.2 – West Gateway Zone Runoff Rates and Volumes

Catchment Location	Reference Doc 14 Drainage Strategy Impermeable Area (Ha)	Updated Impermeable Area (Ha)	Difference (Ha)	Discharge Rate based on 3.13 l/s/ha (l/s)	Max Attenuation Volume 1 :100 year +40%CC (m ³)
West Gateway Zone	27	n/a	n/a		
Strategic SuDS	n/a	17.04		53.34	14,310
NH Pond 1		1.20		3.75	1,070
NH Pond 2		1.63		5.10	2,195
EWR Parcel		3.38		10.57	3,300
Future Road		0.34		1.06	335
TOTAL	27	23.59	-3.41	73.48	21,210

Table 6.3 – Core and Lake Zone Runoff Rates and Volumes

Catchment Location	Reference Doc 14 Drainage Strategy Impermeable Area (Ha)	Updated Impermeable Area (Ha)	Difference (Ha)	Discharge Rate based on 2.5 l/s/ha (l/s)	Max Attenuation Volume 1 :100 year +40%CC (m ³)
Core and Lake Zone	171.2	161.54	-9.64	403.85	151,285
Catchments outside the Order land	138	168.41	+30.41	421.03	76,064
TOTAL	309.2	329.95	+20.74	824.88	227,349

East Gateway Zone

6.74 The elements of the East Gateway Zone included within the Scheme – Manor Road up to the Ampthill Road junction as stated under Section 3 Scope – will drain via a gravity network to the Core Zone diverted watercourse and discharge to the Strategic SuDS in the Lake Zone. Wixams Station is excluded from this submission. The future parcel drainage system is isolated and will not negatively affect flood risk or Strategic Surface Water Drainage.

Surface Water Quality and SuDS Compliance

- 6.75 Surface water quality management for the Order land has been developed in accordance with the Simple Index Approach (SIA) set out in Section 26 of The SuDS Manual (CIRIA C753). The SIA assesses pollution risks associated with the proposed land uses and requires the selection of SuDS components such that the combined pollution mitigation indices equal or exceed the identified pollution hazard indices.
- 6.76 Appropriate SuDS components have been incorporated into the Strategic Surface Water Drainage system for each Zone to satisfy the requirements of the SIA.
- 6.77 As detailed in Table 6.4, surface water quality mitigation within the West Gateway Zone will be provided through a detention basin and pond, which are designed as the Strategic SuDS basin and SuDS Enhancement components, respectively. Sediment forebays will be used in case of spillages, and an emergency penstock valve incorporated to isolate a spill should it occur.

Table 6.4 – West Gateway Zone Surface Water Mitigation

	Land Use	Total Suspended Solids	Metals	Hydrocarbons
Pollution Indices	Medium – commercial yards and delivery areas, non-residential car parking with frequent change, all roads except low traffic roads and trunk roads/motorways	0.7	0.6	0.7
Mitigation Indices	Detention Basin	0.5	0.5	0.6
Mitigation Indices	Pond	0.7 (x 0.5*)	0.7 (x 0.5*)	0.5 (x 0.5*)
Summary		Sufficient	Sufficient	Sufficient

*Second level of SuDS treatment mitigation indices factored by 0.5 in accordance with The SuDS Manual (CIRIA C753) SIA.

For the Core, Lake, and East Gateway Zones, as detailed in Table 6.5, the Lake Zone Clay Pits Wetland Basins will act as the primary strategic SuDS mitigation and treatment feature. For the Inner Core Zone, local upstream drainage components, including standard gullies, will provide initial sediment control before runoff discharges by gravity to the Core Zone diverted watercourse and onward to the strategic SuDS in the Lake Zone.

Table 6.5 – Core, Lake, and East Gateway Zone Surface Water Mitigation

	Land Use	Total Suspended Solids	Metals	Hydrocarbons
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Pollution Indices	Medium – commercial yards and delivery areas, non-residential car parking with frequent change, all roads except low traffic roads and trunk roads/motorways	0.7	0.6	0.7
Mitigation Indices	Wetland	0.8	0.8	0.8
Summary		Sufficient	Sufficient	Sufficient

This demonstrates compliance with the water quality treatment requirements set out in CIRIA C753 and confirms that appropriate SuDS measures have been fully integrated into the Strategic Surface Water Drainage system.

Future Scenario Proposals

- 6.78 Development in the Future Scenario masterplan will be allocated based on flood risk. As stated in Section 6 of reference document 14 (Flood Risk Assessment), development will be allocated sequentially, steering the most vulnerable development away from areas at the highest risk of flooding from all sources, having regard to the flood vulnerability classifications in Annex 3 of the National Planning Policy Framework (NPPF) and the flood zone compatibility guidance in the Planning Practice Guidance (PPG).
- 6.79 For the purposes of this Scheme, the relevant authorised development and authorised works permitted under Schedule 2 (Classes of Development Permitted) to the Order are reflected in the following land-use and flood risk vulnerability categories. These categories have been informed by the flood risk principles set out in the relevant Schedule 1 reference documents, including Reference Document 14 (Flood Risk Assessment), and have informed the allocation of development within the Future Scenario.
- 6.80 In accordance with Annex 3 of the NPPF, the flood risk vulnerability classifications for the development are as follows:
- The proposed strategic road network, Utility Compound and Transport Hubs are classified as Essential Infrastructure.
 - The proposed accommodation and mixed-use development including hotels, retail, dining, entertainment, and camping facilities is classified as More Vulnerable.
 - The theme park, theme park support and car parking are classified as Less Vulnerable.
 - Ecological Enhancement Area and landscaping are classified as Water Compatible.

6.81 In spatial terms:

- Water Compatible development is not limited to any particular part of the Order land. However, in those parts of the Order land where flood risk is intentionally retained as part of the design, including the Ecological Enhancement Area in the northern part of the Lake Zone, only Water Compatible development will be located; and
- Essential Infrastructure, More Vulnerable and Less Vulnerable development will be located only within the developable parts of the West Gateway Zone, Core Zone, Lake Zone and East Gateway Zone included in the Scheme, where flood risk is managed through the mitigation measures described in Section 6 and where the Future Scenario flood risk shown in Section 7 demonstrates that those uses can be accommodated.

6.82 For fluvial flood risk in the future scenario (Flood Map 5 – Future Scenario Fluvial Table 10 of The Order in Appendix A), flood risk is contained within the proposed Strategic SuDS and within the area of existing medium flood risk in the north of the Lake Zone only, with the remainder of the Order Land at Low Risk. The area of medium flood risk is allocated to water compatible development (Ecological Enhancement). Accordingly, from a fluvial flood risk perspective, the remainder of the Order land can accommodate the other land uses described above.

6.83 For pluvial flood risk in the Future Scenario (Flood Map 7 - Future Scenario Pluvial Table 10 of The Order in Appendix A), where localised ponding is shown outside of SuDS features, mitigation will be implemented as described in Table 7.1 in Section 7. This mitigation will include changes to ground levels, strategic surface water drainage, and the allocation of development. Essential Infrastructure, More Vulnerable and Less Vulnerable development will only be allocated to those parts of the Order land where flood risk is appropriately managed through the implementation of those mitigation measures and where the Future Scenario flood risk shown in Section 7 demonstrates that those uses can be accommodated.

6.84 Details of the Future Scenario flood risk and model outputs, together with the implementation of the mitigation measures described in this section, are contained in Section 7 – Future Scenario Flood Risk.

7.0 FUTURE SCENARIO FLOOD RISK

Flood Risk Future Scenario

- 7.1 Flood Risk Maps 5 to 8 for the Future Scenario are included in Appendix A: Flood Maps and Plans and show the Order land outlined in red, with flood risk zones shown in shades of blue over the OS base map. Flood Map 5 – Future Scenario Fluvial Table 10 of The Order and Flood Map 7 - Future Scenario Pluvial Table 10 of The Order, show flood zones classified in accordance with Table 10 of the Order, reproduced in Table 5.1. Flood Map 6 - Future Scenario Fluvial Design Flood Event 1% AEP + 20% Climate Change and Flood Map 8 - Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability + 40%, show flood zones for the design flood event.

Fluvial Flood Risk Future Scenario

- 7.2 Flood Map 5 – Future Scenario Fluvial Table 10 of The Order shows flood zones classified in accordance with Table 10 of the Order (reproduced in Table 5.1). In the West Gateway Zone, areas of Medium, High and Very High Probability flooding are contained within the proposed Strategic SuDS only. The Core Zone is at Low Probability across the Zone. In the Lake Zone, Medium Probability flooding is shown in the northern part of the Zone, while Medium, High and Very High Probability flooding is contained within the proposed Strategic SuDS, the Clay Pits, and the Artificial Lake. Details of the SuDS required for flood risk mitigation are set out in Section 6 of this Scheme. No further future mitigation is required for fluvial flood risk.
- 7.3 Flood Map 6 - Future Scenario Fluvial Design Flood Event 1% Annual Exceedance Probability + 20% Climate Change shows the “design flood event” 1% annual probability plus 20% climate change as defined in the SDO. Similarly, the design flood event is contained within proposed SuDS in West Gateway Zone and Lake Zone only, of which the details are contained in Section 6 of this Scheme. No further, future mitigation is required.

Pluvial Flood Risk Future Scenario

- 7.4 Flood Map 7 - Future Scenario Pluvial Table 10 of The Order shows flood zones classified in accordance with Table 10 of the Order (reproduced in Table 5.1). For pluvial flooding, “Very High” is defined as a greater than 3.3% annual probability of flooding, as “functional floodplain” is a term used for fluvial flood risk only.
- 7.5 In the West Gateway Zone, flood risk is contained within the proposed Strategic SuDS, with areas of isolated ponding shown in Future Scenario low points. Flood risk is also shown within the existing National Highways basin west of the A421 and in low points on either side of the carriageway.

