Cole Easdon

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

Proposed Residential Development at The Plough Inn, 81 Chapel Street, Thatcham, West Berkshire on Behalf of Sandstone Estates Limited

Date: September 2024
Issue No. 2

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1.0 INTRODUCTION

1.1 This *Flood Risk Assessment & Drainage Strategy* has been prepared by Cole Easdon Consultants Limited (CE) on behalf of Sandstone Estates Limited in support of a planning application for a proposed residential development at The Plough Inn, 81 Chapel Street, Thatcham, RG18 4JS. Refer to CE Figure 9773/500 Figure 1 [*Site Location Plan*] in Appendix 1.

Development Proposals

1.2 The development proposals for the site include the conversion of an existing public house to create 3 flats and the construction of 2 no. residential dwellings with associated parking, landscaping and access.

1.3 This study is based on Drawing No. JS/SP/1546/3/09 [*Proposed Site Plan*] (by JS Surveying & Design Services Limited) and Drawing No. JS/SP/1546/1/01B [*Existing Topographical Site Plan*] (by JS Surveying & Design Services Limited) in Appendix 4.

Need for Study

1.4 The purpose of this assessment is to demonstrate that the development proposal outlined above can be satisfactorily accommodated without worsening flood risk for the area and without placing the development itself at risk of flooding, as per National guidance provided within the National Planning Policy Framework document (NPPF).

1.5 Accordingly, this study has been prepared to:

i. assess flood risk to the development from fluvial sources;
ii. assess flood risk to the development from other potential sources, including ditches, sewers, groundwater and overland flows;
iii. ensure that the proposed development will fully comply with the requirements of the Environment Agency's (EA's) policy on the safeguarding of floodplains;
iv. assess a surface water drainage strategy for the proposed development; and
v. assess a foul water drainage strategy for the proposed development.

Local Policy

1.6 This assessment demonstrates that the proposals meet the requirements set out within the *West Berkshire Core Strategy (2006 – 2026) Development Plan Policy CS 16 – Flooding* (West Berkshire Council, July 2012). Additionally, this Report also demonstrates that the proposals meet the requirements set out by West Berkshire Council (WBC) in the *Local Flood Risk*

Management Strategy 2022-2027 (2021) and the *Level 1 Strategic Flood Risk Assessment* (November 2022). *The Sustainable Drainage Systems Supplementary Planning Document* (December 2018) and the *Non-statutory technical standards for sustainable drainage systems* (March 2015) have been used in the design of SuDS within this development.

Scope of Study

1.7 In Section 2.0, we describe the characteristics of the proposed development site and surrounding area. In Section 3.0, we assess flood risk issues. The proposed surface water drainage strategy is outlined in Section 4.0. The proposed foul water drainage strategy is outlined in Section 5.0. Conclusions are presented in Section 6.0.

1.8 The following resources have been used for this study:

- Defra's Multi-Agency Geographic Information for the Countryside (MAGIC) Map (EA, accessed August 2024);
- Flood Map for Planning – Environment Agency (EA, accessed August 2024);
- Flood Map for Surface Water – Environment Agency (EA, accessed August 2024);
- Geological Map - British Geological Survey (BGS, accessed August 2024);
- Public Sewer Records (Thames Water, April 2024); and
- Revised Climate Change Allowances (EA, May 2022).

1.9 The following publicly available documents have also been reviewed as part of this assessment:

- *Building Regulations 2015 – Approved Document H (Drainage and Waste Disposal);*
- *CIRIA C753 The SuDS Manual (November 2015);*
- *Level 1 Strategic Flood Risk Assessment (West Berkshire Council, November 2022);*
- *Local Flood Risk Management Strategy 2022-2027 (West Berkshire Council December 2021);*
- *National Planning Policy Framework (December 2023);*
- *Non-Statutory Technical Standards for Sustainable Drainage Systems (Defra, March 2015);*
- *Planning Practice Guidance – Flood Risk and Coastal Change (July2022);*
- *Rainfall Runoff Management for Developments (R&D Technical Report W5-074/A/TR/1 Revision E, Defra, June 2012);*
- *Sewerage Sector Guidance Appendix C – Design and Construction Guidance V2;*
- *Sustainable Drainage Systems Supplementary Planning Document* (West Berkshire Council, December 2018);
- *Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems* (DEFRA, Match 2015); and

- *West Berkshire Core Strategy (2006* – 2026) Development Plan Document (West Berkshire Council, July 2012).

1.10 The following abbreviations have been used in this Report:

- AOD Above Ordnance Datum;
- BGS British Geological Survey;
- EA Environment Agency;
- LASOO Local Authority SuDS Officer Organisation;
- NPPF National Planning Policy Framework;
- PPG Planning Practice Guidance;
- SuDS Sustainable Drainage Systems; and
- WBC West Berkshire Council.

