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ENVIRONMENT

CP Logistics UK Reading Propco Limited
Land to the North of the A4
Theale
Flood Risk Assessment

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EXECUTIVE SUMMARY

This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG). It has been produced on behalf of CP Logistics UK Reading Propco Limited in respect of a planning application on Land to the North of the A4, Theale (approximate grid reference: SU647714).

This report demonstrates that the proposed development is at an acceptable level of flood risk, subject to the recommended flood mitigation strategies being implemented.

The Environment Agency (EA) Flood Map for Planning identifies the site to be partially located in Flood Zone 2, land at a medium probability of flooding from rivers.

River Kennet flood model data supplied by the EA identifies the site to be located outside the model predicted floodplain extents for all modelled return periods including the 1 in 1000-year event. The A4 has been embanked around the site and therefore acts as a topographical barrier to fluvial flood flows. However, a culvert underneath the A4 represents a potential mechanism for flood flows to enter the site, this is not reflected in the EA model data. Measures to mitigate this source of flood risk include the sequential arrangement of the site and elevated development levels.

The site is located in an area considered to be susceptible to groundwater emergence. The site investigations undertaken by BWB Consulting identified groundwater at depths of 0.53m to 1.89m below existing ground levels. If groundwater emerges within the site flows will generally be conveyed into the unnamed ditch in the south-east of the site and conveyed out of the site via the culvert. It is considered that the elevated development levels and profiling of ground will provide mitigation against groundwater flooding.

The design of any below ground infrastructure in the development should consider the potential presence of shallow groundwater. Water levels should be monitored during the construction phase and appropriate dewatering implemented where necessary.

A public foul water network is present in the site boundary towards High Street. The manhole data indicates that the network here is between 1.45m to 1.7m below existing ground levels. The network is understood to have limited capacity. In the event that this sewer was to exceed capacity, flows would be directed into the topographical depressions or unnamed ditch within the site, the risk is therefore considered to be medium.

Based on the available Risk of Flooding from Surface Water (RoFSW) mapping, the site is considered to be predominately at very low risk of flooding from pluvial sources. Isolated areas of high risk are present, but these are associated with localised topographical depressions which will not preclude development.

The raising of finished floor levels will provide suitable mitigation against surface water, groundwater and sewer flooding. Furthermore, appropriate surface water drainage management will prevent an increase of surface water flooding as a result of the development.

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

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APPENDICES

1. INTRODUCTION

1.1 This FRA has been prepared in accordance with the requirements set out in the NPPF and the associated PPG. The FRA has been produced on behalf of CP Logistics UK Reading Propco Limited in respect of a planning application on Land to the North of the A4, Theale.

1.2 This FRA is intended to support a full planning application, the level of detail included is commensurate and subject to the nature of the proposals at the planning stage. Summary information is included as **Table 1.1**.

Table 1.1: Site Summary

Site Name	**Land to the North of the A4**
Location	Theale
NGR (approx.)	SU647714
Application Site Area (ha)	5.4
Development Type	Commercial
Flood Zone Classification	Flood Zone 2
NPPF Vulnerability	Less Vulnerable
Anticipated Development Lifetime	75 years
Environment Agency Office	Thames
Lead Local Flood Authority	West Berkshire Council
Local Planning Authority	West Berkshire Council

Sources of Data

i. Topographical Survey by BWB Consulting, reference THR-BWB-00-M2-DR-G-0001-Existing_Site_2D_Model
ii. EA River Kennet (2017) Model Information
iii. EA Risk of Flooding from Surface Water Data
iv. West Berkshire Council Level 1 Strategic Flood Risk Assessment (SFRA)
v. West Berkshire Council Level 2 SFRA
vi. West Berkshire Council Preliminary Flood Risk Assessment (PFRA)
vii. West Berkshire Council PFRA Addendum
viii. West Berkshire Council Draft Local Flood Risk Management Strategy (LFRMS)

ix. West Berkshire Core Strategy (2006 – 2026) Development Plan Document

x. Web Based Soil Mapping

xi. Ground Investigations undertaken by BWB Consulting, reference THR-BWB-ZZ-XX-RPYE-0001_Ph1&2

xii. Thames Water Sewer Records

xiii. British Geological Survey (BGS) Drift & Geology Maps

Existing Site

1.3 The site is located to the east of Theale village centre, West Berkshire. The site is approximately 8km southwest of Reading and 16km east of Thatcham. The site is bound by the M4 to the east, the A4 (Bath Road) to the south and Hoad Way to the east. The north of the site is surrounded by High Street and existing residential properties. The site's location is illustrated within **Figure 1.1**.

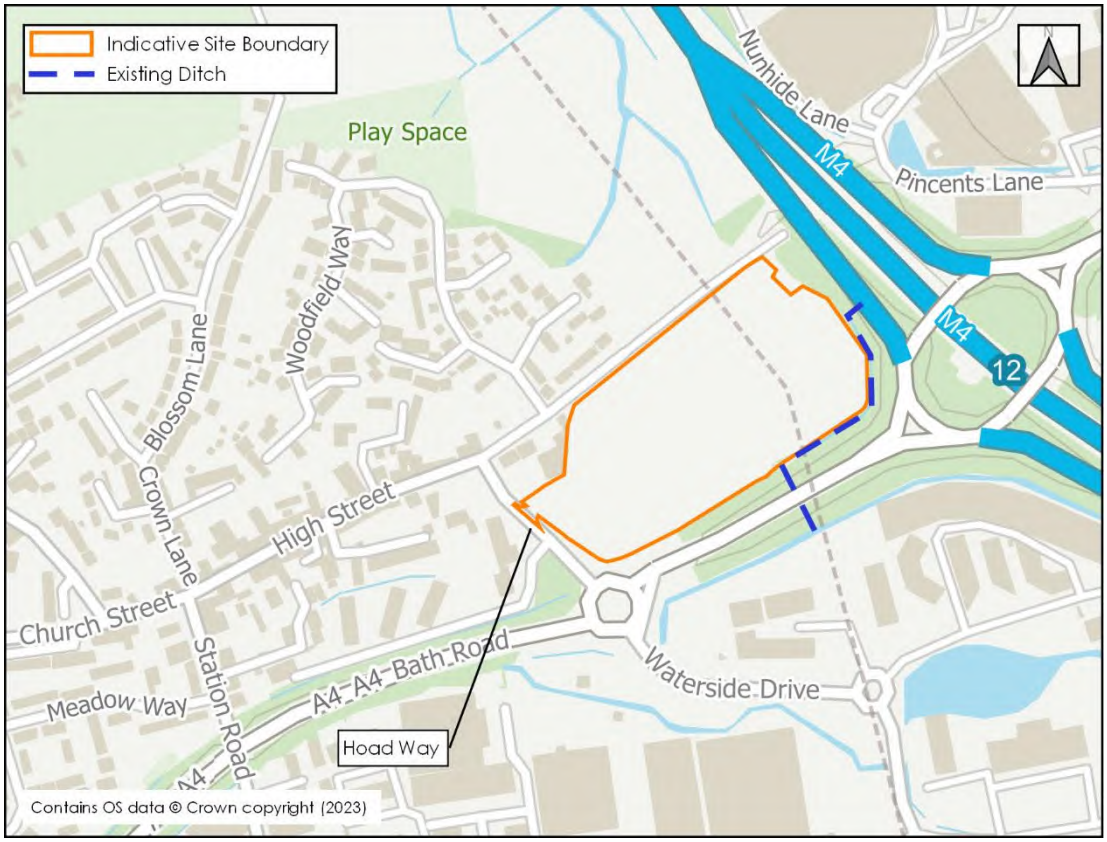


Figure 1.1: Site Location

1.4 The topographical survey, included as **Appendix 1**, indicates that the site is relatively level with a gentle slope in a southerly direction from High Street towards the A4. The approximate high point of 47.40metres Above Ordnance Datum (m AOD) is located in the northeast of the site and the approximate low point of 44.34m AOD is located in the southwest.

1.5 The site is currently agricultural land. An unnamed ditch enters the site on the eastern boundary via a culvert underneath the M4 and leaves the site on the southern boundary in a culvert underneath the A4.

1.6 The topographical survey confirmed the presence of the aforementioned unnamed ditch feature around the eastern and southern site boundaries, as shown in **Figure 1.1**. The ditch was identified to be dry at the time of survey with vegetation and debris present within the channel.

1.7 The topographical survey provides an indication of the ditch levels. The ditch enters the site on the eastern boundary through a 600mm culvert at 44.50m AOD and flows around the site's eastern and southern boundaries towards a 900mm culvert underneath the A4 at 43.72m AOD. The ditch is approximately 2.5m wide based on the surveyed banks and approximately 15.m deep at its deepest point.

Proposed Development

1.8 Full planning application for the construction of 2 employment units for flexible uses within Class E (light industrial), B2 and/or B8 of the Use Classes Order (including ancillary office provision) with associated enabling works, access from Hoad Way, parking and landscaping. The current layout is included as **Appendix 2**..

2. FLOOD RISK PLANNING POLICY & GUIDANCE

National Planning Policy Framework

2.1 The NPPF[1] sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. PPG is also available online[2].

2.2 The PPG sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.

2.3 The PPG also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing a FRA.

2.4 The PPG includes a series of tables that define Flood Zones (Table 1), the flood risk vulnerability classification of development land uses (Table 2) and 'compatibility' of development within the defined Flood Zones (Table 3). Table 2 and Table 3 are recreated within **Appendix 3** of this report for reference.

2.5 This FRA is written in accordance with the NPPF and the PPG.

Flood Map for Planning

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

Table 2.1: Flood Zone Classifications

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

[1] Revised National Planning Policy Framework, Ministry of Housing, Communities & Local Government, amended 2021
[2] Planning Practice Guidance: https://www.gov.uk/government/collections/planning-practice-guidance

2.7 The site is shown to be located mostly within 2, as shown in **Figure 2.1**. It is also shown to be subject to a reduction in risk of flooding due to defences, mostly likely be the elevated A4 highway embankment.