- 7.6 In the Core Zone, flood risk is conveyed to the proposed strategic SuDS in the Lake Zone, with areas of isolated ponding shown in Future Scenario low points and within the proposed water feature at the centre of the Zone.
- 7.7 In the Lake Zone, flood risk is contained within the Artificial Lake and the proposed strategic SuDS. Isolated areas of ponding are shown in Future Scenario low points towards the south of the Zone and within the existing retained watercourse at the northern edge of the Zone.
- 7.8 Along Manor Road in the East Gateway Zone, isolated areas of Medium, High and Very High ponding are shown at local low points in the Future Scenario road levels.
- 7.9 Where localised, isolated surface ponding is shown in the Future Scenario, this reflects the high-level resolution of the flood model, in line with the approach described in Section 4. In practice, these ponded areas are not representative of the detailed local drainage arrangements. Where such ponding is shown in isolated areas of the proposed road or landscape, it will be addressed through the relevant zone-specific detailed surface water drainage network, including conveyance systems and associated controls sized to manage runoff appropriately. Where flood risk is shown in relation to existing features, further modelling of the relevant existing drainage systems will be undertaken as part of the detailed design for the affected works. Where that modelling identifies the need for improvement works, any such upgrades will be incorporated into the relevant detailed design submission and implemented before the corresponding works are brought forward. Where flood risk is shown within existing basins or waterbodies, there will be no increase in runoff to those features in the Future Scenario.
- 7.10 Flood Map 8 - Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability + 40%, shows the “design flood event” 1% annual probability plus 40% climate change as defined in the SDO. Similarly, the design flood event is contained within proposed SuDS in West Gateway Zone and Lake Zone of which the details are contained in Section 6 of this Scheme.
- 7.11 Exceedance Plan 2 Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability +40% Climate Change in Appendix A: Flood Maps and Plans shows Proposed Mass Grading Ground Level Contours at 0.1m intervals and the “design flood event” 1% annual probability plus 40% climate change, as defined in the SDO. Surface water flow paths are included across the proposed ground falling from high to low points towards strategic drainage attenuation, or low points where detailed drainage networks will convey flows to attenuation systems. There is no flow of surface water routing from outside the Order Land.

Future Mitigation Measures

7.12 Future mitigation measures will be required to address areas of surface water flood risk shown in Flood Map 8 - Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability + 40%. These measures will be taken forward through the relevant future detailed design submissions for the affected works and, where required, implemented before works commence in those areas.

Measures may include:

- Further survey and modelling of existing drainage systems where flooding is shown in existing road low points along the A421 and, where appropriate, upgrading of the existing systems to convey ponded flows;
- Ensuring that there is no increase in runoff to existing basins or waterbodies where baseline flood risk is already shown for the A421 detention basin west of the A421 and ordinary watercourses within the northern part of the Lake Zone; and
- Implementation of the Flood Risk Mitigation Measures set out in Section 6, including changes to ground levels, strategic surface water drainage, the allocation of development, or a combination of these measures.

7.13 Figures 7.1 to 7.3 identify the principal locations where pluvial flood risk is shown in the Future Scenario, based on extracts from Flood Map 8 – Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability +40% Climate Change. These figures are intended to assist the reader in locating the areas described in Table 7.1. The mitigation measures that may be applied in response to those locations are summarised through the mitigation codes set out in the legend below and then cross-referenced in Table 7.1.

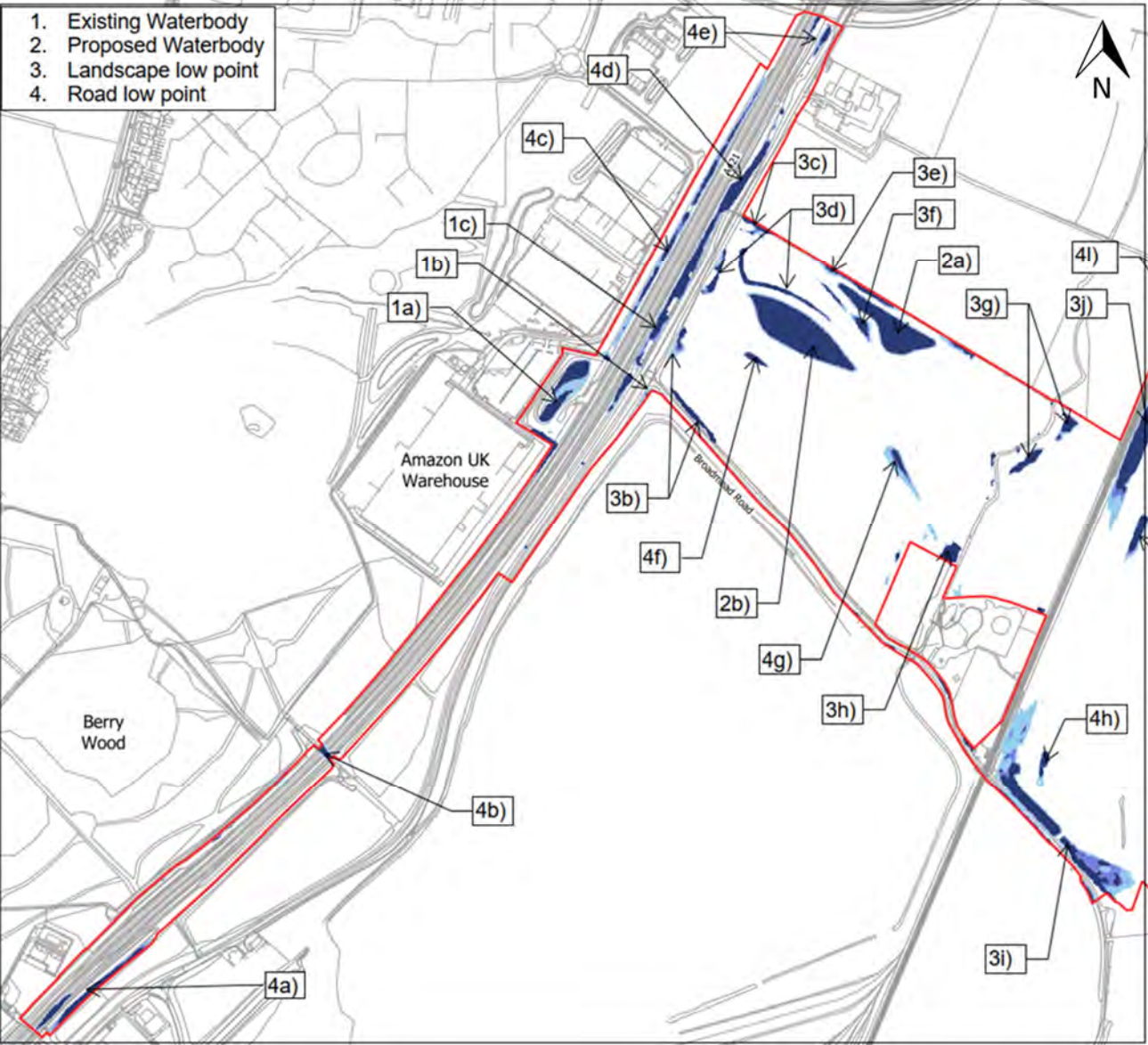


Figure 7.1 Pluvial Flood Risk Locations 1 of 3 (Extract from Flood Map 8 - Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability + 40%)

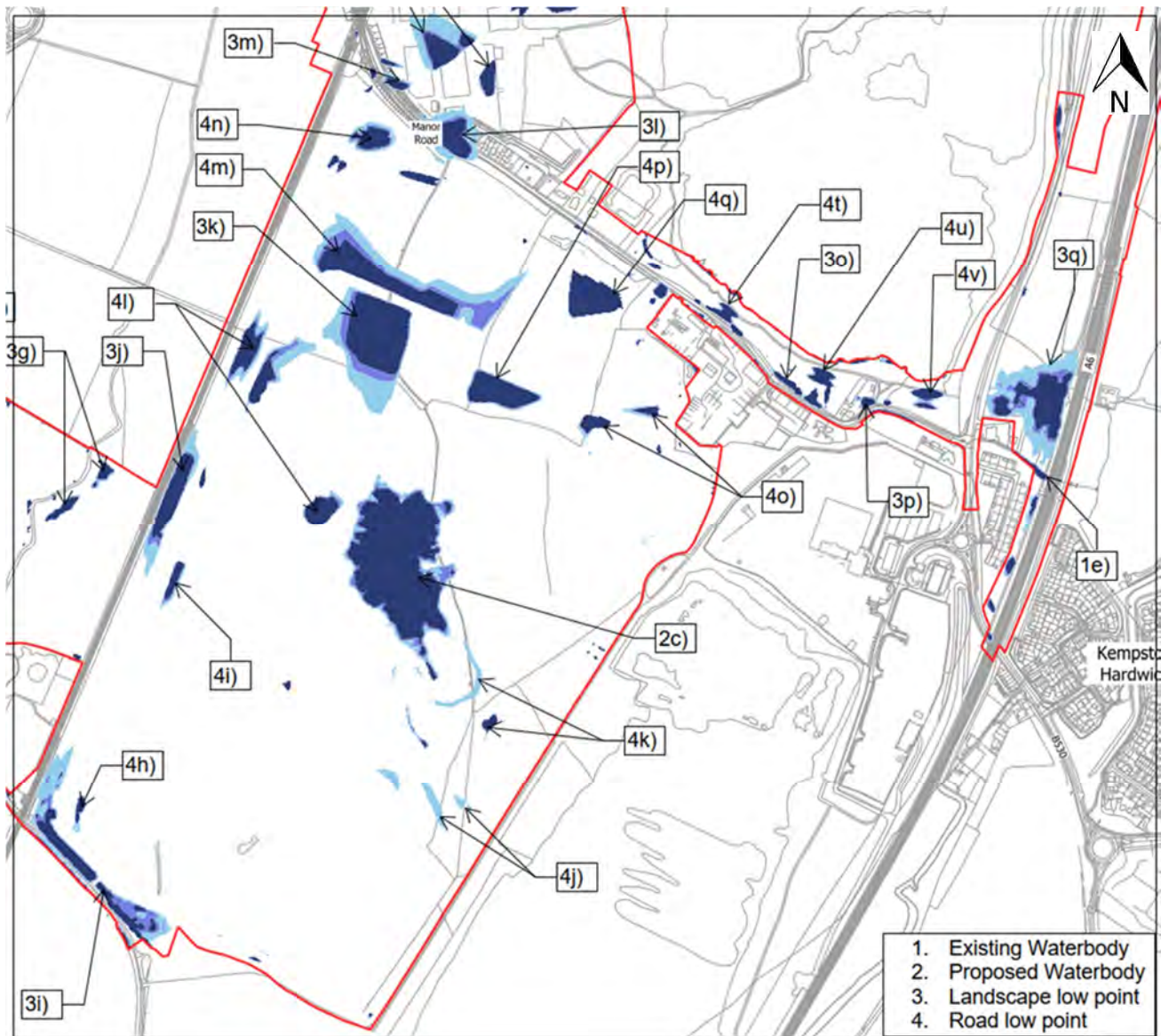


Figure 7.2 Pluvial Flood Risk Locations 2 of 3 (Extract from Flood Map 8 - Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability + 40%)