2.0 THE EXISTING SITE

2.1 The development site comprises an existing public house 'The Plough Inn' including associated parking and access located to the south of Chapel Street. The site is located within the town of Thatcham, some 1.1km north of Thatcham train station. Refer to CE Figure 9773/500 Figure 1 [*Site Location Plan*] in Appendix 1.

2.2 The site is immediately bounded to the north by Chapel Street and Stoney Lane to the east. Beyond Chapel Street to the north is greenfield land currently used as a public park, to the east beyond Stoney Lane is residential development fronting Stoney Lane and London Road. To the south and west the site is immediately bound by residential dwellings. Land use in the vicinity of the site is predominantly residential.

Existing Topography

2.3 A site topographical survey, referenced to Ordnance datum, has been provided and is included within CE Plan 9773/501 [*Proposed Drainage Strategy*] in Appendix 1. The survey indicates that the site falls to the east. The northern half of the site is relatively flat with a gentle fall to the east. Existing ground levels in the north of the site vary from approximately 76.66mAOD in the west to 75.02mOAD in the east. In the southern half of the site, there is an existing bank adjacent to the western boundary. Ground levels vary from 76.50mAOD in the west to 74.35mAOD in the east. Refer to Drawing No. JS/SP/1546/1/01B [*Existing Topographical Site Plan*] (by JS Surveying & Design Services Limited) in Appendix 2.

Existing Sewers

2.4 Asset records obtained from Thames Water Utilities (TWU) indicate the presence of an existing 500mm diameter non TWU-owned drain/culverted watercourse to the east of the site, flowing in a southerly direction within Stoney Lane. This drain receives flows from an open watercourse to the north of the site, as well as presumed highway drainage. A 900mm diameter public surface water sewer is also located within Stoney Lane, flowing in a southerly direction away from the site. The private drain/culverted watercourse discharges to the existing public surface water sewer at MH 3303.

2.5 A 225mm diameter public foul water sewer is located within Stoney Lane to the south east of the site. This public foul water sewer also flows in a southerly direction away from the site. Refer to TWU Sewer Records within Appendix 2.

Existing Ground Conditions

2.6 Records from the British Geological Survey indicate that the site is underlain by bedrock comprising London Clay Formation Clay. No superficial geology has been identified as underlaying the site. Refer to Figure 2.1 below.

2.7 Defra's Multi-Agency Geographic Information for the Countryside (MAGIC) map indicates that the geology underlying the site is classified as an "Unproductive" aquifer. The site is located within a Zone 3 'Total Catchment' Groundwater Source Protection Zone.

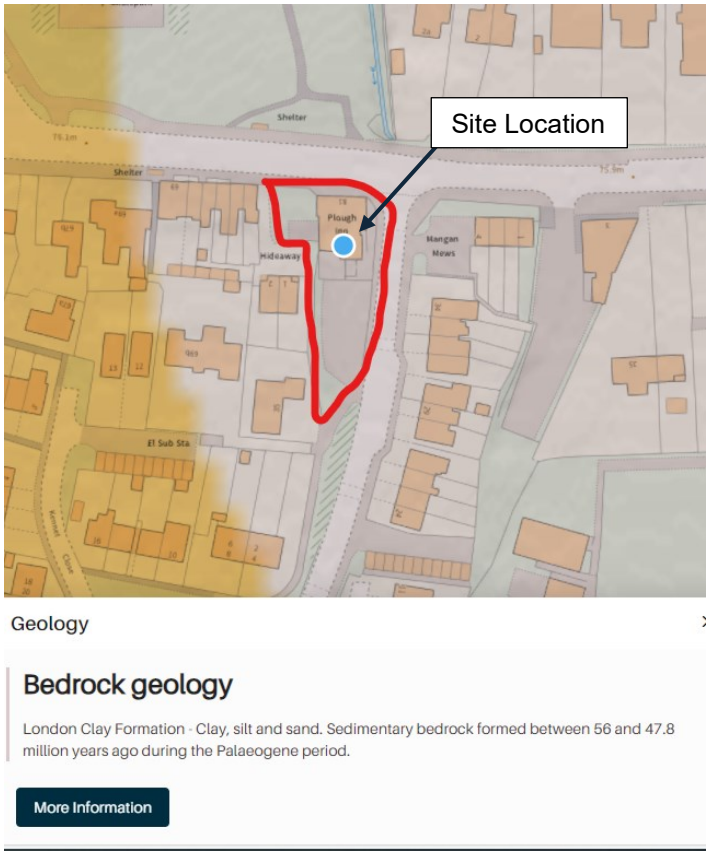


Figure 2.1: Bedrock Geology Map (Extract from British Geological Survey Geoindex)
Source: Geology of Britain viewer - British Geological Survey (bgs.ac.uk)

Nearby Watercourses/Drainage Features

2.8 An existing drainage ditch is located within the greenspace beyond Chapel Street, some 15m north of the site. The existing watercourse discharges to the existing non TWU-owned drain/culverted watercourse in Chapel Street as described above. This drain flows sounthwards discharging to the existing public surface water sewer to the south east of the site within Stoney Lane.