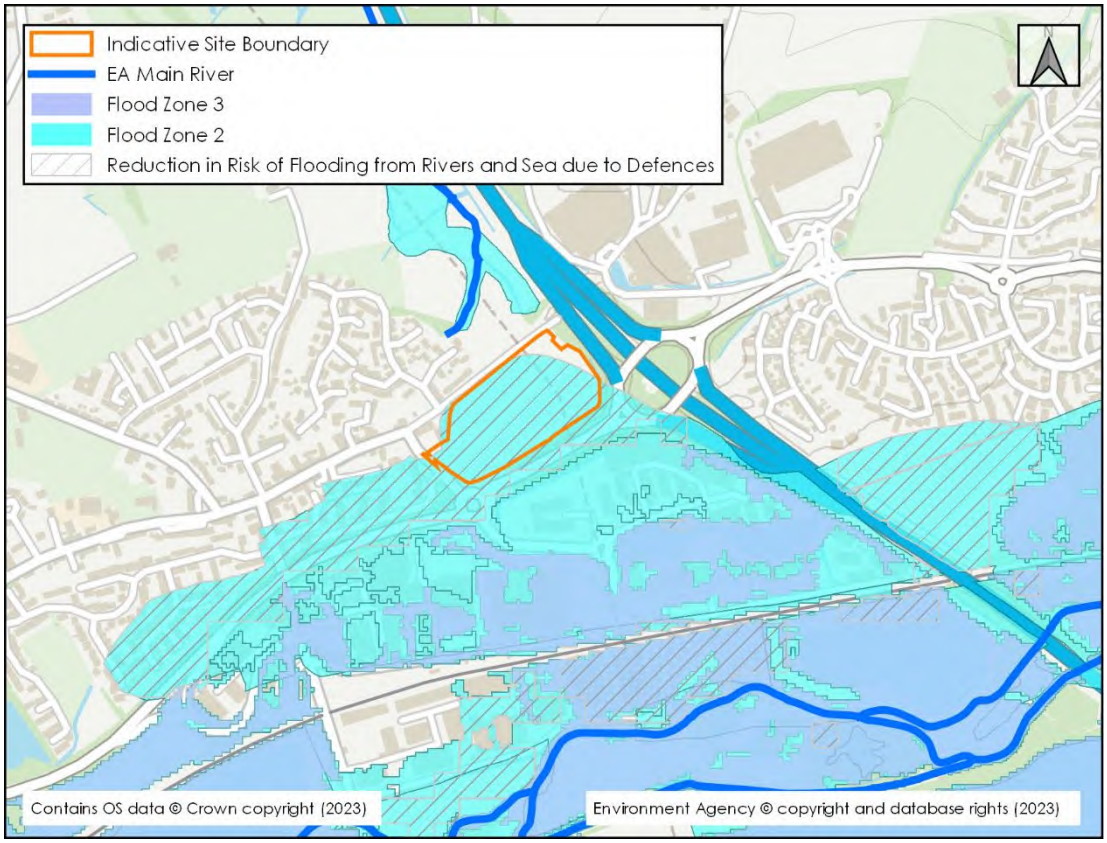


Figure 2.1: Flood Map for Planning

The Design Flood

2.8 The PPG identifies that new developments should be designed to provide adequate flood risk management, mitigation, and resilience against the 'design flood' for their lifetime.

2.9 This is a flood event of a given annual flood probability, which is generally taken as fluvial (river) and surface water (pluvial) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or tidal flooding with a 0.5% annual probability (1 in 200 chance each year), against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Climate Change

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

[3] Environment Agency, Flood risk assessments: climate change allowances: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. Last Accessed July 2023

2.11 The site falls within the Kennet and Tributaries and Thames and South Chilterns Management Catchments of the Thames River Basin District. **Table 2.2** identifies the relevant peak river flow climate change allowances from these Management Catchments.

Table 2.2: Peak River Flow Climate Change Allowances for the Kennet and Tributaries and Thames and South Chilterns Management Catchment within the Thames River Basin District

Allowance Category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2125)
Kennet and Tributaries			
Upper End	32%	39%	76%
Higher Central	16%	16%	35%
Central	10%	8%	21%
Thames and South Chilterns			
Upper End	30%	42%	76%
Higher Central	17%	22%	43%
Central	12%	14%	31%

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

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

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	Use the central allowance where a location may fall within Flood Zone 2 or 3 in the future.				
2	Use the higher central allowance	Use the central allowance			
3a	Use the higher central allowance	Development should not be permitted	Use the central allowance		
3b	Use the higher central allowance	Development should not be permitted			Use the central allowance

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
If development is considered appropriate by the local authority when not in accordance with Flood Zone vulnerability categories, then it would be appropriate to use the higher central allowance.					

2.13 The site is located within Flood Zone 2, the proposed development is classified as 'Less Vulnerable', and it has an anticipated lifespan of 75 years. Therefore, the Central allowance for the '2080s' epoch will be considered. As a conservative approach the allowances of the Thames and South Chilterns Management Catchment will be used as these are highest under these circumstances.

2.14 Therefore, to ensure the development is designed adequately for its lifetime, the development should be assessed against a 31% climate change allowance.

Strategic Flood Risk Assessment

2.15 A SFRA is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future.

2.16 The West Berkshire Council Level 1 SFRA[4] has been reviewed in the production of this FRA. The SFRA provides information specific to the site location in the form of fluvial, surface water and groundwater flood risk mapping, as well as records of historical flooding. It also includes flood risk policy and guidance for the area. Information from the Level 1 SFRA will be referenced within **Section 3**, where applicable.

2.17 The West Berkshire Council Level 2 SFRA[5] was produced to facilitate the application of Sequential and Exception Tests to screen allocated development sites. The proposed application site is referenced within the Level 2 SFRA. Information from the Level 2 SFRA will be referenced within **Section 3**, where applicable.

Preliminary Flood Risk Assessment

2.18 A PFRA is an assessment of floods that have taken place in the past and floods that could take place in the future. It generally considers flooding from surface water runoff, groundwater and ordinary watercourses, and is prepared by the Lead Local Flood Authorities (LLFAs).

2.19 The West Berkshire Council PFRA[6] considers flooding from surface water runoff, groundwater, ordinary watercourses and canals. It also references the historical river flooding which occurred in the local area in July 2007. However, no historical instances of flooding at the site are referenced.

[4] Level 1 Strategic Flood Risk Assessment (JBA Consulting, November 2022)
[5] Level 2 Strategic Flood Risk Assessment (JBA Consulting, November 2020)
[6] Preliminary Flood Risk Assessment (West Berkshire Council, June 2011)

2.20 An Addendum to the PFRA[7] was produced in December 2017. No changes to the understanding of significant flood risk are reported.

Local Flood Risk Management Strategy

2.21 A LFRMS is prepared by an LLFA to help understand and manage flood risk at a local level.

2.22 The LFRMS aims to ensure that the knowledge of local flood risk issues is communicated effectively so that they can be better managed. The LFRMS also aims to promote sustainable development and environmental protection.

2.23 The West Berkshire LFRMS[8] has been reviewed. The report lists six flood risk management objectives for West Berkshire, including the below objectives deemed most relevant for the site:

i. To develop plans to reduce existing flood risk taking account of people, communities and the environment;
ii. To identify measures to reduce flood risk; and
iii. To ensure that planning decisions take full account of flood risk.

2.24 A draft for an updated LFRMS[9] has been produced. This report has been reviewed and the above objectives have been retained.

River Basin Flood Risk Management Plan

2.25 Flood Risk Management Plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. FRMPs set out how risk management authorities will work with communities to manage flood and coastal risk. Risk management authorities include the EA, Natural Resources Wales, local councils, internal drainage boards, Highways England and LLFAs.

2.26 The first FRMPs were published in March 2016 and subsequently updated in December 2022.

2.27 The site is located within the Thames River Basin District, and the Thames River Basin District FRMP[10] has been reviewed; however, no relevant site scale objectives were found.

Surface Water Management Plan

2.28 Surface Water Management Plans (SWMPs) are non-statutory plans which preceded the introduction of the Flood and Water Management Act 2010. They can provide an

[7] Preliminary Flood Risk Assessment Addendum (West Berkshire Council, December 2017)
[8] Local Flood Risk Management Strategy 2013-2017 (West Berkshire Council, December 2013)
[9] Draft Local Flood Risk Management Strategy 2021-2026 (West Berkshire Council, June 2021)
[10] Thames River Basin District Flood Risk Management Plan (Environment Agency, December 2022)

important evidence base of local flood risk issues which can include surface water drains, groundwater and small watercourses.

2.29 A search of the West Berkshire website has not identified a SWMP which includes the site's location.

Section 19 Flood Investigation Reports

2.30 Under their duties of the Flood and Water Management Act 2010, LLFAs have a responsibility to publish reports of investigations of flood incidents. A section 19 flood investigation report is a public statement of the circumstances of a historical flood event and what parties have a role in managing the risks. The investigation does not always give an in-depth analysis of the flood risk or mechanisms, but it can provide a valuable record of past events.

2.31 West Berkshire have published two Section 19 reports on their website, which document the flooding that occurred in 2014 and 2016. The reports have been reviewed in relation to the site's location, but no evidence of flooding at the site was identified.

Local Plan

2.32 The West Berkshire Core Strategy (2006-2026) has been reviewed in relation to the development proposals. The Core Strategy includes Policy CS 16 – Flooding which notes that development should only be permitted if the following can be demonstrated:

i. Development would not have an impact on the capacity of the area to store floodwater.
ii. Development would not have a detrimental impact on the flow of fluvial flood water or surface water.
iii. Development would not obstruct the runoff of water due to high levels of groundwater.
iv. Development can implement appropriate flood risk management measures.
v. Development provides for long term maintenance and management of flood protection and mitigation measures.
vi. Safe access and egress from the site can be provided for routine and emergency access under both frequent and extreme flood conditions.

2.33 Policy CS 16 – Flooding also notes that development sites will need to demonstrate suitable management of surface water drainage in a sustainable manner through the use of Sustainable Drainage Systems (SuDS).

3. POTENTIAL SOURCES OF FLOOD RISK

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

Table 3.1: Pre-Mitigation Sources of Flood Risk

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial		X			The site is located in Flood Zone 2 of the River Kennet. However, the EA River Kennet 2017 model shows the site to be located outside of the floodplain for all modelled return periods.
			X		An unnamed ditch crosses the site. Based on the proposed finished floor level and topographical survey ditch invert levels, the site will be raised between 1.41m and 2.19m above this feature.
Canals			X		The River Kennet is navigable around Theale. There are no other canals in the vicinity.
Groundwater		X			The site is shown to fall within an area predicted to be at a high susceptibility to groundwater flooding based upon shallow groundwater levels. If groundwater were to emerge to flows would either pool within topographical depressions or be conveyed out of the site via the unnamed ditch. Therefore, there is considered to be a medium risk of flooding from groundwater.
Reservoirs and waterbodies			X		The site is shown to be well removed from the areas at risk of reservoir failure.
Pluvial runoff			X		The majority of the site is at a very low risk of flooding from pluvial sources. Higher risk is confined to isolated depressions within the site.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Sewers		X			The public sewer network around the site is known to have limited capacity. Should the sewer within the site exceed flows would either pool within topographical depressions or be conveyed out of the site via the unnamed ditch. Therefore there is considered to be a medium risk of flooding from sewers.
Effect of Development on Wider Catchment			X		The model data suggests the site is outside the design event floodplain. Therefore, the development is not expected to displace the design event floodplain.
		X			The development will increase the area of impermeable surfaces leading to a potential increase in runoff.

Fluvial Flood Risk

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

Historical Flooding

3.3 EA Recorded Flood Outlines (**Figure 3.1**) show two instances of historical flooding in 1971 and 2002. The available data indicates that these events were both caused by channel capacity exceedance of the nearest EA Main River, the River Kennet prior to the construction of defences.