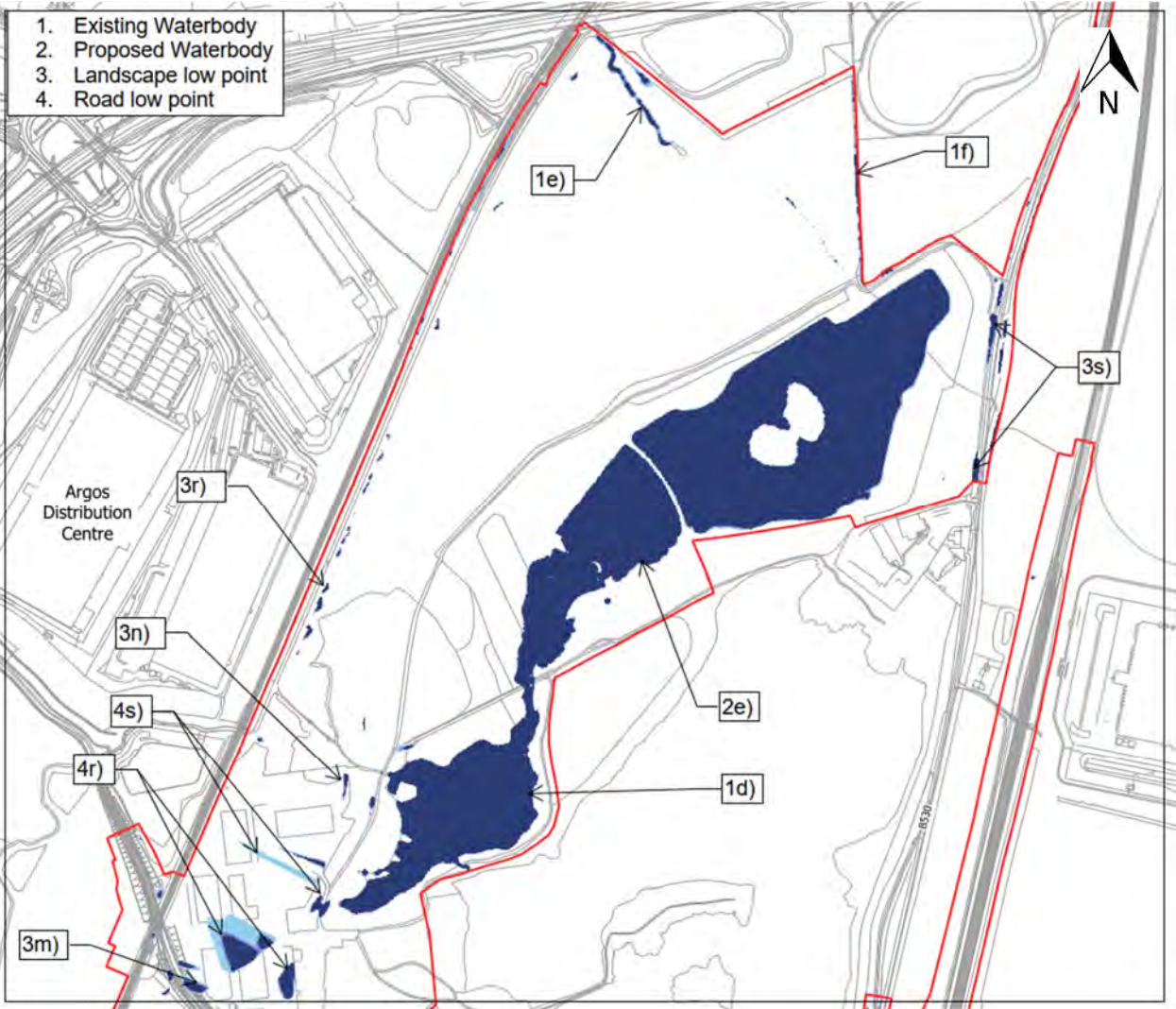


Figure 7.3 Pluvial Flood Risk Locations 3 of 3 (Extract from Flood Map 8 - Future Scenario Pluvial Design Flood Event 1% Annual Exceedance Probability + 40%)

Mitigation Legend

7.14 The mitigation codes used in Figures 7.1 to 7.3 and Table 7.1 are defined as follows:

- M1: Future proposals to maintain no increase in runoff rates from existing drained areas, with ongoing maintenance and operation by undertaker/asset owner to maintain existing condition and capacity.
- M2: Existing drainage infrastructure to be surveyed, modelled and enhanced as required.
- M3: Implementation of the Proposed Strategic Surface Water Drainage strategy as defined in Section 6.
- M4: Localised low point drained to nearby Strategic SUDS or SUDS Enhancement defined in Section 6.
- M5: Allocation of development - flood risk contained in localised water compatible development (landscaping, water features, habitat) outside of highways and buildings, with no impact to users or operations.
- M6: Site levels constructed to direct flood risk to the receiving watercourse with no adverse impact to users or operations.
- M7: Wixams Flood Resilience Scheme to be submitted separately

7.15 Table 7.1 identifies the pluvial flood risk locations shown in Figures 7.1 to 7.3 and cross-refers each location to the relevant mitigation code or codes. Where more than one mitigation measure may be appropriate, the table identifies the principal mitigation proposed at this stage, subject to suitability and the relevant detailed design.

Table 7.1 Pluvial Flood Risk Mitigation

Identifier	Location	Mitigation
1. Existing Waterbody		
a)	A421 Detention Basin.	M1
b)	Ordinary Watercourse at Broadmead/Woburn Road Junction.	M3
c)	Kempston Hardwick Clay Pits (North) – Artificial Lake.	
d)	Ordinary Watercourse at northern part of Lake Zone.	
e)	Ordinary Watercourse at northern boundary of Lake Zone.	M1
f)	Ordinary Watercourse at East Gateway Zone.	
2. Proposed Waterbody		
a)	SUDS Enhancement watercourse diversion in West Gateway Zone.	M3
b)	Strategic SUDS in West Gateway Zone.	M3
c)	Show Lagoon in Core Zone, not part of surface water management.	M5
d)	Strategic Clay Pits Wetlands Basins in Lake Zone.	M3
3. Landscape Low Point		

Identifier	Location	Mitigation
a)	Land adjacent to watercourse and A421 in West Gateway Zone.	M4
b)	Land adjacent to Broadmead/Woburn Road.	
c)	Land between Active Travel Route and at boundary edge.	
d)	Land outside of proposed highway Woburn Road.	M5
e)	Existing watercourse along northern boundary of West Gateway Zone.	M3
f)	Land between proposed Active travel Route and A421 Slip Road Embankment.	M5
g)	Land to the east of Elstow Brook in West Gateway Zone.	M7
h)	Land adjacent to Elstow Brook and the proposed road crossing.	M6
i)	Land located between Broadmead Road and southern corner of Core Zone.	M5
j)	Land located between Public Road A and Marston Vale Railway.	M5
k)	Parcel of landscaping in Core Zone Inner Core Zone.	M3
l)	Land between New Manor Road and existing Manor Road.	M3
m)	Land located between New Manor Road and southern corner of Lake Zone.	M5
n)	Land located outside of Public Road B in Lake Zone.	M5
o)	Land located between New Manor Road and Existing Manor Road.	M5
p)	Land located between New Manor Road and Existing Manor Road.	M3
q)	Land at East Gateway/Wixams Bus Depot.	M7
r)	Land located outside of Elstow Brook in Lake Zone.	M5
s)	Land located outside of Ampthill Road.	M5
4. Road Low Point		
a)	Existing A421.	M2
b)	Existing farm track underpass beneath A421.	
c)	Land between 421 and Bedford Commercial Park Development.	
d)	Existing Woburn Road layby.	M3
e)	Existing A421 and Woburn Road.	M2
f)	Proposed Road in West Gateway Zone.	M3
g)	Proposed parcel development located adjacent to proposed Road in West Gateway Zone.	
h)	Proposed hard standing in southern part of Core Zone.	
i)	Proposed hard standing outside of Public Road A in Core Zone.	
j)	Proposed hard standing in south-eastern part of Core Zone.	
k)	Proposed hard standing in eastern part of Core Zone.	
l)	Proposed Public Road A and hard standing in central part of Core Zone.	
m)	Proposed hard standing in northern part of Core Zone.	
n)	Proposed Public Road A in northern part of Core Zone.	
o)	Proposed hard standing in north-eastern part of Core Zone.	
p)	Proposed hard standing in north-central part of Core Zone.	
q)	Proposed hard standing in north-eastern part of Core Zone.	
r)	Proposed hard standing in southern part of Lake Zone.	
s)	Proposed hard standing in southern part of Lake Zone, and Public Road B.	
t)	Proposed New Manor Road.	
u)	Proposed New Manor Road.	



Identifier	Location	Mitigation
v)	Proposed New Manor Road.	

APPENDIX A – FLOOD MAPS AND PLANS



UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

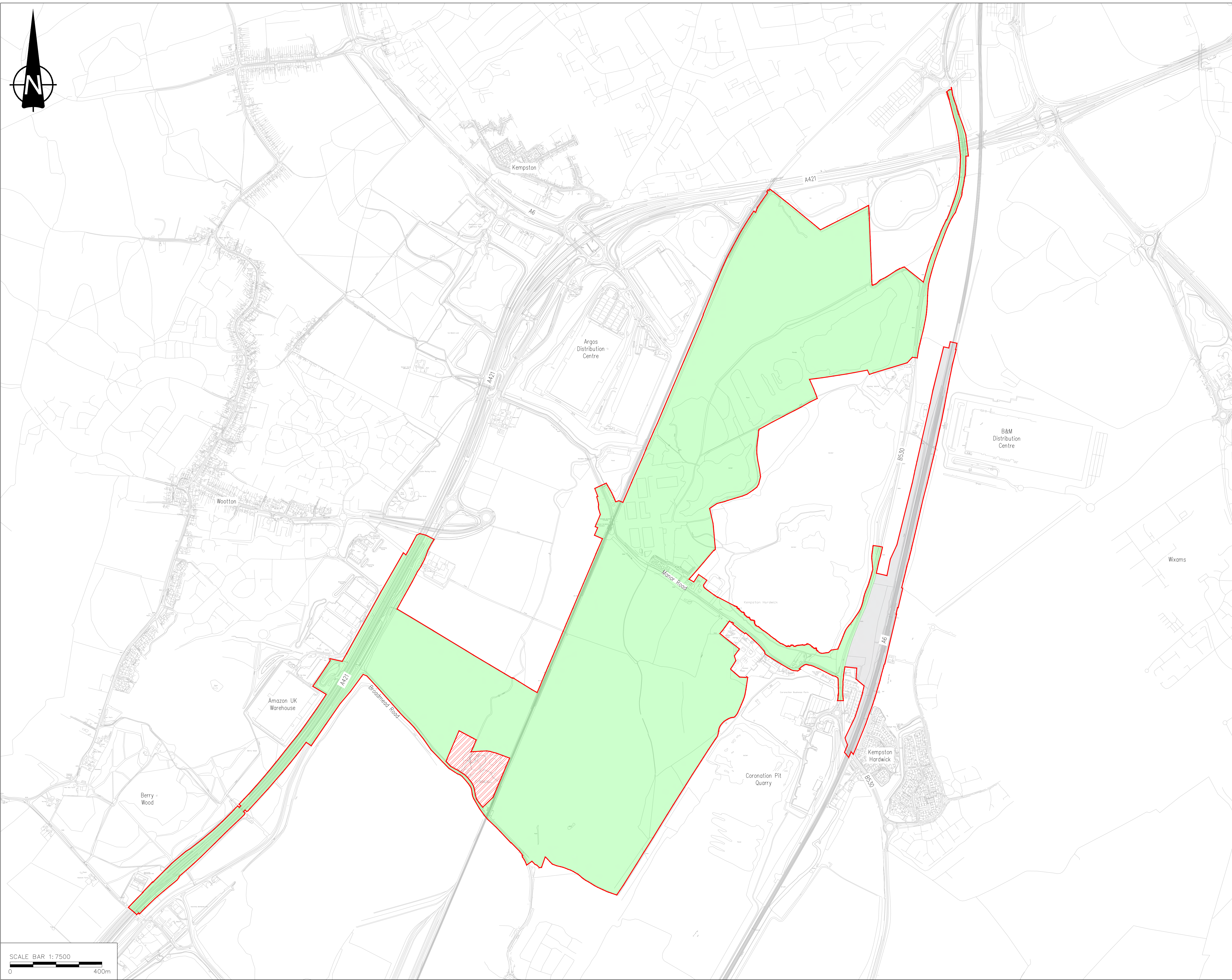
Former Kempston Hardwick Brickworks
and adjoining land, Bedford