Existing Drainage

2.9 The site comprises an existing public house which is presumed to discharge both foul and surface water runoff via a positive drainage system to the public sewer network. Topographical survey indicates the presence of a number of existing manholes onsite, however further details are unknown.

2.10 The existing site consists of approximately 0.075ha of impermeable area in the form of existing buildings and hardstanding area. Equivalent brownfield runoff rates for the site are 4.7l/s in the 1:1 year event, 11.7l/s in the 1:30 year event and 15.2l/s in the 1:100-year event.

2.11 Equivalent greenfield runoff rates for the proposed site impermeable areas have been calculated using FEH 2022 data. Equivalent greenfield runoff rates are 0.58l/s in the 1:1 year event, 1.57l/s in the 1:30 year event and 2.17l/s in the 1:100-year event. QBAR for the site has been calculated to be 0.68l/s. Refer to Table 2.1 below.

Table 2.1: Summary of Brownfield and Greenfield Runoff Rates

Scenario	Storm Event		
	1:1 year	1:30 year	1:100 year
Brownfield	4.7l/s	11.7l/s	15.2l/s
Greenfield	0.58l/s	1.57l/s	2.17l/s

3.0 FLOOD RISK ISSUES

3.1 This Section presents an assessment of flood risk to the development and includes recommended flood risk mitigation measures appropriate to the level of perceived risk. Flood risk issues and proposed mitigation measures are summarised in Table 3.1 below.

Historic Flooding

3.2 The WBC Strategic Flood Risk Assessment (SFRA) includes a record of historic flood events across West Berkshire. While there are reports of significant flooding throughout the borough no significant flooding is recorded as having occurred at the proposed development site. Refer to mapping included in Appendix 5.

Assessment of Flood Risk from Fluvial/Tidal Sources

3.3 The Flood Map for Planning (FMP) for the locality as produced by the EA is shown on Figure 3.1 below. According to the FMP, it can be seen that the site lies within Flood Zone 1 (Low Risk).

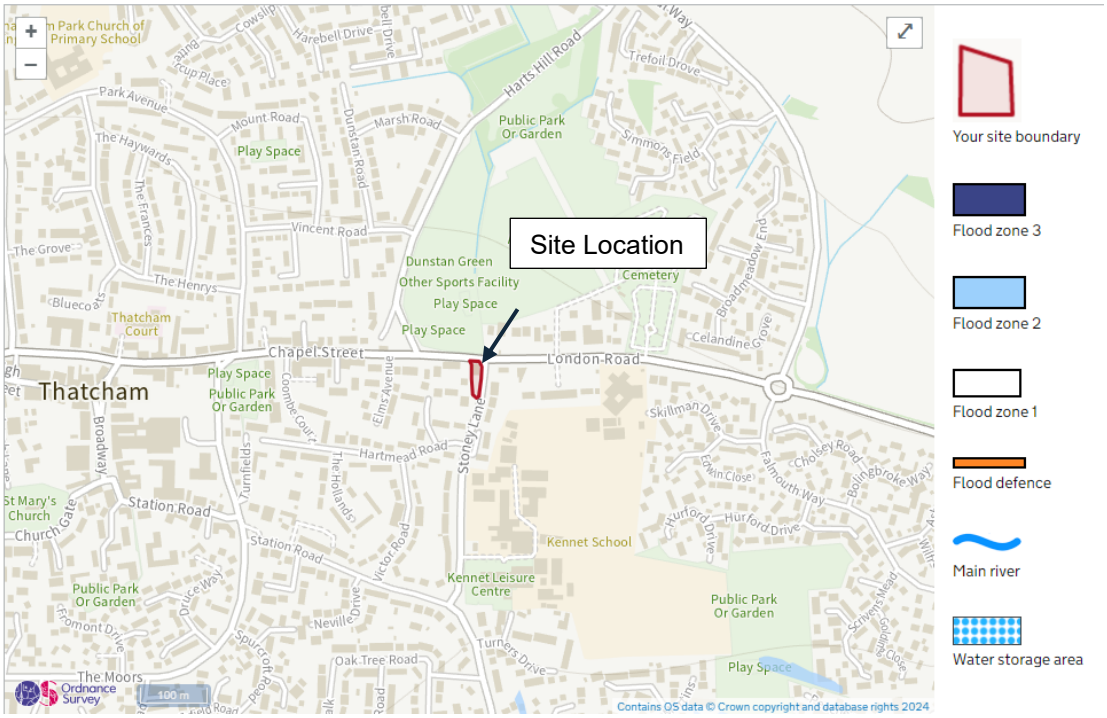


Figure 3.1: EA Flood Map for Planning
Source : https://flood-map-for-planning.service.gov.uk/

3.4 *NPPF Annex 3: Flood Risk Vulnerability Classification* classifies the proposed site usage 'Buildings used for dwelling' as 'More Vulnerable' development. In accordance with the *NPPF*

Practice Guidance Table 2 (Flood Risk Vulnerability and Flood Zone 'incompatibility'), More Vulnerable Development is appropriate within Flood Zone 1.