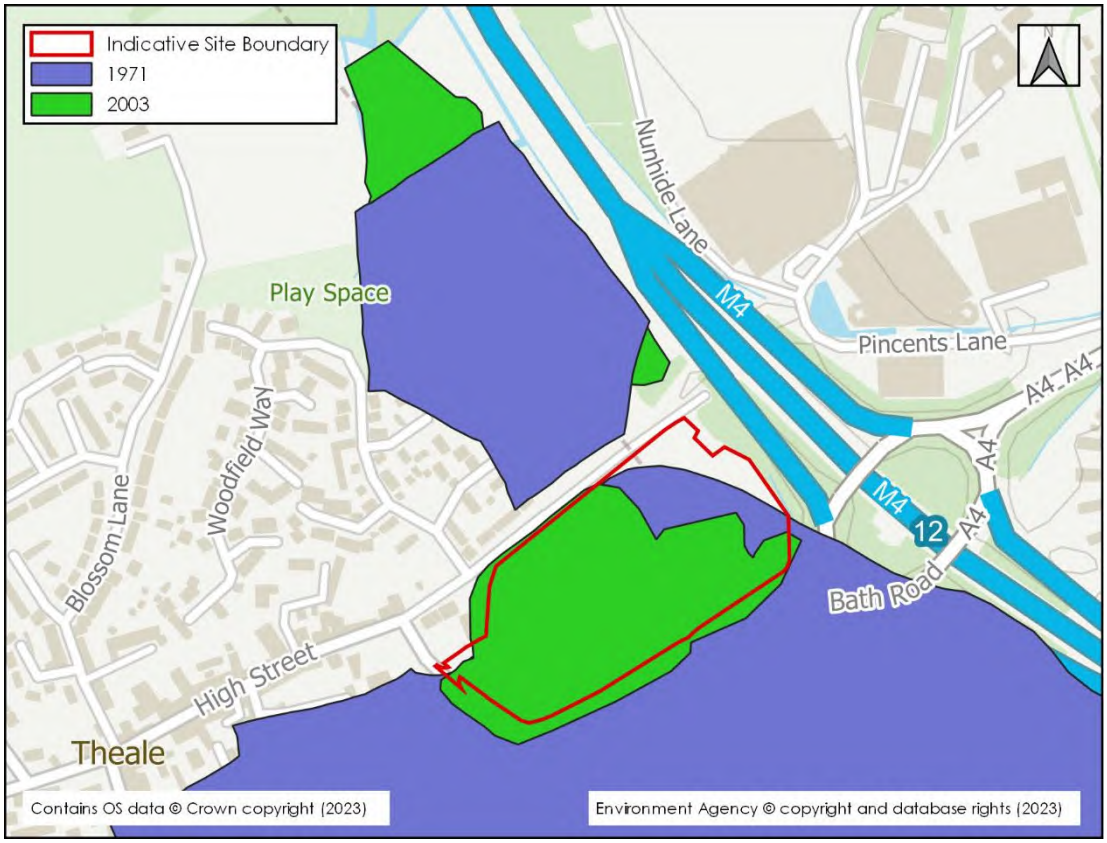


Figure 3.1: EA Recorded Flood Outlines

3.4 There are no instances of fluvial flooding at the site reported in the Levels 1 and 2 SFRA or PFRA.

EA Main River

3.5 The nearest EA Main River to the site is the River Kennet located approximately 600m to the south. The River Kennet flows in a north easterly direction around Theale towards its confluence with the River Thames, approximately 8.5km northeast of the site.

3.6 The West Berkshire SFRA notes that the A4, Bath Road, is raised in order to protect Theale Village from fluvial flooding. The topographical survey identifies the site level to be between approximately 44.3m AOD and 47.4m AOD and the crest level of Bath Road to be approximately 54.7m AOD.

3.7 The 2017 River Kennet model was obtained from the EA for the area. Recent correspondence has been sought from the EA to confirm this remains the latest iteration; however, at the time of writing, no response has been received.

3.8 The predicted floodplain extents, including climate change events, are shown in **Figure 3.2**, with peak flood levels nearest the site summarised in **Table 3.2**. The EA correspondence, including model results, are shown in **Appendix 4**. The climate change allowances within the model differ from those reported in **Section 2**; however, they are considered to be more conservative.

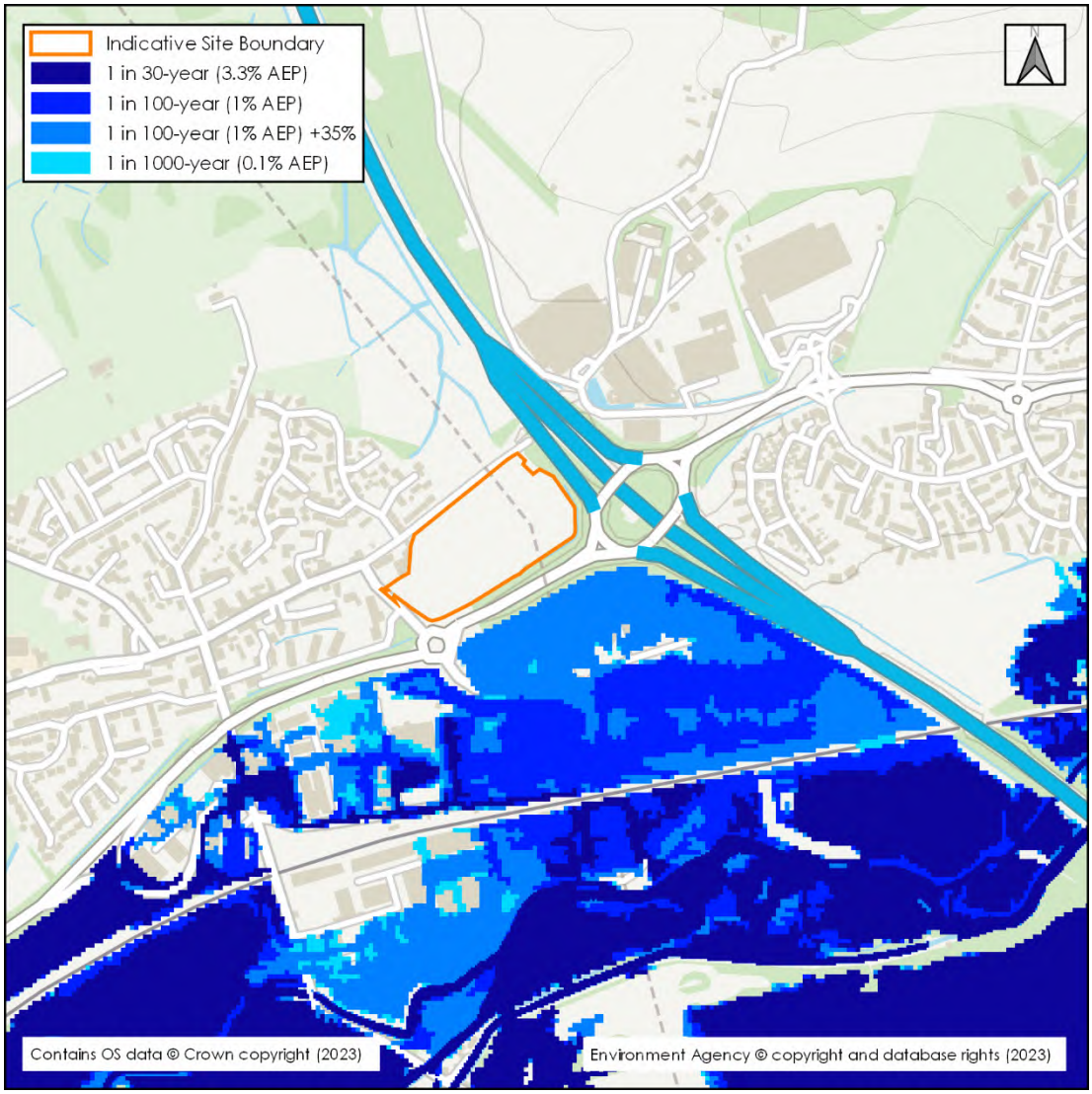


Figure 3.2: EA River Kennet 2017 Modelled Floodplain Extents

Table 3.2: EA River Kennet 2017 Modelled Peak Flood Levels Adjacent to Site (m AOD)

1 in 30-year	1 in 100-year	1 in 100-year +25%	1 in 100-year +35%	1 in 100-year +70%	1 in 1000-year
-	-	45.44	45.61	45.75	45.68

3.9 The River Kennet is expected to overtop its banks during the 1 in 20-year event. The functional floodplain associated with the River Kennet is primarily confined to the south of Theale in an area featuring a number of existing waterbodies.

3.10 The model predicts the site to be raised outside the 1 in 1000-year floodplain, equivalent to the definition of Flood Zone 1. The site is also raised above the design event floodplain including allowances for climate change. The floodplain extents appear to reinforce the suggestion that the A4 acts as a topographical barrier preventing fluvial flood flows from the River Kennet impacting Theale village.

3.11 The model predicted floodplain extents appear to contradict the EA Flood Map for Planning information. The outline of Flood Zone 3 correlates with the model predicted 1 in 100-year floodplain, however the outline of Flood Zone 2 is more extensive than the model predicted 1 in 1000-year floodplain. The EA Flood Zone 2 extent correlates with the historic flood event mapping and therefore it is likely that the site is included within Flood Zone 2 due to its recorded flood history. The site is also shown to be within a defended area, the Flood Zone extents in the Flood Map for Planning do not account for these defences.

Unnamed Ordinary Watercourse

3.12 There are no model predicted floodplain extents associated with the unnamed ditch through the site. The ditch enters and leaves the site through culvert structures beneath the M4 and A4 respectively.

3.13 The culvert underneath the A4 provides hydraulic connectivity between the model predicted fluvial floodplain and the site. A high-level interpretation of the topographical survey suggests that the levels of the culvert and site would mean sufficient head is available for flood flows to enter the site. Therefore, the flood levels have been extrapolated from the nearest modelled node to the site, which is discussed further in **Section 4**.

3.14 Overall, the site is considered to be at a low risk of flooding from fluvial sources. Appropriate mitigation measures are discussed in **Section 4**.

Groundwater Flood Risk

3.15 Groundwater flooding occurs when the water table rises above ground elevations, or it rises to depths containing basement level development. It is most likely to happen in low lying areas underlain by permeable geology. This is most common on regional scale chalk aquifers, but there may also be a risk on sandstone and limestone aquifers or on think deposits of sands and gravels underlain by less permeable strata such as that in a river valley.

3.16 BGS mapping shows the site to be underlain by Seaford Chalk Formation – Chalk. This is designated by the EA as a Principal Aquifer defined as layers of rock that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

3.17 There are expected to be superficial deposits of Alluvium - Clay, Silt, Sand and Gravel, Beenham Grange Gravel Member - Sand and Gravel, and Langley Silt Member – Clay and Silt present within the site. These deposits are designated as Secondary A Aquifers, defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

3.18 Mapping within the Level 1 SFRA shows the site to be at a high risk of groundwater flooding with groundwater levels within 0.025m of the surface. It is noted that the mapping is of a strategic scale and may not be fully representative of conditions within

the site. No incidents of groundwater flooding have been recorded within proximity of the site.

3.19 Intrusive ground investigations undertaken by BWB Consulting in 2019 confirmed the presence of chalk, alluvium, and clay on site. As part of the investigations, a number of borehole samples were undertaken. Groundwater was recorded at depths of 0.53m to 1.89m below ground level and was confined by the presence of overlying Alluvial clay in places. The shallow depths of groundwater recorded on site suggest there may be a risk of groundwater emergence.

3.20 In the event that groundwater emerges flows will form overland flows and either pool within the topographical depressions within the site or conveyed from the site via the unnamed ditch in the south-east.