Appendix A – Flood Maps and Plans

CONDITION 57 – FLOOD RESILIENCE SCHEME

Revision Number: 01
Date: June 2026

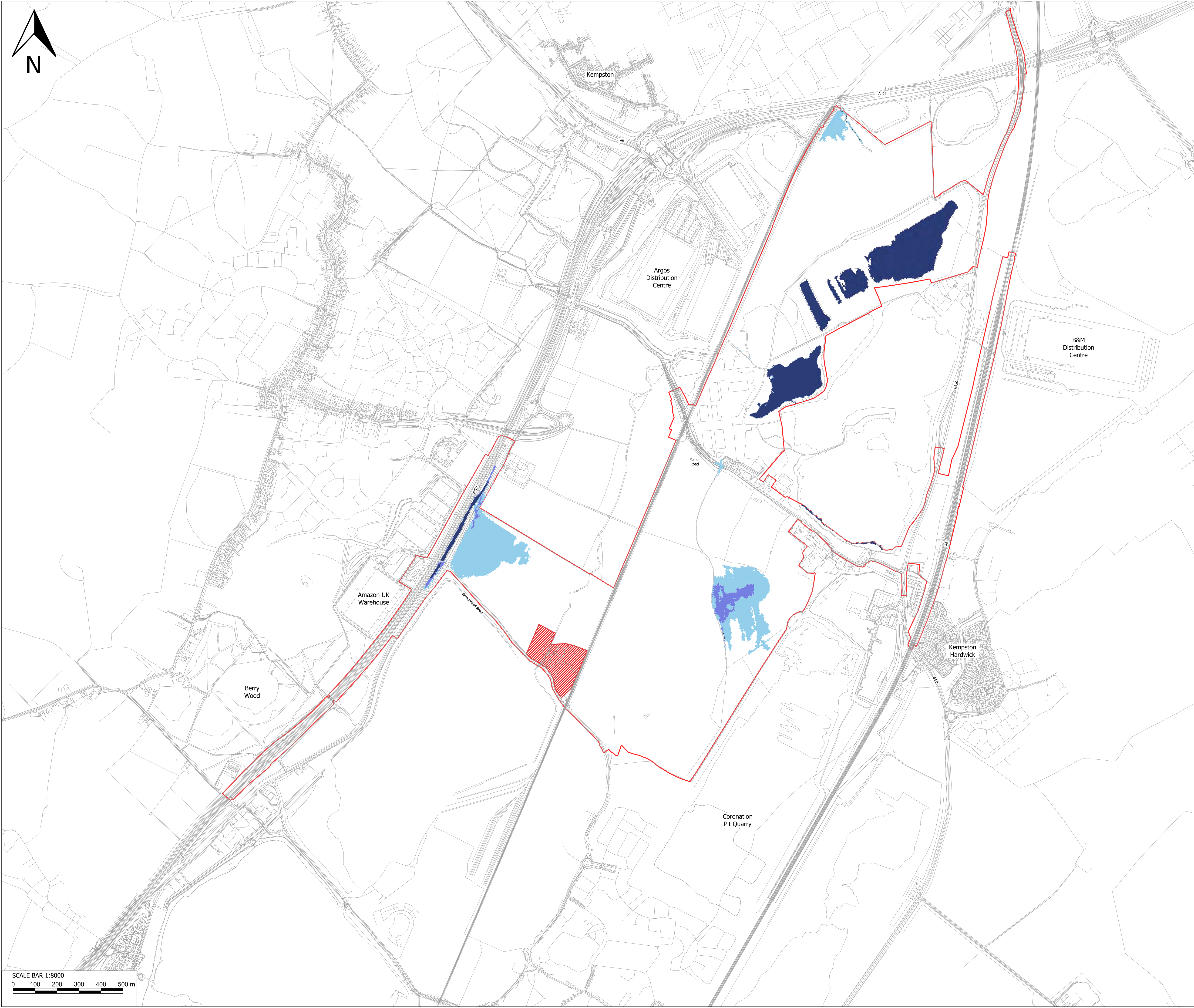




KEY	
	SITE BOUNDARY
	AREA OF FLOOD RESILIENCE SCHEME
	EXCLUDED FROM FLOOD RESILIENCE SCHEME
	EXCLUDED FROM SITE BOUNDARY

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Drawing Status: FOR ENDORSEMENT	
Scale: 1:7500 © A1	
Sheet Name: CONDITION 57 FLOOD RISK SCHEME LOCATION PLAN	
Sheet No.: SHEET 01 OF 01	Rev #: P01



KEY:

- Site Boundary
- Excluded from Site Boundary
- OS MasterMap
- Classification Of Flood Zones
- Very High Probability
- High Probability
- Medium Probability
- Low Probability

Low Probability - Land with less than a 0.1% annual probability of fluvial flooding

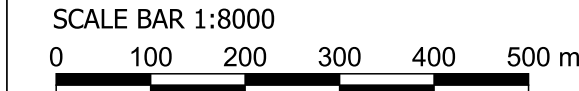
Medium Probability - Land with between 0.1% and 1% annual probability of fluvial flooding

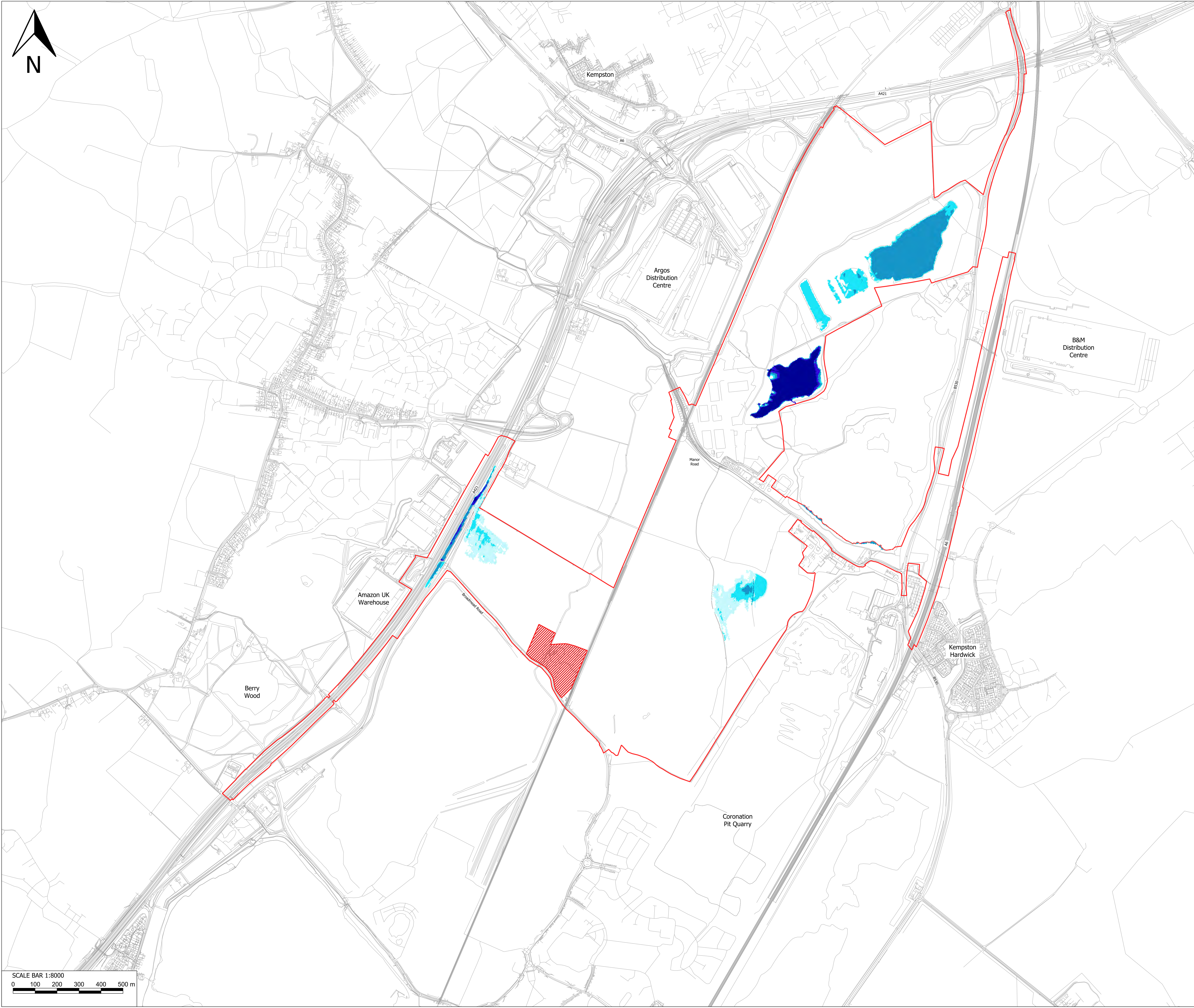
High Probability - Land with a 1% or greater annual probability of fluvial flooding