3.5 Flood risk from this source is therefore considered to be low.

Fluvial/Tidal Flood Risk Mitigation Measures

3.6 No mitigation is required.

Assessment of Flood Risk from Existing Sewers/Drains

3.7 Both public foul and surface water sewers and a non-TWU owned drain/culverted watercourse are located within Stoney Lane to the east of the site.

3.8 Should sewer flooding occur, flows would be contained within the highway corridor and flow away from the site in a southerly direction, without impacting on the site itself. Topographical survey indicates that existing ground levels within the development site are higher than those within the highway corridor. Therefore, flood risk from existing sewers is considered to be low.

Sewer/Drain Flood Risk Mitigation Measures

3.9 No mitigation is required.

Assessment of Flood Risk from Overland Flow (Pluvial)

3.10 According to the EA Map 'Risk of Flooding from Surface Water' in Figure 3.2 below, the surface water flood risk to the site itself is 'very low' with the chance of flooding being below 0.1% each year. However, within both Chapel Street to the north of the site and Stoney Lane to the east of the site, mapping indicates that there is a 'high risk' of surface water flooding. This indicates that the chances of surface water flooding occurring within Chapel Street and Stoney Lane are above 3.3% each year. Topographical survey indicates that existing ground levels within the development site are higher than those within the highway corridor. Therefore, flood risk from this source is considered to be low.

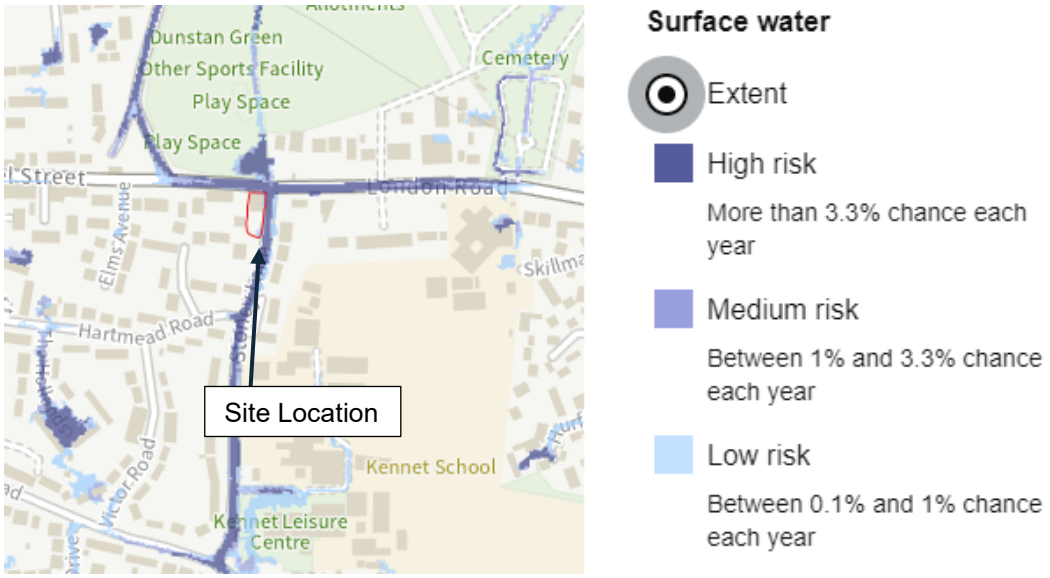


Figure 3.2: EA Surface Water Flood Map
Source : https://flood-map-for-planning.service.gov.uk/

Overland Flow Flood Risk Mitigation Measures

3.11 No mitigation required

Assessment of Flood Risk from Groundwater

3.12 BGS records indicate the site is underlain by geology comprising of clay. This strata is typically impermeable and does not allow the storage and transmission of groundwater therefore, the chance of groundwater emergence is unlikely.

3.13 The WBC SFRA has advised that the borough is subject to potential groundwater risks in areas and has produced mapping to highlight areas that are at risk. The mapping indicates that the site itself is not at risk of groundwater flooding. Groundwater emergence mapping, also from the WBC SFRA, indicates that the site is not within an area where groundwater emergence is predicted to occur. Refer to mapping within Appendix 5. Flooding from this source is considered to be low.

Groundwater Flood Risk Mitigation Measures

3.14 No mitigation required.

Assessment of Flood Risk from Artificial Sources

3.15 The EA Risk of Flooding from Reservoirs map shows the site is not at risk from flooding. Refer to Figure 3.3 below. Therefore, flood risk from this source is considered to be low.