3.21 Overall, the site is considered to be at a medium risk of flooding from groundwater if emerging flows pool within any topographical depression within the site. Appropriate mitigation measures are discussed in **Section 4**.

Pluvial Flood Risk

3.22 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.

3.23 Risk of Flooding from Surface Water (RoFSW) mapping has been collated and published by the EA, this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. An extract from the mapping is included as **Figure 3.3**.

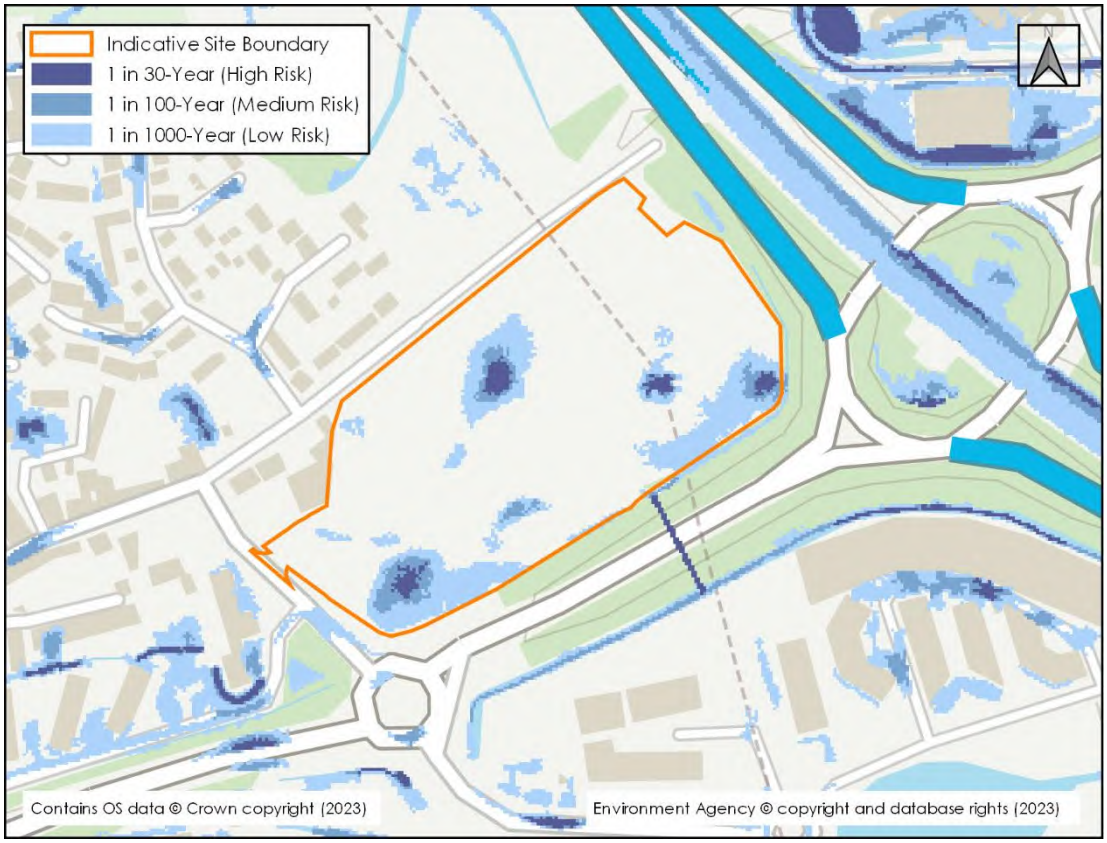


Figure 3.3: EA Risk of Flooding from Surface Water Mapping

3.24 The site is predominantly at a very low of surface water flooding. A number of low (1 in 1000-year) to high (1 in 30-year) risk areas are located in isolated topographical depressions within the site as identified on the topographical survey.

3.25 There are no surface water flow routes identified within the site boundary, however, the culvert underneath the A4 appears to be represented by a high-risk surface water flow route.

3.26 The site access and egress via Hoad Way is at very low to low risk of flooding from pluvial sources. The available data suggests that in the low risk event, beyond the 1 in 100-year design standard, the flood depths on Hoad Way are not expected to exceed 300mm.

3.27 Overall, the site is considered to be at a low risk of flooding from pluvial sources. Appropriate mitigation for any residual risk is included in **Section 4**.

Flood Risk from Sewers

3.28 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.

3.29 The Thames Water sewer records (**Appendix 5**) indicate the presence of a 300mm diameter foul water network towards the north of the site. This network is between 1.45m and 1.7m below the existing ground levels. The Thames Water Pre-Development Enquiry (**Appendix 6**) suggests that the foul network around the site has limited capacity.

3.30 The West Berkshire Council SFRA identified that the RG7 5 postcode area has experienced 14 historical sewer flooding incidents according to the Thames Water DG5 data.

3.31 In the event that the sewers within the site exceed capacity, flows will form overland flows and either pool within the topographical depressions within the site or be conveyed from the site via the unnamed ditch in the south-east.

3.32 Overall, the site is considered to be at a medium risk of flooding from sewer sources if exceedance flows pool within any topographical depression within the site. Appropriate mitigation measures are discussed in **Section 4**.

Effect of Development on Wider Catchment

Displacement of Floodplain

3.33 The site is located outside of the modelled fluvial floodplain, therefore there will be no displacement of floodplain.

Development Land Use/Drainage Considerations

3.34 The development proposals will lead to an increase of impermeable surfaces within the site boundary and a subsequent increase of surface water runoff. Suitable measures for the management of surface water drainage will be discussed in **Section 4**.

4. FLOOD RISK MITIGATION

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

Development Levels

4.2 The West Berkshire Council SFRA notes that floor levels should be situated a minimum of 300mm above the 1 in 100-year event including an allowance for climate change for all development. Therefore, it is recommended that finished floor levels are raised to a minimum of 45.91m AOD, 300mm above the 1 in 100-year + 35% climate change event. This is considered conservative over the 31% peak river allowance of the Thames and South Chilterns Management Catchment.

4.3 A comparison against all other flood levels is included in as part of a resilience check.

Table 4.1: Freeboard Above Modelled Flood Levels

	1 in 100-year +25%	1 in 100-year +35%	1 in 100-year +70%	1 in 1000-year
Modelled Flood Level (m AOD)	45.44	45.61	45.75	45.68
Freeboard above Proposed Finished Floor Level of 45.91m AOD (m)	0.47	0.30	0.16	0.23

4.4 Elevating the finished floor levels will also help mitigate the potential flood risk posed by surface water, sewer and groundwater sources. Further resilience should be afforded by ensuring ground levels are profiled to encourage pluvial runoff and overland flows away from the built development and towards the nearest drainage point.

4.5 Ground levels are to be profiled to facilitate overland flow routes away from built development. The culvert, and associated unnamed ditch, is to be retained as part of the development proposals.

Safe Access and Egress

4.6 The West Berkshire Level 1 SFRA states that "Safe access and egress from the development must be provided during the 100-year plus climate change event, from any source of flooding. An emergency plan will be needed wherever emergency flood response is an important consideration in making a development safe".

4.7 The River Kennet 2017 model outputs show the access/egress from Hoad Way and subsequently the A4 is dry in all modelled events. Hoad Way also demonstrates a low risk of flooding from pluvial sources. It is therefore considered that safe access/egress is achievable.

Flood Contingency Plan and Evacuation Procedures

Flood Warning and Evacuation

4.8 The site is located within the River Kennet from Thatcham down to Reading Flood Alert Area. The proposals show that built development and the access/egress routes for the site are located outside of the floodplain for all modelled return periods. Owners and occupiers may still sign up to receive EA Flood Alerts to maintain an awareness of local watercourses experiencing flood conditions.

Groundwater Considerations

4.9 The development will be set upon raised plateaus which will provide mitigation against any emerging groundwater.

4.10 Any below ground infrastructure should be designed to consider the presence of shallow groundwater.

4.11 It is recommended that groundwater levels are monitored during the construction phase and appropriate dewatering implemented where necessary.

Surface Water Drainage

4.12 To mitigate the development's impact on the current runoff regime it is proposed to incorporate surface water attenuation and storage as part of the development proposals.

4.13 In brief surface water runoff is to be pumped at a restricted rate that does not exceed the existing greenfield QBAR runoff rate to the Thames Water surface water sewer within Rotherfield Close. Attenuated surface water storage will be provided with capacity for the 1 in 100-year storm with an allowance for climate change.

4.14 Further information on the drainage approach is provided within the accompanying Sustainable Drainage Statement, reference THR-BWB-ZZ-XX-RP-CD-0001_SDS.

Foul Water Drainage

4.15 It is proposed to drain used water from the development separately to surface water.

4.16 Further information on the drainage approach is provided within the accompanying Sustainable Drainage Statement, reference THR-BWB-ZZ-XX-RP-CD-0001_SDS.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 This FRA has been prepared in accordance with the requirements set out in the NPPF and the associated PPG. The FRA has been produced on behalf of CP Logistics UK Reading Propco Limited in respect of a planning application on Land to the North of the A4, Theale.

5.2 This FRA is intended to support a full planning application, the level of detail included is commensurate and subject to the nature of the proposals at the planning stage.

5.3 This report demonstrates that the proposed development is at an acceptable level of flood risk to the recommended flood mitigation strategies being implemented. The identified risks and mitigation measures are summarised within **Table 5.1**:

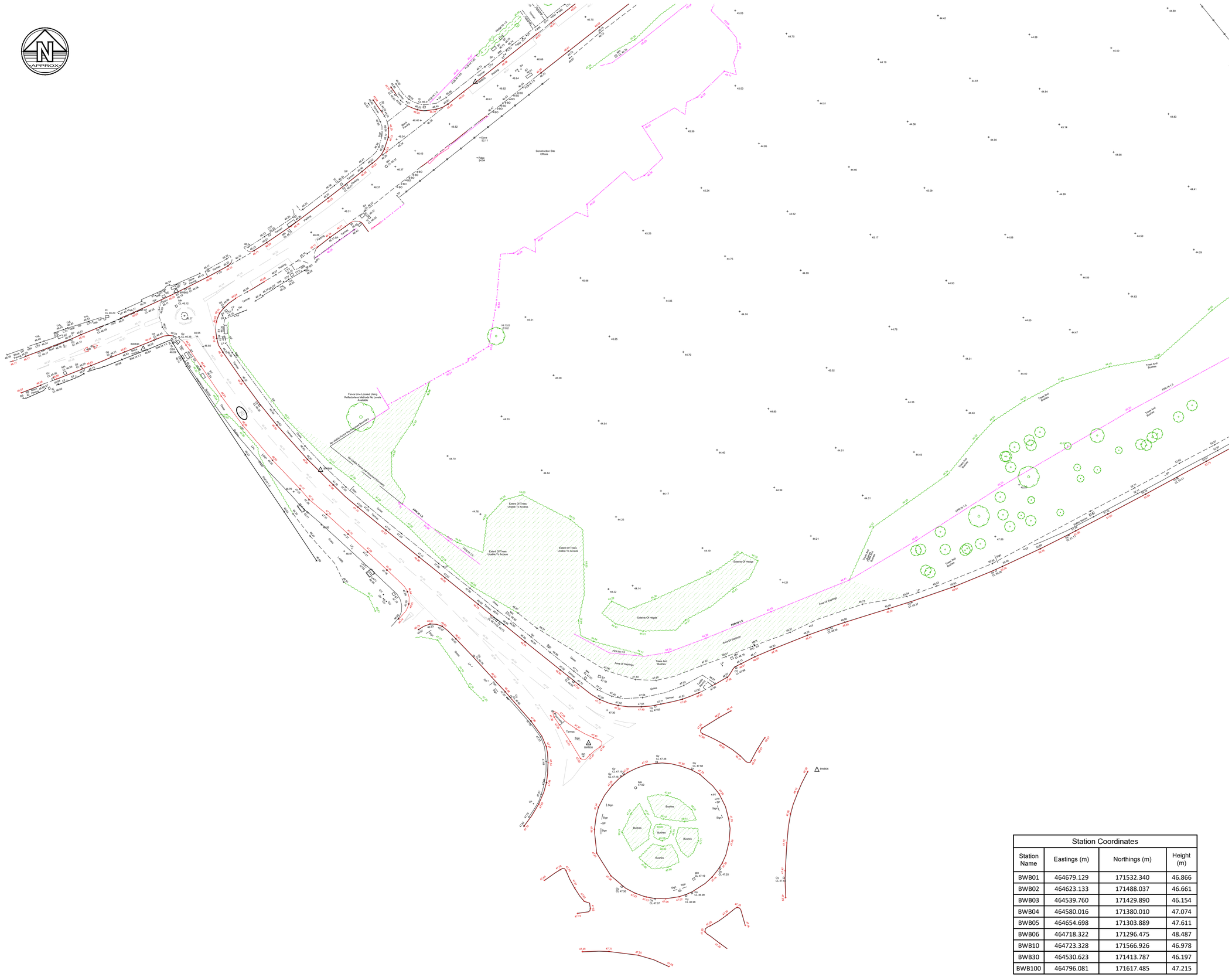
Table 5.1: Summary of Flood Risk Assessment