Very High Probability - Land classified as functional floodplain

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Drawing Status:	FOR ENDORSEMENT	
Scale:	1:8,000 @ A1	
Sheet Name:	Flood Map 1 Existing Baseline Fluvial Table 10 of Order Condition 57	
Drawing No.:	DR-1331-WSPUK-1093-3108-DR-50217	
Sheet No:	SHEET 1 OF 1	Rev #: P01





- KEY:
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 - Excluded from Site Boundary
 - OS MasterMap
 - Max Depths (m)
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 - <= 0.01
 - 0.1 - 0.3
 - 0.3 - 0.6
 - 0.6 - 0.9
 - 0.9 - 1.2
 - 1.2 - 1.5
 - 1.5+

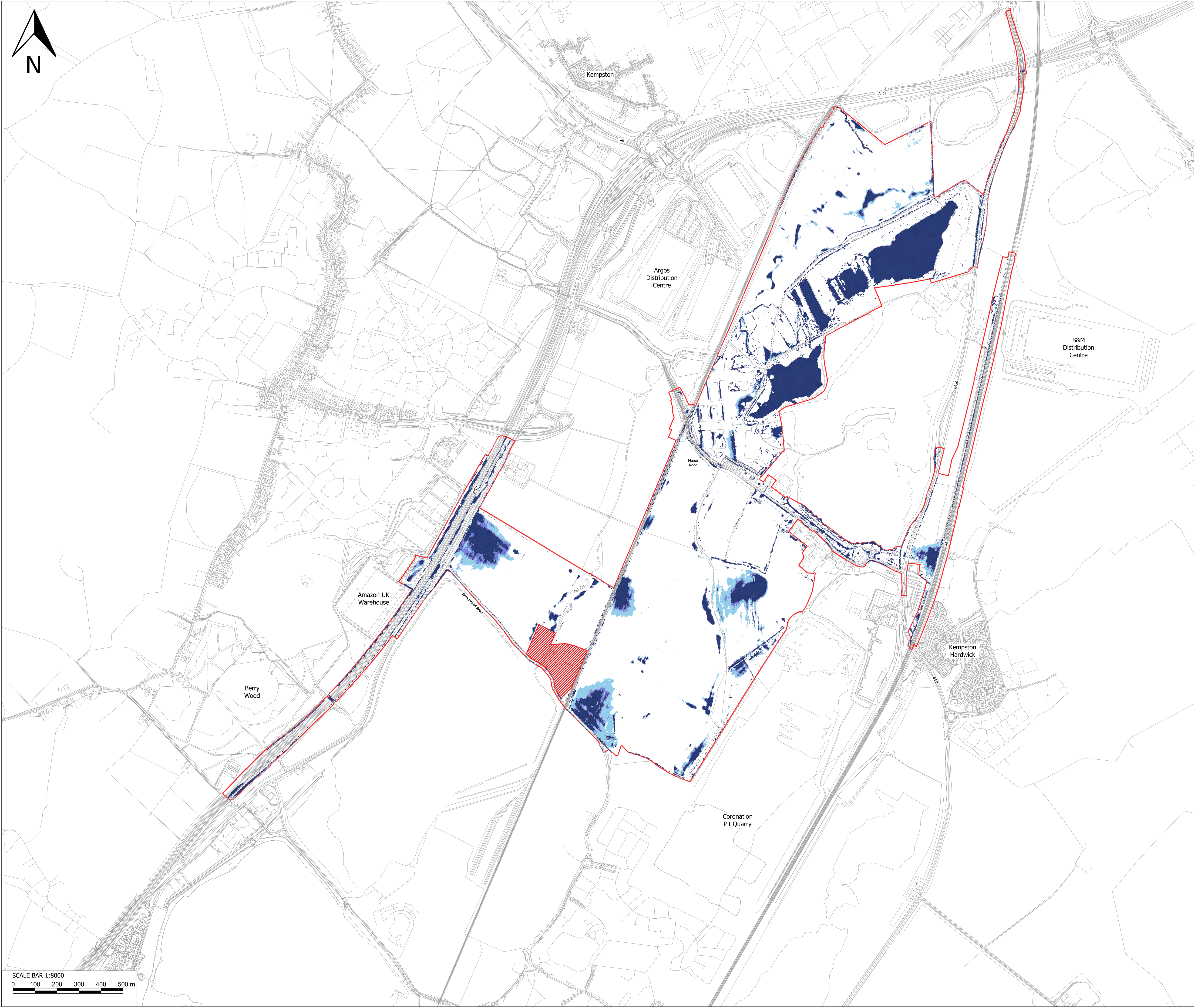
NOTES:

Peak river flow allowance of +20% is included for climate change

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Drawing Status:	FOR ENDORSEMENT	
Scale:	1:8,000 @ A1	
Sheet Name:	Flood Map 2 Existing Baseline Fluvial Design Flood Event 1% Annual Exceedance Probability +20% Climate Change	
Drawing No.:	DR-1331-WSPUK-1093-3108-DR-50205	
Sheet No:	SHEET 1 OF 1	Rev #: P01

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KEY:

- Site Boundary
- Excluded from Site Boundary
- OS MasterMap

Classification of Surface Water Flood Risk

- Very High Probability
- High Probability
- Medium Probability
- Low Probability

Low Probability - Land with less than a 0.1% annual probability of pluvial flooding

Medium Probability - Land with between 0.1% and 1% annual probability of pluvial flooding

High Probability - Land with a 1% or greater annual probability of pluvial flooding

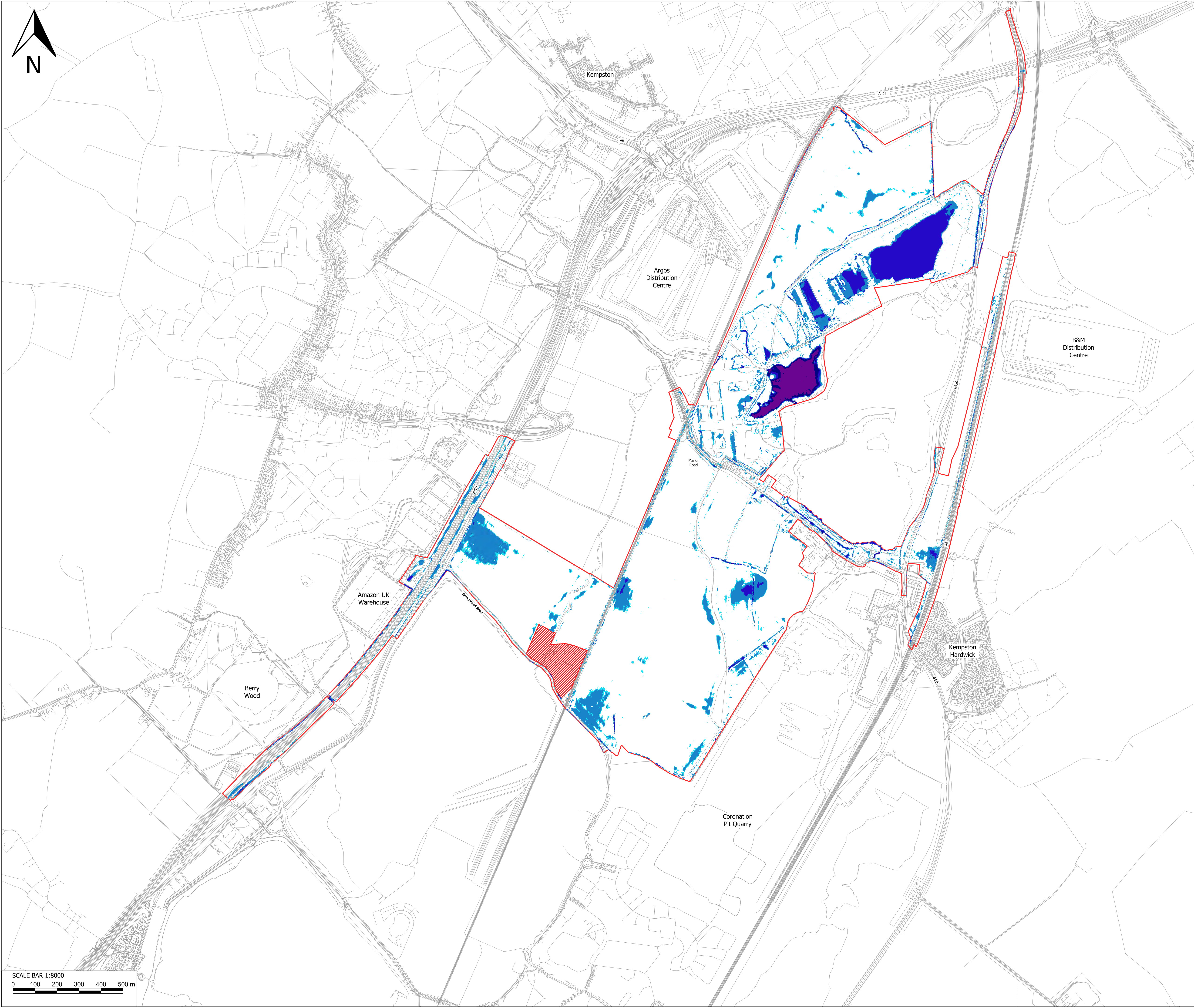
Very High Probability - Land with more than a 3.3% chance of pluvial flooding each year

NOTES:

Flood depths less than 0.075m have been filtered out

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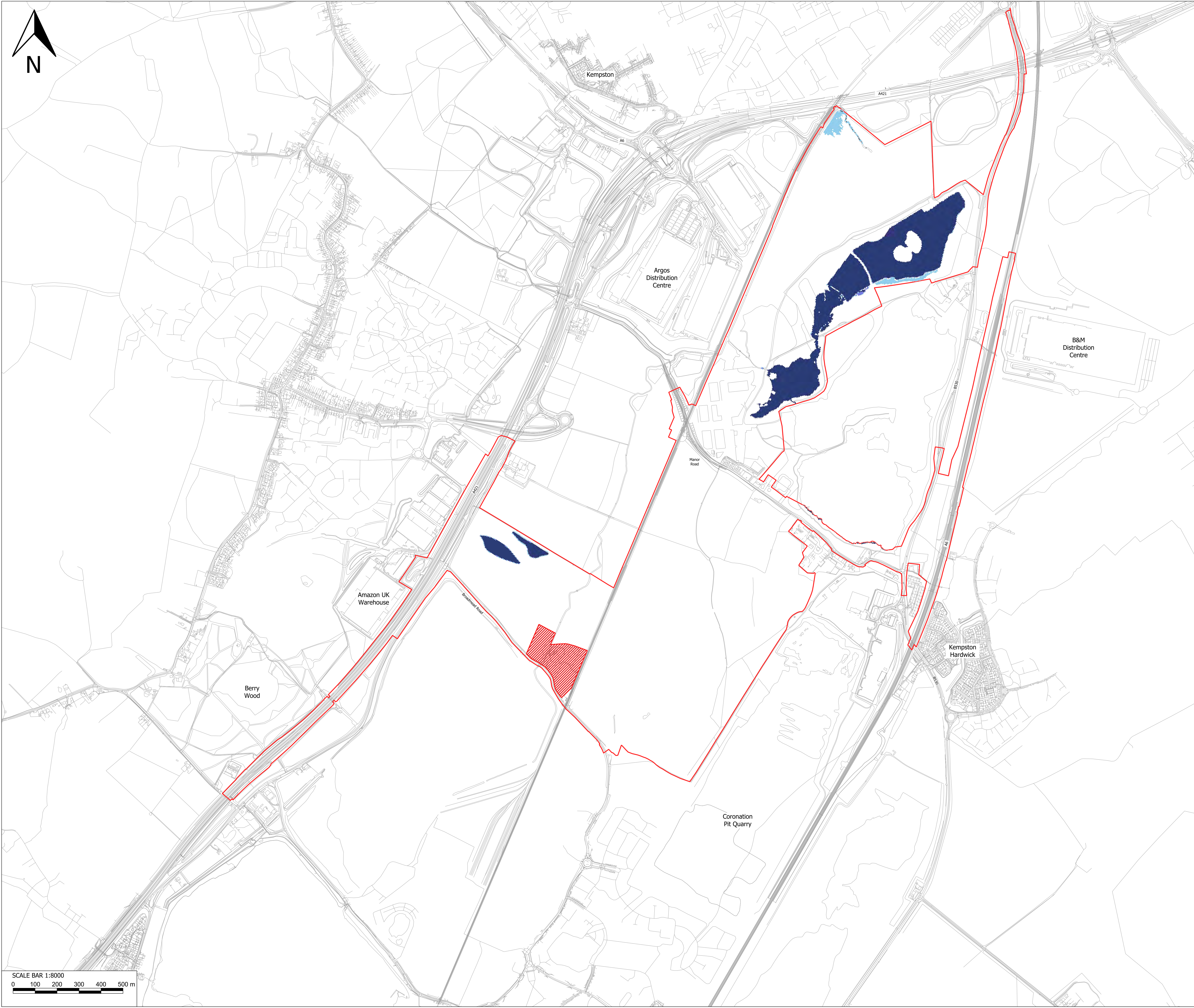
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Sheet No:	SHEET 1 OF 1	Rev #: P01



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 - Excluded from Site Boundary
 - OS MasterMap
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 - 0.1 - 0.3
 - 0.3 - 0.6
 - 0.6 - 0.9
 - 0.9 - 1.2
 - 1.2 - 1.5
 - > 1.5

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Drawing No:	DR-1331-WSPUK-1093-3108-DR-50212	
Sheet No:	SHEET 1 OF 1	Rev #: P01



KEY:

- Site Boundary
- Excluded from Site Boundary
- OS MasterMap
- Classification Of Flood Zones
- Very High Probability
- High Probability
- Medium Probability
- Low Probability

Low Probability - Land with less than a 0.1% annual probability of fluvial flooding

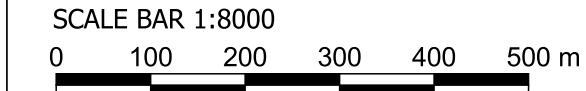
Medium Probability - Land with between 0.1% and 1% annual probability of fluvial flooding

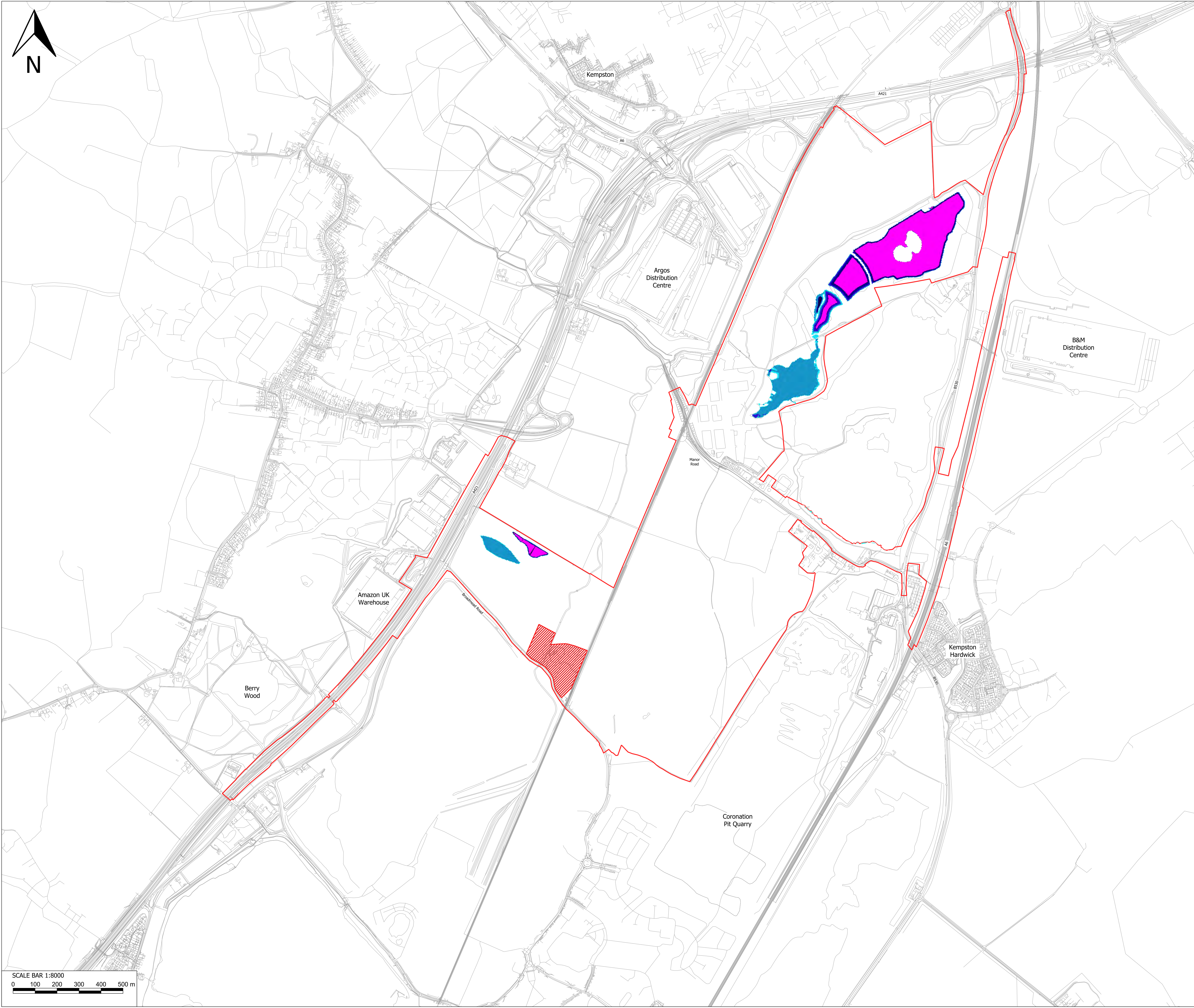
High Probability - Land with a 1% or greater annual probability of fluvial flooding

Very High Probability - Land classified as functional floodplain

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Sheet Name:		Flood Map 5 Future Scenario Fluvial Table 10 of Order Condition 57
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Sheet No:	SHEET 1 OF 1	Rev #:
		P01





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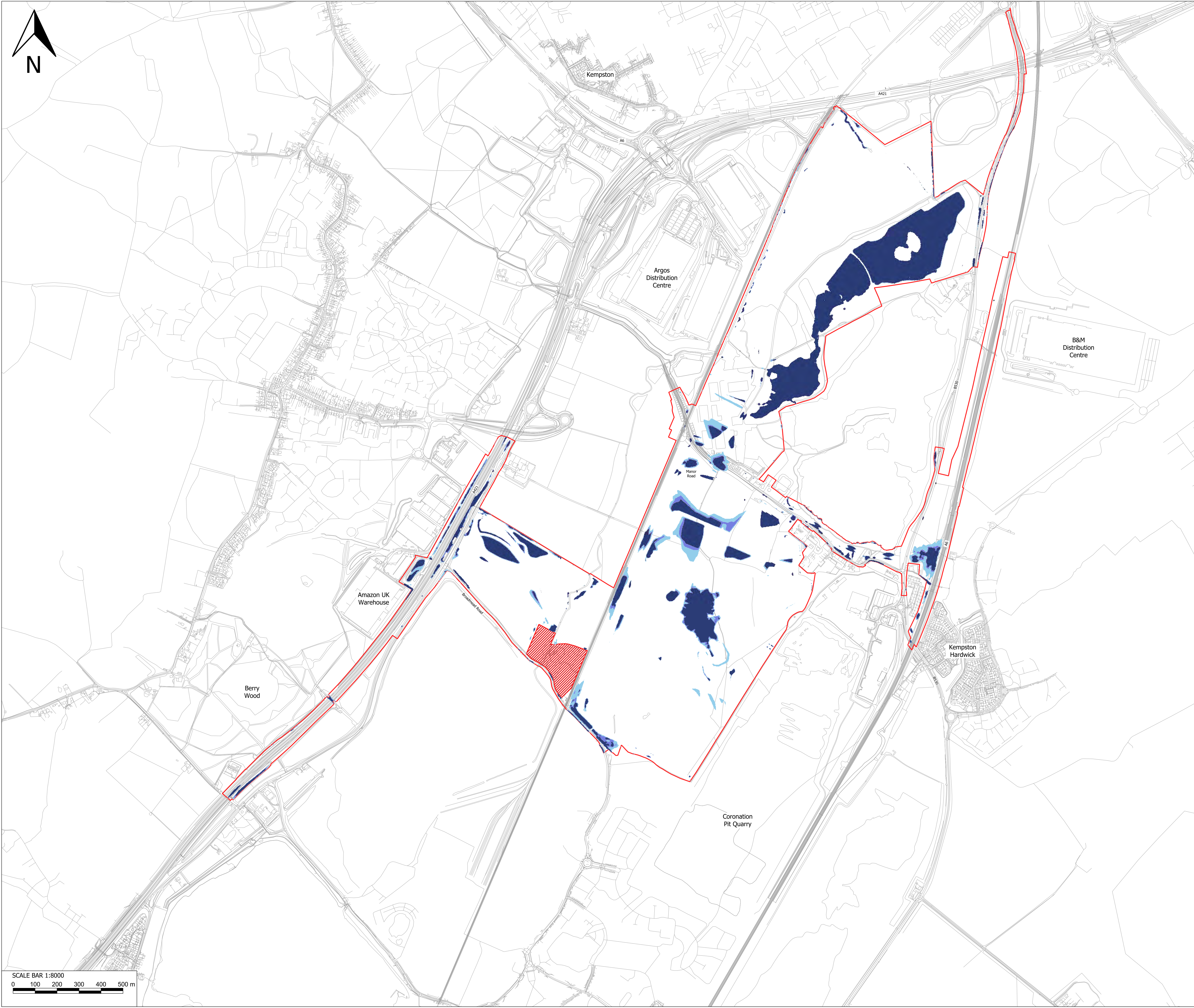
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 - 0.1 - 0.3
 - 0.3 - 0.6
 - 0.6 - 0.9
 - 0.9 - 1.2
 - 1.2 - 1.5
 - 1.5+