Artificial Sources Flood Risk Mitigation Measures

3.16 No mitigation is required.

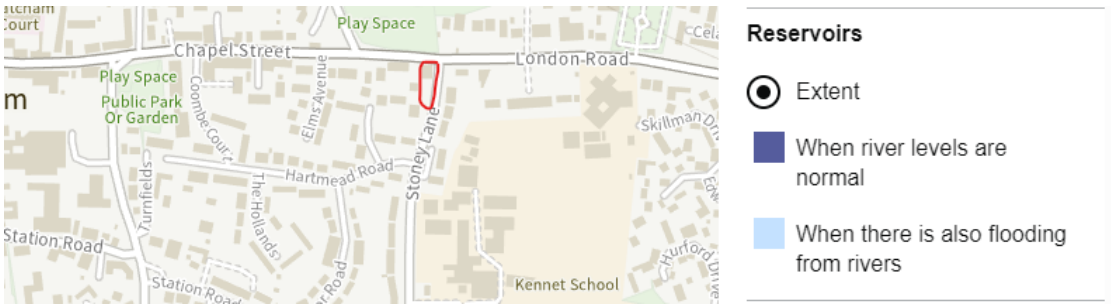


Figure 3.3: EA Risk of Flooding from Reservoirs
Source : https://flood-map-for-planning.service.gov.uk/

Table 3.1: Assessment of Flood Risk to the Development Site Arising from External Sources

Source of Potential Flooding to the Development Site	Flood Risk	Mitigation/Comments
Fluvial/Tidal	Low	▪ The site is located within Flood Zone 1 (Low Risk). ▪ No mitigation is required
Overland Flow (Pluvial)	Low	▪ Existing site at very low risk of flooding. ▪ High Risk of flooding located within Chapel Street to the north and Stoney Lane to the east ▪ No mitigation required.
Groundwater	Low	▪ WBC mapping indicates that the site is not at risk of groundwater emergence ▪ No mitigation required
Public Sewer	Low	▪ If surcharging of sewers was to occur flows would be contained within the highway corridor without impacting on the proposed development site ▪ No mitigation required
Artificial Sources	Low	▪ No mitigation is required.

4.0 SURFACE WATER DRAINAGE STRATEGY

Refer to CE Plan 9773/501 [*Proposed Drainage Strategy*] in Appendix 1 and to the *WBC Minor Applications Sustainable Drainage Strategy Validation Checklist* enclosed within Appendix 6.

4.1 In order to mitigate flood risk posed by post development runoff, adequate control measures will be provided within the site. This will ensure that flood risk is not increased elsewhere as a result of the development.

Drainage Hierarchy

4.2 The drainage strategy for the site has been prepared according to the drainage discharge hierarchy set out in *CIRIA C753 The SuDS Manual*, as follows. Refer to Table 4.1 below

1. Infiltration to the maximum extent that is practical;
2. Discharge to surface waters;
3. Discharge to surface water sewer; and,
4. Discharge to combined sewer.

Infiltration Potential

4.3 While an intrusive site investigation has not been undertaken on site BGS mapping confirms that the site is underlain by London Clay strata. Additionally, as the site has been previously developed it is assumed made ground is also present underlying the site. Clay is impermeable and the presence of made ground would limit the effective operation of infiltration-based SuDS.

4.4 Due to geographical and land ownership constraints it is not possible to discharge to the existing watercourse to the north of the site. Therefore, in accordance with the drainage hierarchy, an attenuation-based surface water drainage strategy with disposal via the existing surface water sewer has been proposed.

4.5 Surface water runoff from the site will be discharged into the existing 900mm diameter public surface water sewer to the south of the site at manhole 3351.

Discharge Rate

4.6 It is proposed to restrict post development flows to 0.6l/s for all storms up to and including the 1 in 100 year + 40% climate change storm. This rate is equivalent to the 1:1 year greenfield runoff rate for the proposed development impermeable area. This rate will provide significant betterment over existing unattenuated brownfield discharge rates. Refer to calculations within Appendix 3. Post development flows will be restricted using an orifice flow control. The

proposed post development runoff rate of 0.6l/s has been deemed acceptable by Thames Water. Refer to TWU correspondence in Appendix 2.

Table 4.1: Review of SuDS Components in accordance with the Drainage Hierarchy

SuDS Technique	Proposed	Not proposed	Reason
Store rainwater for later use		X	While rainwater harvesting has not been considered at this stage it shall be considered as part of detailed design for non-potable water reuse.
Use infiltration techniques		X	Underlying superficial deposits comprising clay strata and made ground will prevent the use of infiltration techniques
Attenuate rainwater in ponds or open water features		X	Due to lack of space, it is proposed to discharge runoff to a tanked permeable paving structures before discharging to the public surface water sewer.
Attenuate rainwater in sealed tanks	X		Tanked permeable paving will be used to attenuate runoff before being discharged to the surface water sewer
Discharge direct to a watercourse		X	There are no suitable existing watercourses in the immediate vicinity of the site.
Discharge to a surface water sewer	X		Public surface water sewers are present in the vicinity of the site.
Discharge to a combined sewer		X	No combined sewers are present in the vicinity of the site.