Flood Source	Risk & Proposed Mitigation Measures
Fluvial	The River Kennet 2017 model shows the site to be located outside of the modelled floodplain for all return periods up to and including the 1 in 1000-year event. It is recommended that finished floor levels are raised to 45.91m AOD, providing 300mm freeboard above the 1 in 100-year +35% climate change event peak flood level.
Groundwater, Sewer, and Pluvial	The elevation of finished floor levels will also help to mitigate against flood risk posed by other sources. Ground levels should be profiled to encourage pluvial runoff and overland flows away from the built development and towards the nearest drainage point.
Impact of the Development	Surface water runoff is to be pumped at a restricted rate that does not exceed the existing greenfield QBAR runoff rate. Attenuated surface water storage will be provided with capacity for the 1 in 100-year storm with an allowance for climate change. The foul water from the development will be discharged separately to surface water.
This summary should be read in conjunction with BWB's full report. It reflects an assessment of the Site based on information received by BWB at the time of production.	

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

APPENDICES

Appendix 1: Topographical Survey



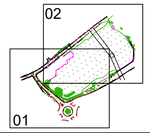
Station Coordinates

Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	464679.129	171532.340	46.866
BWB02	464623.133	171488.037	46.661
BWB03	464539.760	171429.890	46.154
BWB04	464580.016	171380.010	47.074
BWB05	464654.698	171303.889	47.611
BWB06	464718.322	171296.475	48.487
BWB10	464723.328	171566.926	46.978
BWB30	464530.623	171413.787	46.197
BWB100	464796.081	171617.485	47.215

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. No scale factor has been applied to this survey, therefore the os coordinates are to be treated as arbitrary. Please refer to survey station information below for on site control establishment.
6. All coordinates and height data relate to OSGB36(15). Control stations are coordinated by means of GPS receiving real time corrections via OS smart net.
7. All manhole data is collected from ground level therefore discrepancies may occur. More accurate data is only achievable via confined space entry.
8. OS license number: 100022432

Key Plan



Legend

- OS Buildings
- Surveyed Buildings
- Building
- Wall
- Kerb Channel Line
- Top of Kerb
- Edge of Surface
- Top of Bank
- Bottom of Bank
- Canopy / Overhang
- Line Marking
- Centre Line
- Watercourse Centre Line
- Barrier
- Fence
- Gate
- Overhead Powerline
- Overhead Utilities
- Contour Lines
- Inspection Chamber
- Flow direction and pipe diameter (0.25, 1)
- Station and Name (BH 1)
- Monitoring Borehole
- Tree / Bush / Sapling
- Area of Vegetation/ Extent of Tree Canopy
- Hedge
- Body of Water
- Body of Water from OS
- Spot Level (+50.00)
- Assumed Surface Water Drainage Line
- Surface Water Drainage Line

AP	Anchor Point	FBW	Fence Barbed Wire	LB	Litter Bin
BG	Back Gully	FCB	Fence Closed Board	LP	Lamp Post
BO	Bollard	FCL	Fence Chain Link	MH	Manhole
BS	Bus Stop	FEL	Fence Electric	Mkr	Service Marker
BT	British Telecom	FMP	Fence Metal Panel	PB	Post Box
C	Crest	FMR	Fence Metal Railing	PT	Post
CL	Cover Level	FOB	Fence Open Board	RE	Rodding Eye
CMP	Cable Marker Post	FPW	Fence Post & Wire	SP	Sign Post
		FSP	Fence Steel Palisade	ST	Stop Tap
CCTV	Security Camera	FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone Call Box
DC	Drainage Channel	FP	Flagpole	THL	Threshold Level
DK	Drop Kerb	Gas	Gas	TL	Traffic Light
DP	Down Pipe	GV	Gas Valve	TP	Telegraph Post
Elec	Electric	GY	Gully	TS	Traffic Signal
EP	Electricity Post	Ht	Height	UTS	Unable to Survey
ER	Earth Rod	IC	Inspection Chamber	WL	Water Level
FH	Fire Hydrant	IFL	Internal Floor Level	WM	Water Meter
FL	Floodlight	IL	Invert Level (as a reduced level)	WO	Wash Out

Rev	Date	Details of issue / revision	Drw	Rev
P3	14.08.19	Survey Updated Fence lines added	IR	JM

Issues & Revisions

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Client

First Panattoni UK Development Ltd

Project Title

Theale , Reading

Drawing Title

Existing Site Plan

Drawn:	I.Riley		Reviewed:	J.Mathieson
BWB Ref:	NTE2460	Date:	25.09.18	Scale@A1: 1:500

Drawing Status

Information

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
THR-BWB-00-01-DR-G-0001	S2	P3

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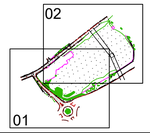

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CL	Cover Level	FOB	Fence Open Board	RE	Rodding Eye
CMP	Cable Marker Post	FPW	Fence Post & Wire	SP	Sign Post
		FSP	Fence Steel Palisade	ST	Stop Tap
CCTV	Security Camera	FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone Call Box
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DK	Drop Kerb	Gas	Gas	TL	Traffic Light
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Elec	Electric	GY	Gully	TS	Traffic Signal
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FH	Fire Hydrant	IFL	Internal Floor Level	WM	Water Meter
FL	Floodlight	IL	Invert Level (as a reduced level)	WO	Wash Out

Rev	Date	Details of issue / revision	Drw	Rev
P2	07.08.19	Survey Updated (Trees Added)	IR	JM

Issues & Revisions

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Client

First Panattoni UK Development Ltd

Project Title

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Drawing Title

Existing Site Plan

Drawn:	I.Riley	Reviewed:	J.Mathieson
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Scale@A1:	1:500		

Drawing Status

Information

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
THR-BWB-00-02-DR-G-0001	**S2**	**P2**

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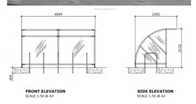
Appendix 2: Illustrative Masterplan

Boundaries

- Red Line Boundary
- NDA
- Security Fence

01 WASTE MANAGEMENT STORE
Concrete base with 2.4m high timber palisade fencing with galvanized structure.

02 BICYCLE STORE
Urban Engineering 'Series A' or similar and approved Polycarbonate transparent sheets with polyester powder coated steel frame.
Colour: White (BS00E55) Shetfield steel cycle racks or similar and approved to accommodate 10 cycles per shelter.



Arrangement and quantity of Cycle Stands within the Cycle Store area in accordance with planning requirements

Refer to site plan for location and positioning.

03 BOUNDARY SECURITY FENCE

Typical Paladin Fencing:
The perimeter of the service yards will be provided with 2.4m high paladin fencing. Post and panels to be black finish. Fences to be suitably set back from vehicular areas to reduce risk of accidental impact. Fencing / landscaping to be co-ordinated such that a maximum gap beneath fence is 100mm.

04 KNEE RAIL FENCING
Made from softwood guaranteed for 25 years.
Galvanised strap for longer life
5 year treatment guarantee
Height 1.20m with planed finish.

05 DOCK APRON RETAINING WALL
External retaining walls to the sides of the dock access will be also of fair faced concrete. Armco barrier galvanised mild steel and handrailing is to be provided adjacent to the retaining wall to level access ramps. The barrier uprights are to be surface fixed to the concrete.

06-07 VEHICLE AND PEDESTRIAN GATES:

To security sensitive areas near the main access road, vehicle gate is to be black steel paladin, 2.4m high to BS 1722-12:2006 (including concrete foundations). Gates to hinge open and be able to be held in the open position by providing bolt sleeves. Posts to be square section powder coated black steel with capped tops, cast in concrete bases.

07 AUTO CANTILEVERED SLIDING GATE

2.4m high Paladin automated sliding Gates.

Rev	Date	Iss. By	App. By	Description
P1	26/07/23		ELF	Revised Layout.
P2	03/08/23		ELF	Access to Unit 1 moved.
P3	04/08/23		ELF	Car Park layout updated.
P4	08/08/23		ELF	Update site layout as per latest comments from Panattoni.
P5	09/08/23		ELF	Issued for Planning
P6	11/09/23		ELF	Updated layout according to the latest landscape and drainage strategy.