NOTES:

Peak river flow allowance of +20% is included for climate change

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Sheet Name:	Flood Map 6 Future Scenario Fluvial Design Flood Event 1% Annual Exceedance Probability +20% Climate Change	
Drawing No.:	DR-1331-WSPUK-1093-3108-DR-50207	
Sheet No:	SHEET 1 OF 1	Rev #: P01



KEY:

Site Boundary

Excluded from Site Boundary

OS MasterMap

Classification of Surface Water Flood Risk

Very High Probability

High Probability

Medium Probability

Low Probability

Low Probability - Land with less than a 0.1% annual probability of pluvial flooding

Medium Probability - Land with between 0.1% and 1% annual probability of pluvial flooding

High Probability - Land with a 1% or greater annual probability of pluvial flooding

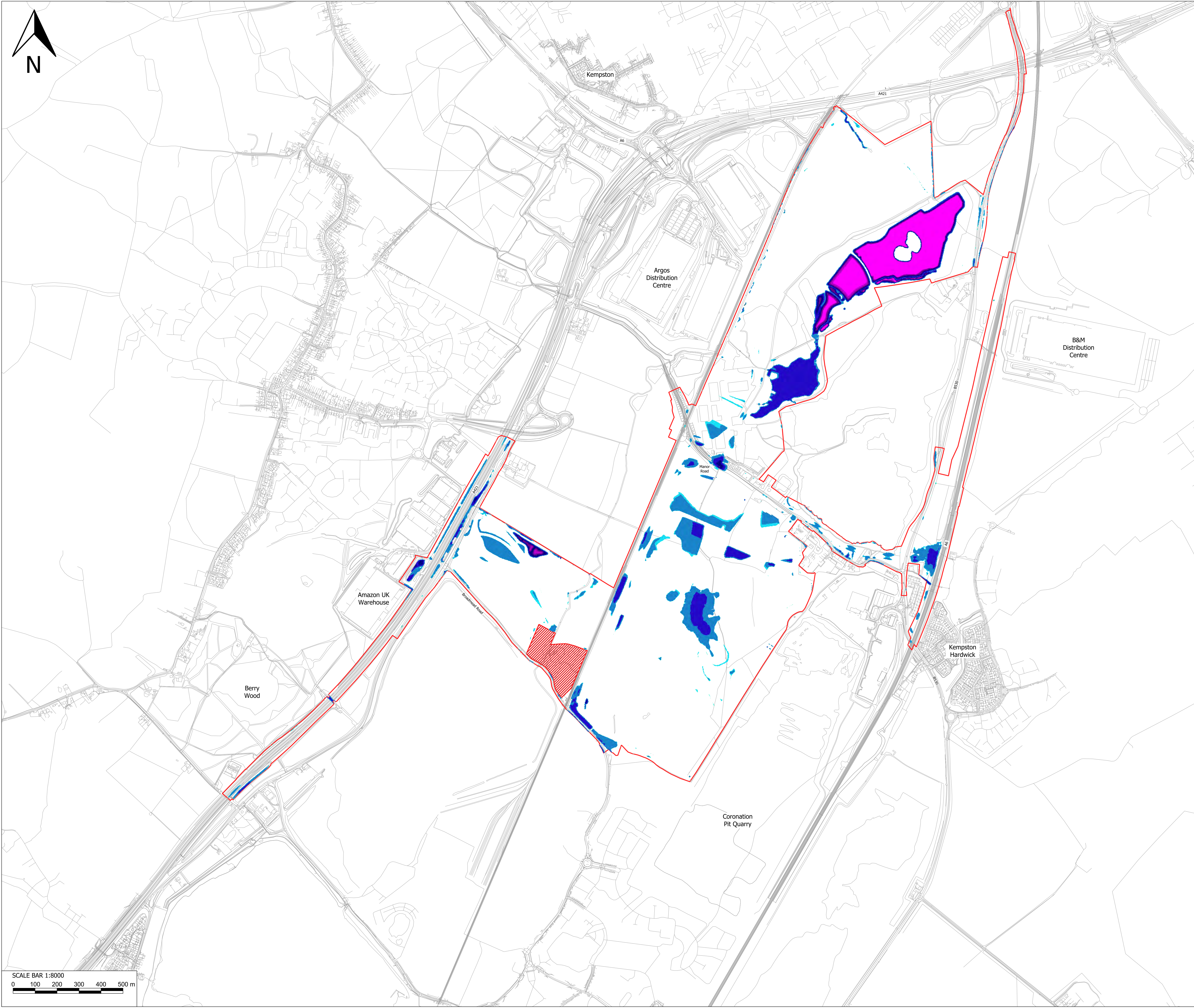
Very High Probability - Land with more than a 3.3% chance of pluvial flooding each year

NOTES:

Flood depths less than 0.075m have been filtered out

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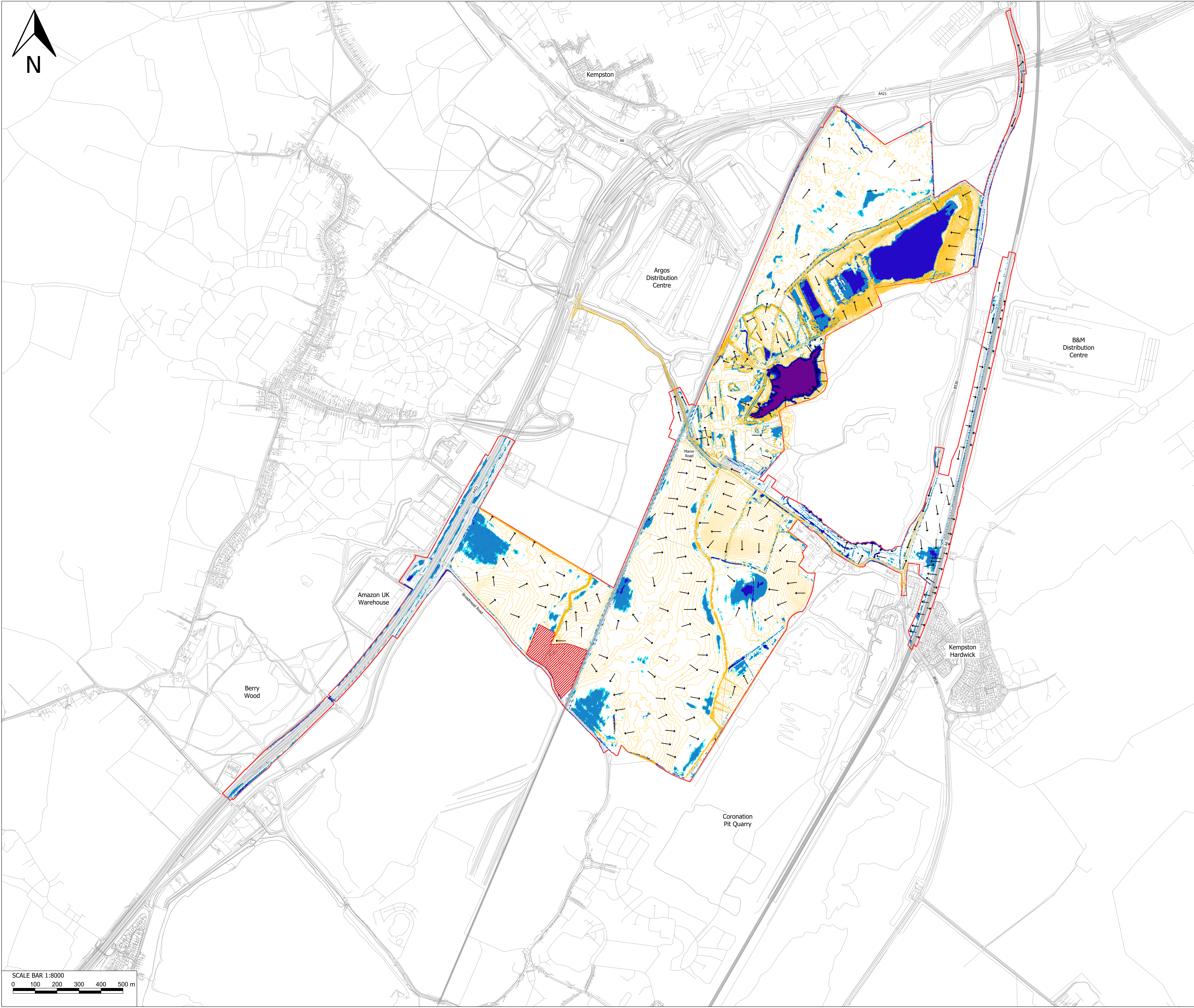
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Drawing No.:	DR-1331-WSPUK-1093-3108-DR-50220	
Sheet No:	SHEET 1 OF 1	Rev #: P01



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 - Excluded from Site Boundary
 - OS MasterMap
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 - 0.1 - 0.3
 - 0.3 - 0.6
 - 0.6 - 0.9
 - 0.9 - 1.2
 - 1.2 - 1.5
 - > 1.5

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Drawing Status:	FOR ENDORSEMENT	
Scale:	1:8,000 @ A1	
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Drawing No.:	DR-1331-WSPUK-1093-3108-DR-50214	
Sheet No:	SHEET 1 OF 1	Rev #: P01