Urban Creep

4.7 In accordance with LASOO guidance, urban creep has not been considered in the drainage calculations as the development consists of the construction of flats and thus urban creep does not need to be applied in this scenario.

Proposed Sustainable Drainage Systems (SuDS)

4.8 On site storage will be provided within three separate areas of tanked permeable paving located within the proposed access path to the north of the site (TPP1) and within the two proposed carparking areas (TPP2 & 3). Runoff from the proposed access path and parking areas will percolate through the paving into the storage medium below, enclosed within an impermeable membrane. Runoff from roof areas will be piped directly into the storage medium.

4.9 Preliminary calculations indicate that a volume of 50.8m^3 will be required to accommodate runoff from the proposed development, at the proposed discharge rate of 0.6l/s.

4.10 Tanked permeable paving one (TPP1) will be located within the access path to the north of the site. and will provide 2.26m^3 of storage. TPP 1 is some 30m^2 in area with a subbase depth of 0.4m and 30% voids.

4.11 TPP 2 will be located within Car Park A at the centre of the site. It shall provide 39.85m^3 of storage. TPP 2 is some 210m^2 in area with a subbase depth of 0.78m and 30% voids.

4.12 TPP 3 will be located within Car Park B to the south of the site. TPP 3 will provide 8.7m^3 of storage and will be some 60m^2 in area with a subbase depth of 0.6m and 30% voids. Refer to Table 4.2 below.

4.13 TPP 1 and 3 will discharge into TPP 2 before discharging to the existing public surface water sewer at MH3351 at 0.6l/s.

4.14 All surface water drainage design calculations have been undertaken using InfoDrainage software. Refer to Appendix 3.

Table 4.2: Summary of Existing and Proposed Surface Water Discharge Rates

Developable area (ha)		Discharge Point	Calculation Method	Discharge Rate (l/s)				Volume required (m^3)
				1:1yr	1:30 yr	1:100 yr	1:100yr +40%	
Existing	0.075	To SW sewer (assumed)	Modified Rational Method	4.7	11.7	15.2	-	-
Proposed	0.063	To SW sewer	Info Drainage	0.6	0.6	0.6	0.6	50.8

Design Exceedance

4.15 The proposed SuDS has been designed to accommodate the 1 in 100 year + 40% storm event, therefore design exceedance is unlikely. If design exceedance were to occur, flows will follow the existing topography of the site. Flows from TPP 2 & 3 would flow east towards Stoney Lane. Flows from TPP 1 would flow north towards Chapel Street. Design exceedance flows would be conveyed within the highway corridor, without impacting upon the site or adjacent properties. Refer to CE Plan 9773/501 [*Proposed Drainage Strategy*] in Appendix 1.

Water Quality

4.16 Water quality has been assessed in line with the Simple Index approach from Chapter 26 of CIRIA *C753 The SuDS Manual:*

1. Step 1 – Allocate suitable pollution hazard indices for the proposed land use.
2. Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index.

4.17 The highest pollution hazard level for the proposed land use is Low (residential car parks and low traffic roads). The pollution hazard indices for the proposed land uses are shown in Table 4.3 below.

Table 4.3: Pollution Hazard Indices for the Proposed Site (from Table 26.2 of CIRIA C753 The SuDS Manual)

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential car parks	Low	0.5	0.4	0.4

4.18 The Pollution Mitigation Indices for permeable surfacing are greater than the Pollution Hazard Indices for residential car parks and low traffic roads. Refer to Table 4.4 below. The SuDS systems proposed on site will provide adequate water quality prior to discharge to the surface water sewer.

Table 4.4: Pollution Mitigation Indices for Discharge to Surface Water from the Proposed Site (from Table 26.3 of CIRIA C753 The SuDS Manual)

SuDS Feature	Total suspended solids (TSS)	Metals	Hydrocarbons
Tanked Permeable Paving	0.7	0.6	0.7

Adoption and Maintenance

4.19 The tanked permeable paving and associated drainage network will be maintained by the site owner or a private maintenance company acting on the owner's behalf. A draft Maintenance Schedule is outlined below and summarised in Table 4.5.

Tanked Permeable Paving

4.20 Permeable surfaces need to be regularly cleaned of silt and other sediments to preserve their infiltration capability. A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

1. End of winter (April) – to collect winter debris.
2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
3. After autumn leaf fall (November).

4.21 If reconstruction is necessary, the following procedure should be followed:

1. Lift surface layer and laying course.
2. Remove any geotextile filter layer.
3. Inspect sub-base and remove, wash and replace if required.
4. Renew any geotextile layer.
5. Renew laying course, jointing material and concrete block paving.