Red Line Boundary

Name	Area (Hectares)	Area (Acres)
Site Gross Area	5.43 hectare	13.41 acres
Total Area	5.43 hectare	13.41 acres

Planning Site Area Schedule

Name	Area (Hectares)	Area (Acres)
Net Dev Area Unit 1	0.98 hectare	2.42 acres
Net Dev Area Unit 2	1.04 hectare	2.58 acres
Total Area	2.02 hectare	4.99 acres

UNIT 1 GIA Area Schedule

Name	Area (m²)	Area (ft²)
Unit 1 Escape Stair	24.29 m²	261.48 ft²
Unit 1 GF Core	86.68 m²	933.06 ft²
Unit 1 Mezzanine Office	415.76 m²	4,475.16 ft²
Unit 1 Warehouse	4,029.72 m²	43,375.58 ft²
	4,556.45 m²	49,045.27 ft²

UNIT 2 GIA Area Schedule

Name	Area (m²)	Area (ft²)
Unit 2 Escape Stair	24.29 m²	261.48 ft²
Unit 2 GF Core	86.68 m²	933.06 ft²
Unit 2 Mezzanine Office	415.76 m²	4,475.16 ft²
Unit 2 Warehouse	4,561.56 m²	49,100.20 ft²
	5,088.29 m²	54,769.90 ft²

TOTAL GIA

Name	Area (m²)	Area (ft²)
<varies>	9,644.74 m²	103,815.17 ft²
	9,644.74 m²	103,815.17 ft²

GEA Schedule

Name	Area (m²)	Area (ft²)
<varies>	9,889.97 m²	106,454.73 ft²
Total GEA:	9,889.97 m²	106,454.73 ft²

SCALE 1:1000

0m 50m 100m

PANATTONI

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Theale, Reading

Drawing Name:
Site Plan

Drawing Stage: **Planning**

Status: **S0**

SGP File Ref: 18-095-SGP-ZZ-ZZ-M3-A-00000

SGP Project No	Date	Drawn	Team	Scale	Rev
18-095	26/07/23	ELF	MMS	As indicated @ A1	P6

Drawing Number:
18-095-SGP-ZZ-ZZ-DR-A- 131001
Project Code Originator Volume Level Type Role Number

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Appendix 3: NPPF Flood risk Vulnerability and Flood Zone Compatibility

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

Vulnerability Classification	Description
Essential infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood. • Wind turbines. • Solar farms.
Highly Vulnerable	• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)
More Vulnerable	• Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill* and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	• Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place. • Car parks.
Water-Compatible Development	• Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Flood Zone Compatibility (recreated from the NPPF Planning Practise Guidance)

Flood Zone	Vulnerability Classification				
	Essential infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Flood Zone 1 (Low Probability)	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate
Flood Zone 2 (Medium Probability)	Development is appropriate	To be deemed appropriate an exception test is required to demonstrate: • The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk • the sustainability benefits of the development to the community outweigh the flood risk.	Development is appropriate	Development is appropriate	Development is appropriate
Flood Zone 3a (High Probability)	To be deemed appropriate an exception test is required to demonstrate: • The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk the sustainability benefits of the development to the community outweigh the flood risk. Additionally, essential infrastructure should be designed and constructed to remain operational and safe in times of flood.	Development should not be permitted	To be deemed appropriate an exception test is required to demonstrate: • The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk • the sustainability benefits of the development to the community outweigh the flood risk.	Development is appropriate	Development is appropriate

Flood Zone	Vulnerability Classification				
	Essential infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Flood Zone 3b (The Functional Floodplain)	To be deemed appropriate an exception test is required to demonstrate: • The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk • the sustainability benefits of the development to the community outweigh the flood risk. Additionally, development should be designed and constructed to: • remain operational and safe for users in times of flood; • result in no net loss of floodplain storage; • not impede water flows and not increase flood risk elsewhere.	Development should not be permitted	Development should not be permitted	Development should not be permitted	Development is appropriate if designed and constructed to: • remain operational and safe for users in times of flood; • result in no net loss of floodplain storage; • not impede water flows and not increase flood risk elsewhere.

Appendix 4: EA Correspondence

Product 4 (Detailed Flood Risk) for Land adjacent to High Street, Theale
Our Ref: THM_135276

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

i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and

ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

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

A table showing:

i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.

ii) Flood defence locations unique identifiers and attributes; (supplied seperately)

iii) Historic flood events outlines unique identifiers and attributes; and

iv) Local flood history data (where available/relevant).

Please note:

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

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

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

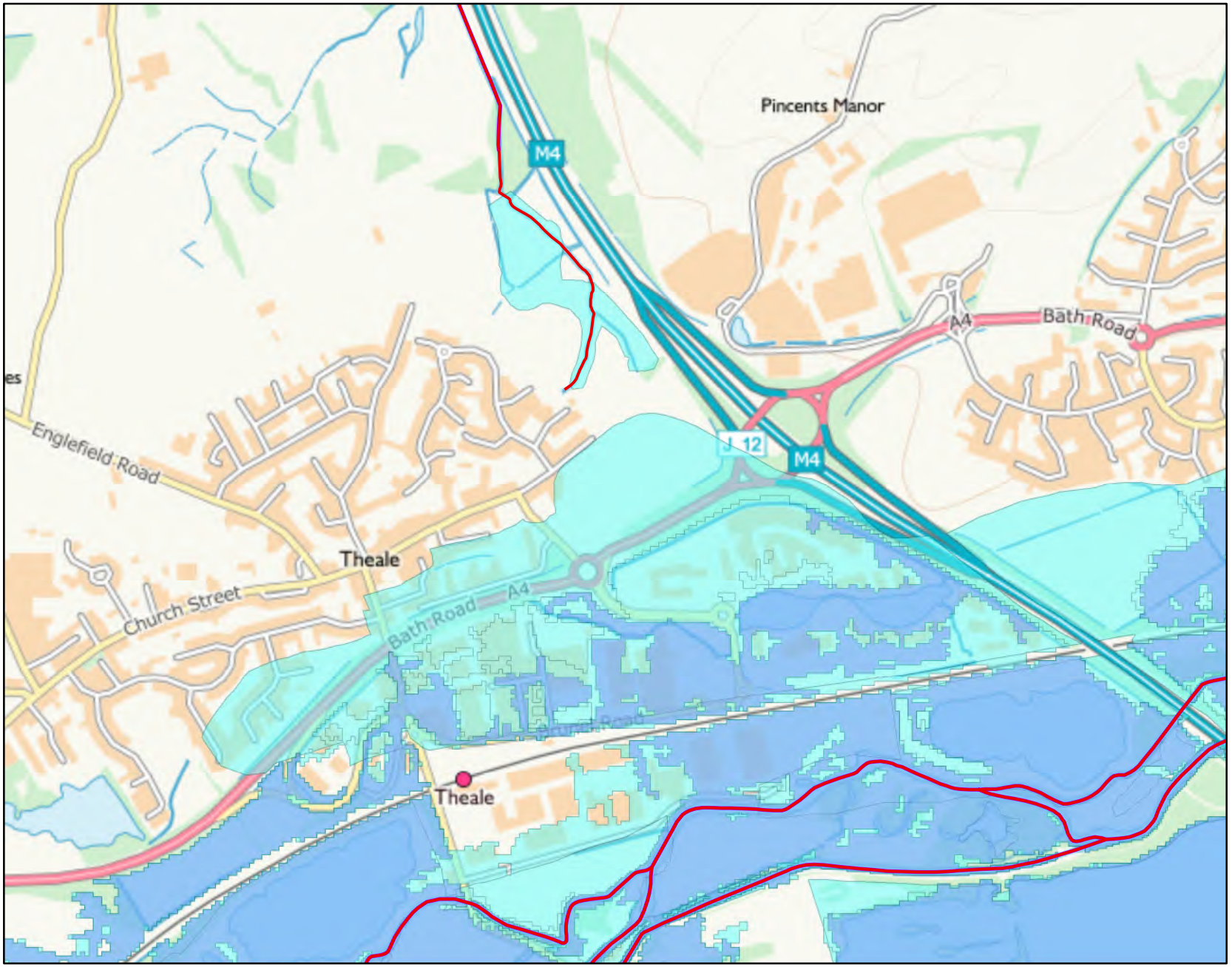
This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

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

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

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

Flood Map for Planning centred on land near High Street, Theale
Created on 18/07/2019 REF: THM_135276



Environment Agency

Kilometres

0 0.25 0.5

Legend

- Main River
- Flood defences
- Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

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

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Defence information

THM_135276

Defence Location:	No defences on Main River
Description:	This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.

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Model information

THM_135276

Model: Kennet (Tyle Mill to Thames Confuence) 2018

Description: The information provided is from the Abingdon Flood Schemes mapping completed in June 2017. The previous model 1D model was updated to a 1D-2D model (Flood modeller-Tuflow). The updated model will also be used to assess downstream effects due to flood alleviation options in Oxford and Abingdon.

Model design runs:
1 in 2/ 50% AEP; 1 in 5 / 20% AEP; 1 in 10/ 10% AEP; 1 in 20 / 5% AEP; 1 in 50/ 2% AEP; 1 in 75 / 1.3% AEP; 1 in 100 / 1% AEP, 1 in 100+25% / 1% + 25% AEP with climate change; 1 in 100+35% / 1% + 35% AEP with climate change; 1 in 100+70% / 1% + 70% AEP with climate change; 1 in 200/ 0.5% AEP and 1 in 1000 / 0.1% AEP.

Mapped outputs:
1 in 2/ 50% AEP; 1 in 5 / 20% AEP; 1 in 10/ 10% AEP; 1 in 20 / 5% AEP; 1 in 50/ 2% AEP; 1 in 75 / 1.3% AEP; 1 in 100 / 1% AEP, 1 in 100+25% / 1% + 25% AEP with climate change; 1 in 100+35% / 1% + 35% AEP with climate change; 1 in 100+70% / 1% + 70% AEP with climate change; 1 in 200/ 0.5% AEP and 1 in 1000 / 0.1% AEP.

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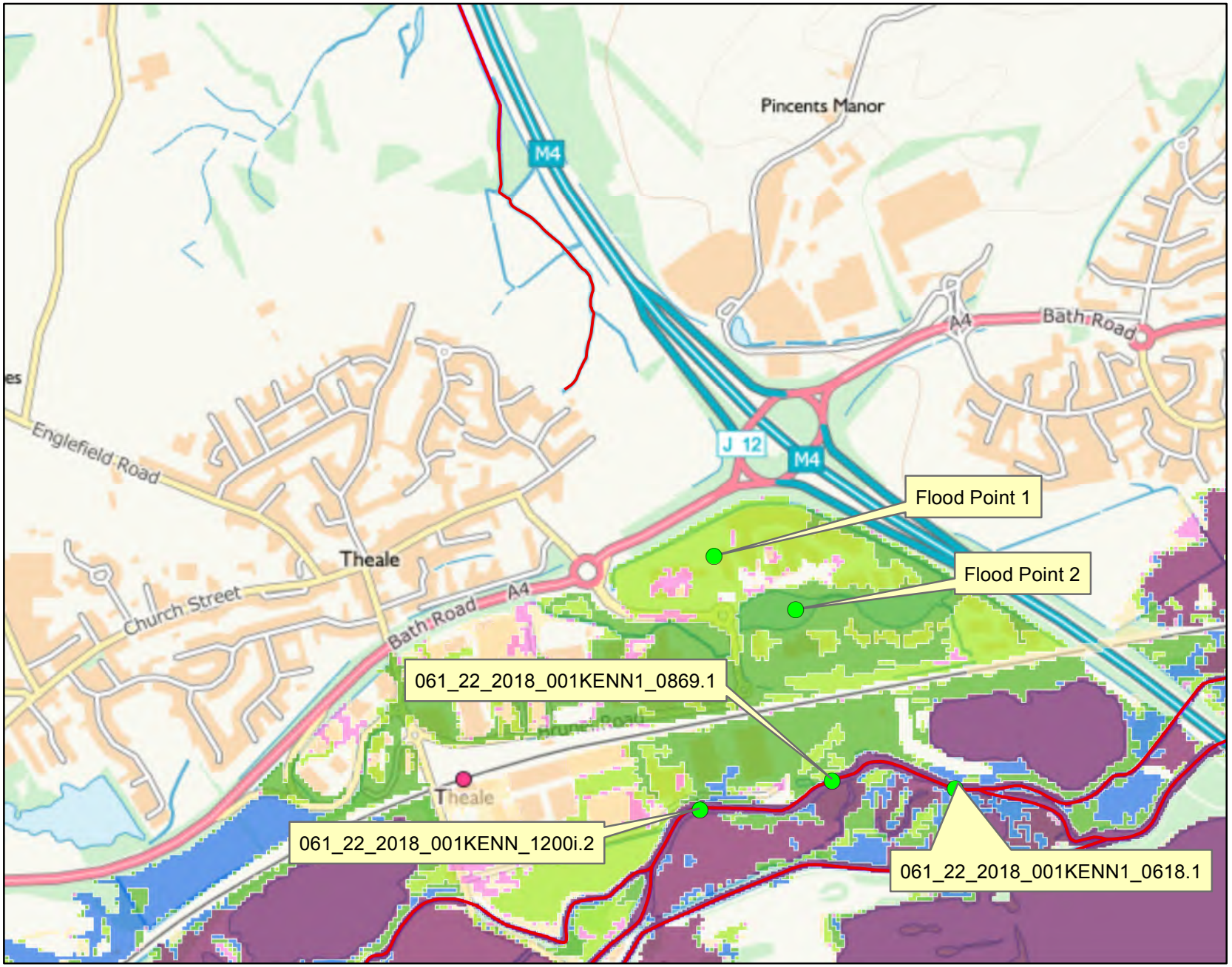
FRA Map centred on land near High Street, Theale
Created on 18/07/2019 REF: THM_135276