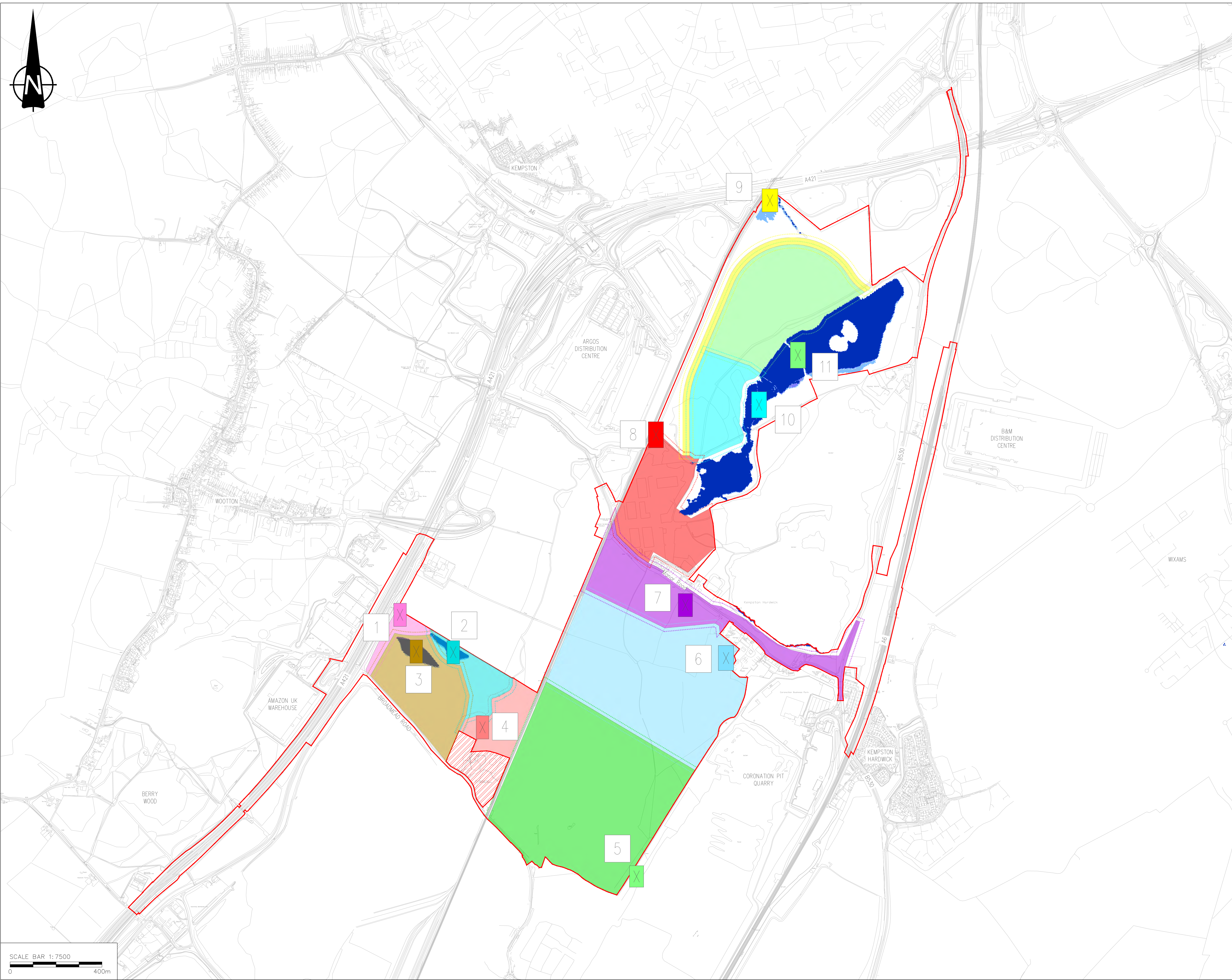


- KEY:
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 - Excluded from Site Boundary
 - OS MasterMap
 - Max Depths (m)
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 - 0.1 - 0.3
 - 0.3 - 0.6
 - 0.6 - 0.9
 - 0.9 - 1.2
 - 1.2 - 1.5
 - > 1.5
 - Existing Contours (0.2m interval)
 - Flow Directions

SCALE BAR 1:8000
0 100 200 300 400 500 m

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Drawing No.:	DR-1331-WSPUK-1093-3108-DR-50221	
Sheet No:	SHEET 1 OF 1	Rev #: P01



Approved by:JO'C

Drawn by:AS

Latest Revision Date:28/05/2026

KEY

SITE BOUNDARY

EXCLUDED FROM SITE BOUNDARY

15m LIMIT OF DEVIATION NODE 1

15m LIMIT OF DEVIATION NODE 2

15m LIMIT OF DEVIATION NODE 3

15m LIMIT OF DEVIATION NODE 4

15m LIMIT OF DEVIATION NODE 5

15m LIMIT OF DEVIATION NODE 6

15m LIMIT OF DEVIATION NODE 7

15m LIMIT OF DEVIATION NODE 8

15m LIMIT OF DEVIATION NODE 9

15m LIMIT OF DEVIATION NODE 10

15m LIMIT OF DEVIATION NODE 11

MINIMUM LEVEL REQUIREMENT NODE 1

MINIMUM LEVEL REQUIREMENT NODE 2

MINIMUM LEVEL REQUIREMENT NODE 3

MINIMUM LEVEL REQUIREMENT NODE 4

MINIMUM LEVEL REQUIREMENT NODE 5

MINIMUM LEVEL REQUIREMENT NODE 6

MINIMUM LEVEL REQUIREMENT NODE 7

MINIMUM LEVEL REQUIREMENT NODE 8

MINIMUM LEVEL REQUIREMENT NODE 9

MINIMUM LEVEL REQUIREMENT NODE 10

MINIMUM LEVEL REQUIREMENT NODE 11

VERY HIGH PROBABILITY OF FLUVIAL FLOODING

HIGH PROBABILITY OF FLUVIAL FLOODING

MEDIUM PROBABILITY OF FLUVIAL FLOODING

LOW PROBABILITY OF FLUVIAL FLOODING

6

X

FLOOD MODELLING NODES

LOW PROBABILITY – LAND WITH LESS THAN A 0.1% ANNUAL PROBABILITY OF FLUVIAL FLOODING

MEDIUM PROBABILITY – LAND WITH BETWEEN 0.1% AND 1% ANNUAL PROBABILITY OF FLUVIAL FLOODING

HIGH PROBABILITY – LAND WITH A 1% OR GREATER ANNUAL PROBABILITY OF FLUVIAL FLOODING

VERY HIGH PROBABILITY – LAND CLASSIFIED AS FUNCTIONAL FLOOD PLAIN

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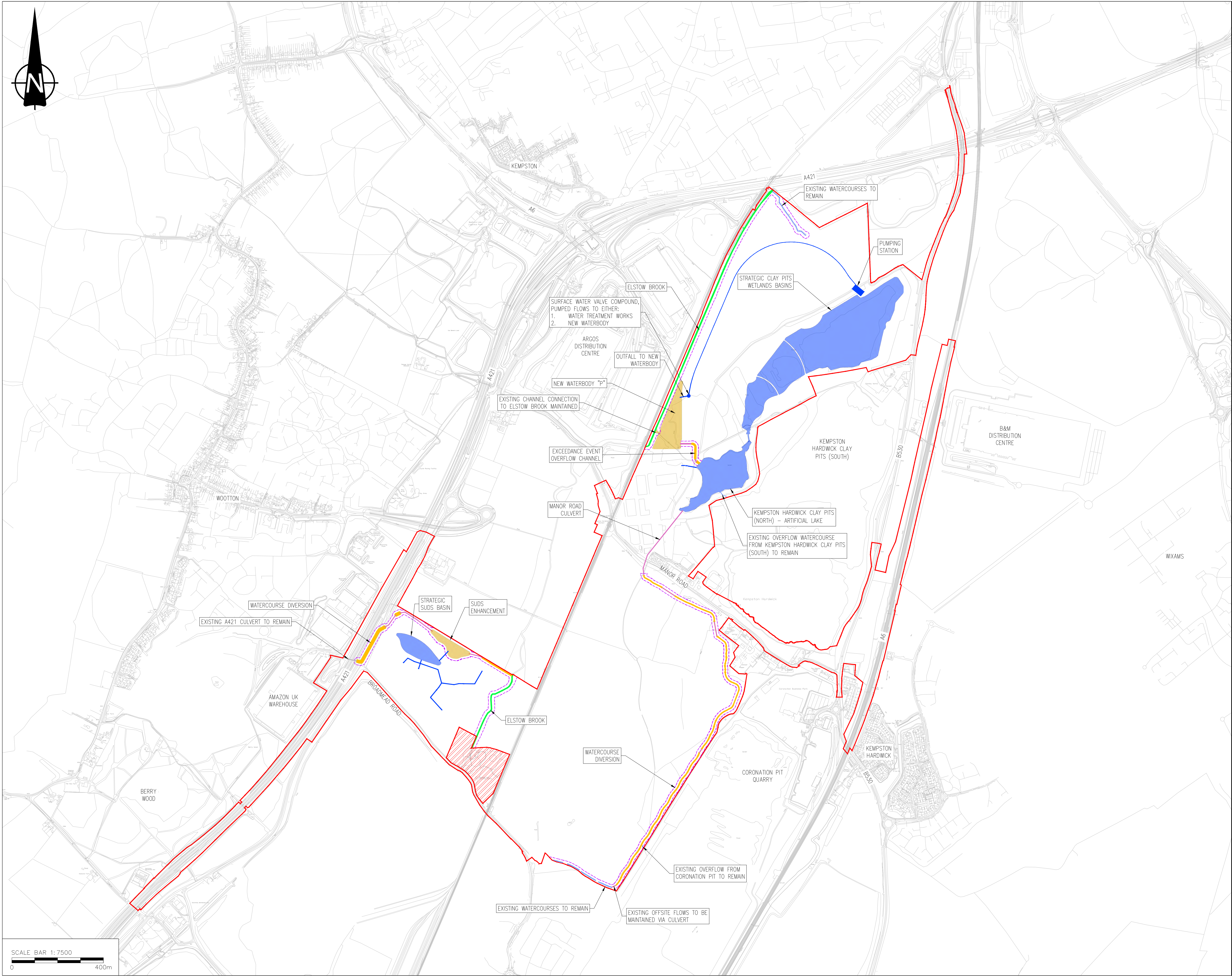
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Sheet No.: SHEET 01 OF 01

Rev #: P01



- LEGEND
- SITE BOUNDARY
 - PROPOSED ATTENUATION BASIN
 - PROPOSED ATTENUATION WETLAND
 - EXISTING CULVERT TO REMAIN
 - PROPOSED CULVERT
 - PROPOSED CONVEYANCE NETWORK
 - PROPOSED WATERCOURSE DIVERSION
 - EXISTING WATERCOURSE TO REMAIN
 - EXISTING WATERCOURSE
 - 9M BYELAW
 - SURFACE WATER VALVE COMPOUND
 - EXCLUDED FROM SITE BOUNDARY

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Drawing Status:	For Endorsement
Scale:	1:7500 © A1
Sheet Name:	CONDITION 57 FLOOD RISK PROPOSED STRATEGIC SURFACE WATER DRAINAGE PLAN
Sheet No.:	SHEET 01 OF 01
Rev #:	P01