4.22 Materials removed from the voids or the layers below the surface of the paving may contain hazardous substances such as heavy metals and hydrocarbons which may need to be disposed of as controlled waste.

Pipework and catchpits

4.23 It is not envisaged that silt build up within the pipework systems will require a rigorous maintenance regime so long as silt is removed from upstream catch pits on a regular basis. Notwithstanding this, a suitable maintenance regime for the systems will comprise of routine inspection (every six months) and silt removal (as necessary).

Flow Control

4.24 The flow control should be inspected regularly for blockages and silt/ debris removed as necessary.

Table 4.5: Draft Maintenance Schedule for Proposed Drainage Infrastructure

Drainage Element	Schedule	Maintenance Requirement	Frequency
Tanked Permeable Paving	Regular	▪ Remove litter and debris	▪ Monthly
		▪ Mow grass at margins	▪ Monthly, or as required
		▪ Brushing and vacuuming over whole surface	▪ Mid-summer, after autumn leaf fall and end of winter
	Occasional	▪ Removal of weeds	▪ As required
	Remedial	▪ Remedial work to any depressions or damage considered a hazard to end users or detrimental to performance ▪ Rehabilitation of surface and upper sub-structure by replacement	▪ As required ▪ Every 10 – 15 years or as required
	Monitoring	▪ Initial inspection ▪ Inspect for evidence of weed growth or poor operation ▪ Inspect silt accumulation rates ▪ Monitor inspection chambers	▪ Monthly for 3 months after instillation ▪ Three monthly, 48 hours after large storms in first six months ▪ Annually ▪ Annually
		▪ Inspect permavoid distribution tanks for silt accumulation	▪ Half yearly

Drainage Element	Schedule	Maintenance Requirement	Frequency
Pipework and Flow Control	Regular	▪ Inspect for accumulation of silt ▪ Inspect inlets, outlets and overflows for blockages ▪ Inspect for debris and litter	▪ Every six months
	Occasional	▪ Remove debris and litter ▪ Remove silt	▪ As required

Note: In addition to the above maintenance requirements, it is recommended that all drainage elements are inspected:

- Following the first storm event
- Monthly for the first 3 months following commissioning

5.0 FOUL WATER DRAINAGE STRATEGY

Refer to CE Drawing 9773/501 [*Proposed Drainage Strategy*] in Appendix 1.

5.1 Thames Water public sewer records indicate the presence of a public foul water sewer within Stoney Lane to the south east of the development site.

5.2 It is proposed to discharge foul water to the existing foul sewer manhole reference 3304, subject to approval from TWU. Refer to CE Drawing 9773/501 [*Proposed Drainage Strategy*] in Appendix 1.

5.3 A foul sewer capacity check application has been submitted and Thames Water have confirmed there is sufficient capacity within the foul water sewer to accommodate foul water flows from the proposed development site. Refer to correspondence within Appendix 2.

5.4 The foul sewer network will be offered for adoption by TWU where applicable.

6.0 DISCUSSION AND CONCLUSIONS

6.1 Flood risk to the proposed development from various sources, such as fluvial, sewers, groundwater, reservoirs and overland flow has been considered in this study. Flood risk from all sources is considered to be low with no mitigation required.

6.2 The surface water drainage strategy for the site has been prepared according to the drainage discharge hierarchy set out in *CIRIA C753 The SuDS Manual.* The site is underlain by made ground and potentially impermeable clay deposits, which would prevent the operation of infiltration-based SuDS. Therefore, in accordance with the drainage hierarchy, an attenuation-based surface water drainage strategy, with disposal to the existing surface water sewer is proposed.

6.3 Post development surface water discharge will be restricted to a rate of 0.6l/s, which has been approved by TWU. This discharge rate equal to the equivalent 1:1 year greenfield runoff rate for the site and provides significant betterment over the currently unattenuated brownfield runoff rate for the site.

6.4 On site attenuation will be provided within three areas of tanked permeable paving to be located within the access path to the north of the site, within Car Park A at the centre of the site and Car Park B at the southern end of the site. Attenuated runoff will be discharged via a flow control device to the public surface water sewer in Stoney Lane. TWU has confirmed that there is sufficient capacity within the existing surface water sewer network to accommodate the proposed attenuated discharge from the development.

6.5 Water quality has been assessed in line with the Simple Index approach from Chapter 26 of CIRIA *C753 The SuDS Manual*. The passage of water through the tanked permeable paving will provide effective pollutant removal prior to discharge, protecting the quality of water resources.

6.6 SuDS exceedance flows would follow the natural topography of the site, flows from tanked permeable paving two and three would flow east towards Stoney Lane and flows from tanked permeable paving one would flow north towards Chapel Street. Exceedance flows would be conveyed within the highway corridor, without impacting upon the site or adjacent properties.