Environment Agency

Kilometres

0 0.25 0.5

Legend

- Kennet Model Node Data
- Main River
- 20% AEP Flood Outline
- 5% AEP Flood Outline
- 1% AEP Flood Outline
- 1%+25% CC AEP Flood Outline
- 1%+35% CC AEP Flood Outline
- 1%+70% CC AEP Flood Outline
- 0.1% AEP Flood Outline

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

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

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Modelled in-channel flood flows and levels

THM_135276

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

				Flood Levels (mAOD)						
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_22_2018_001KENN_1200i.2	Kennet (Tyle Mill to Thames Confluence) 2018	464889	170828	44.77	45.00	45.20	45.33	45.36	45.47	45.39
061_22_2018_001KENN1_0869.1	Kennet (Tyle Mill to Thames Confluence) 2018	465139	170882	44.36	44.53	44.70	44.85	44.89	45.02	44.92
061_22_2018_001KENN1_0618.1	Kennet (Tyle Mill to Thames Confluence) 2018	465373	170868	44.24	44.39	44.54	44.67	44.71	44.84	44.74

				Flood Flows (m3/s)						
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_22_2018_001KENN_1200i.2	Kennet (Tyle Mill to Thames Confluence) 2018	464889	170828	46.22	57.42	71.86	84.61	87.72	96.70	89.26
061_22_2018_001KENN1_0869.1	Kennet (Tyle Mill to Thames Confluence) 2018	465139	170882	46.78	55.91	67.50	77.26	79.83	87.80	81.34
061_22_2018_001KENN1_0618.1	Kennet (Tyle Mill to Thames Confluence) 2018	465373	170868	46.64	58.06	71.22	85.61	90.08	103.64	92.60

Note:

Due to changes in guidance on the allowances for climate change, the 20% increase in river flows should no longer to be used for development design purposes.
The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

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

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Modelled floodplain flood levels

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

2D grid cell reference	Model	Easting	Northing	1% AEP	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
Flood Point 1	Kennet (Tyle Mill to Thames Confuence) 2018	464,908	171,307	No Data	45.44	45.61	45.75	45.68
Flood Point 2	Kennet (Tyle Mill to Thames Confuence) 2018	465,067	171,202	44.68	45.44	45.62	45.76	45.68

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

Note:
river flows should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

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

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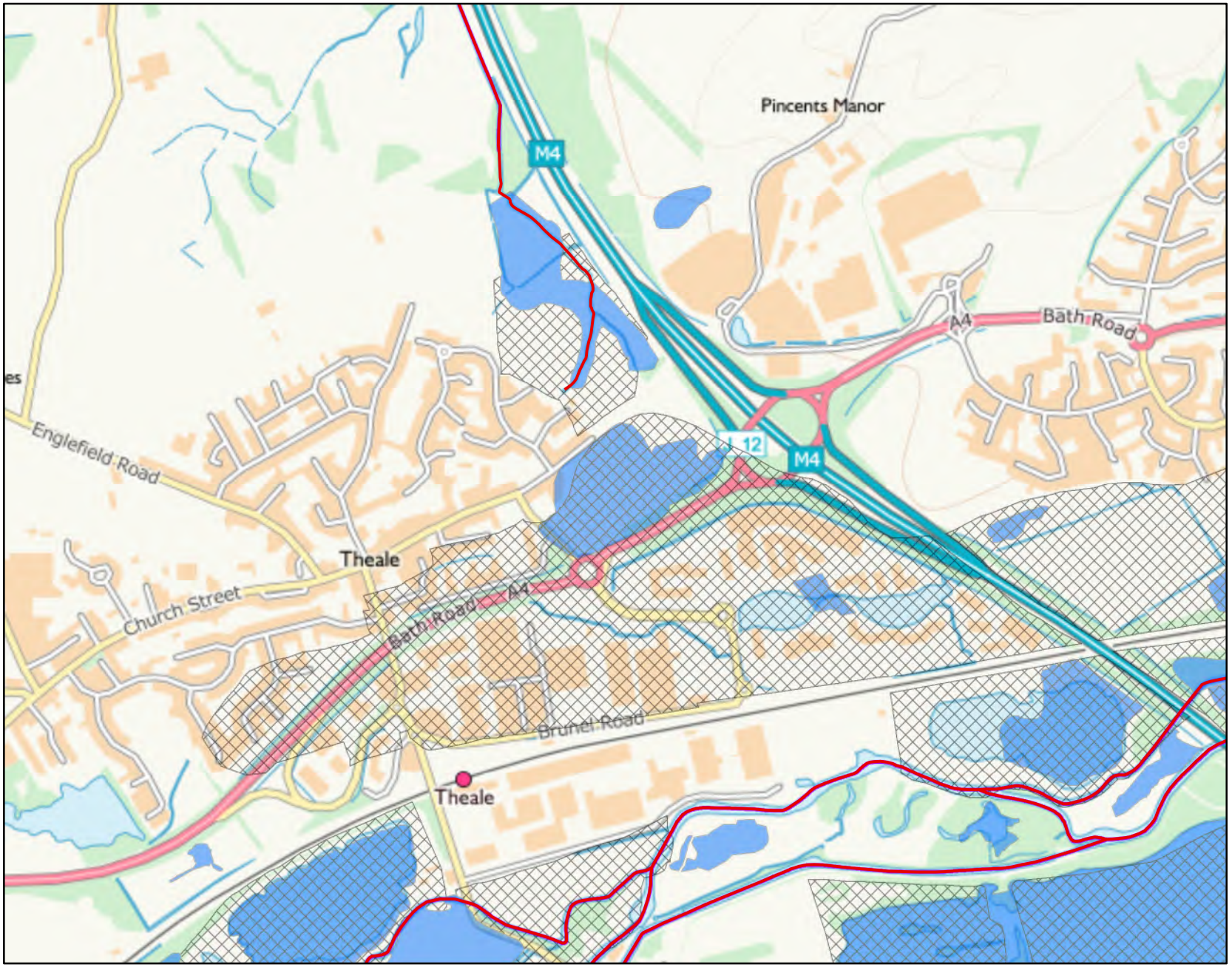
Historic Flood Map centred on land near High Street, Theale
Created on 18/07/2019 REF: THM_135276



Environment Agency

Kilometres

0 0.25 0.5

Legend

Main River

year

1971

2002

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Historic flood data

THM_135276

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

Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
EA0619710600035	06JuneSummer1971	01/01/1971	12/12/1971	main river	channel capacity exceeded (no raised defences)
EA0620030101922	06JanuaryNewYear2003	23/12/2002	12/01/2003	main river	channel capacity exceeded (no raised defences)

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

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

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Appendix 5: Thames Water Sewer Records

Asset location search

Property Searches

BWB Consulting Limited
5th Floor,Waterfront House Waterfront House

NOTTINGHAM
NG2 3DQ

Search address supplied

65
High Street
Theale
Reading
RG7 5AG

Your reference NTE2460

Our reference ALS/ALS Standard/2023_4855836

Search date 11 July 2023

Notification of Price Changes

From 1st April 2023 Thames water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches. Historically costs would rise in line with RPI but as this currently sits at 14.2%, we are capping it at 10%.

Customers will be emailed with the new prices by January 1st 2023.

Any orders received with a higher payment prior to the 1st April 2023 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk

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

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

0800 009 4540

Asset location search

Property Searches

Search address supplied: 65, High Street, Theale, Reading, RG7 5AG

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

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

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

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset location search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

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

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

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

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

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

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

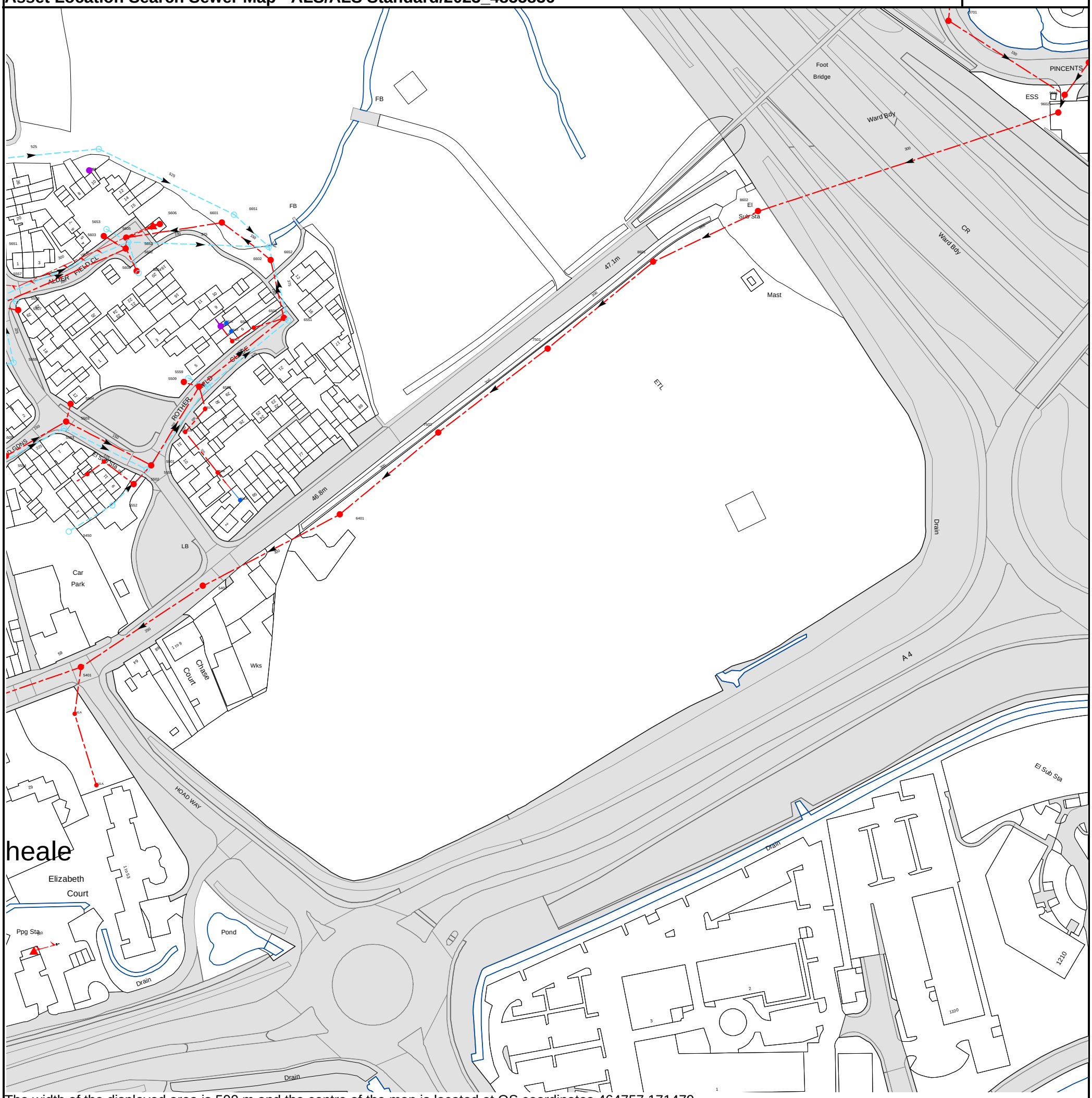
Clean Water queries

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

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

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

Asset Location Search Sewer Map - ALS/ALS Standard/2023_4855836



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 464757,171479

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
6502	45.3	43.36
6652	45.29	43.64
6602	44.91	41.89
6501	45.21	42.26
6551	45.23	43.74
6401	45.61	44.26
7502	45.88	44.43
7501	46.11	44.54
8601	46.33	44.63
8602	46.76	44.78
9701	48.4	45.92
9602	47.67	45.04
9601	49.03	45.37
0701	48.82	46.68
5653	45.06	44.01
5552	45.37	44.37
5602	44.98	42.69
5605	45.18	41.25
5652	44.95	43.79
5502	45.47	43.51
5604	45.33	43.14
5654	45.34	44.02
5551	45.35	44.06
5501	45.36	43.26
5606	45.08	41.22
5509	45.58	43
551B	n/a	n/a
5559	45.61	44.15
5508	45.47	42.79
5402	46.36	44.07
551C	n/a	n/a
6552	45.5	43.88
651B	n/a	n/a
651D	n/a	n/a
6601	44.89	41.45
651E	n/a	n/a
651F	n/a	n/a
651C	n/a	n/a
6651	44.88	43.68
651A	n/a	n/a
5504	45.87	44.17
5555	45.55	44.32
5507	45.57	44
5558	45.58	44.34
5603	45.08	43.1
561A	n/a	n/a
5655	44.87	43.76
531A	n/a	n/a
541A	n/a	n/a
5401	46.09	43.91
5450	45.36	44.59
5505	45.52	44.36
5553	45.76	44.51
5503	45.78	43.87
551E	n/a	n/a
551A	n/a	n/a

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

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

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

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

Sewer Fittings

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

- Air Valve
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

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

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

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

- Inlet
- Outfall
- Undefined End

Other Symbols

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

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

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

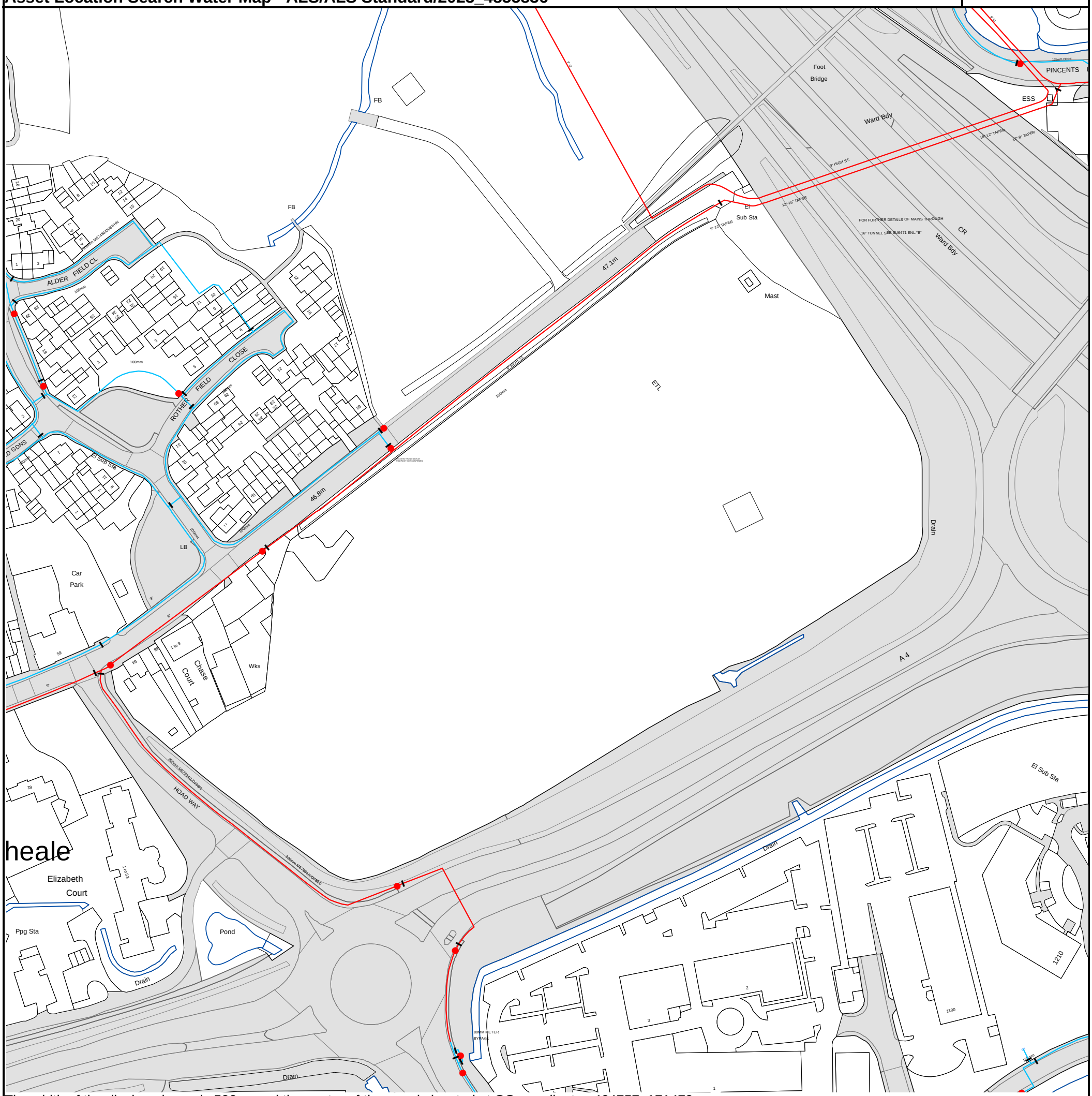
- Casement — Ducts may contain high voltage cables. Please check with Thames Water.
- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement.

If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2023_4855836



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 464757, 171479.

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

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Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

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

Valves

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

Hydrants

- Single Hydrant

Meters

- Meter

End Items

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

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

Operational Sites

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

Other Symbols

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

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

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Payment Terms and Conditions

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

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

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

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

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number

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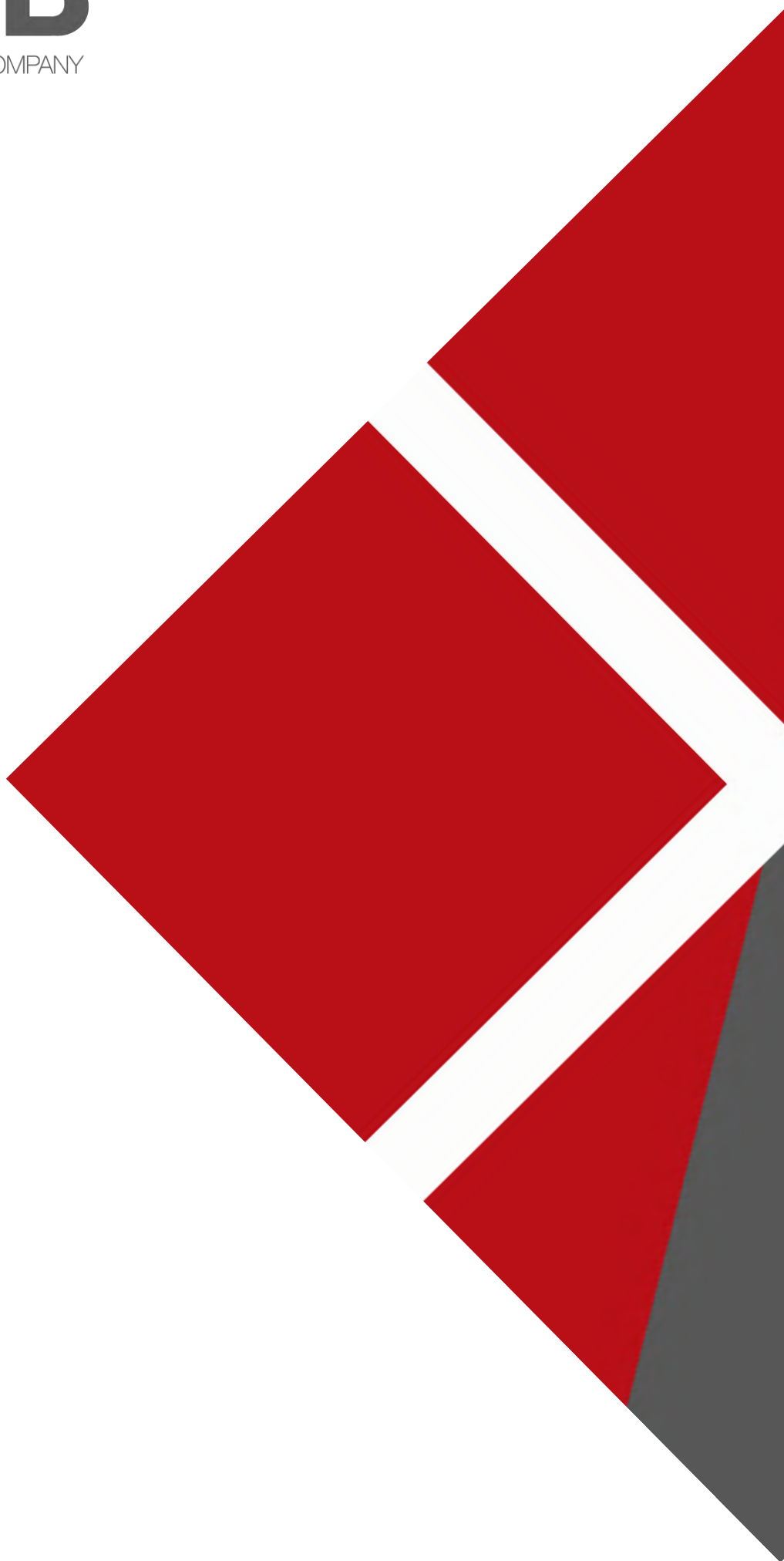

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