6.7 Foul water is proposed to be discharged to the existing public foul sewer within Stoney Lane. TWU has confirmed that there is sufficient capacity within the existing foul sewer network to accommodate the proposed development.

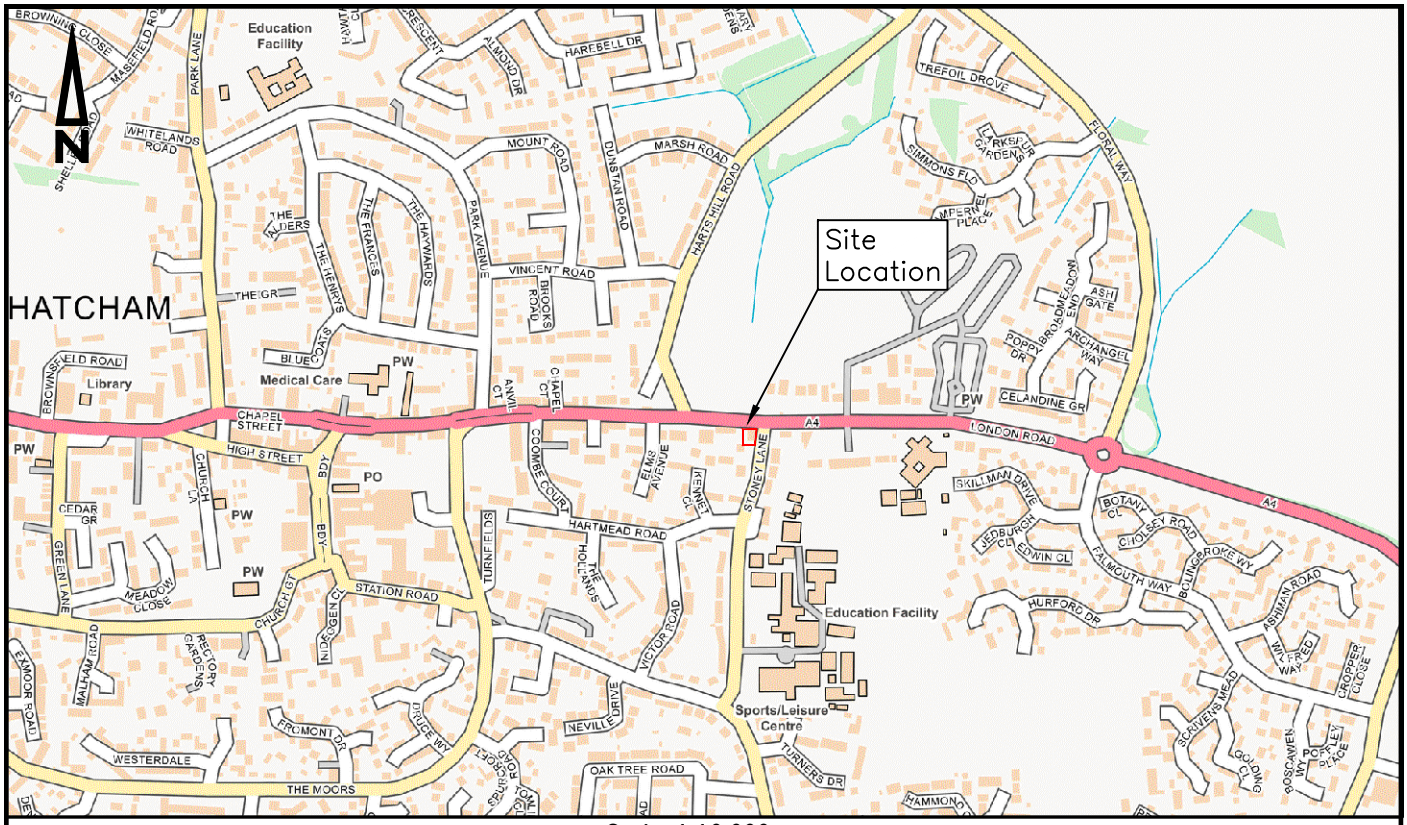
6.8 All on site surface water drainage systems will remain private, and will be the responsibility of the site owner or a private maintenance company acting on the owner's behalf.

6.9 The proposed foul water network will be offered to TWU for adoption where applicable.

6.10 This study has been undertaken in accordance with the principles set out in NPPF. We can conclude that providing the development adheres to the conditions advised in this Report, the said development proposals can be accommodated without increasing flood risk within the locality in accordance with objectives set by Central Government and the EA.

Cole Easdon Consultants Limited
September 2024

Appendix 1



Scale: 1:10,000

Scale: 1:50,000

Cole Easdon
01793 619 965 | cec@ColeEasdon.com | www.ColeEasdon.com

Job Title:
Proposed Residential Development
The Plough Inn, 81 Chapel Street
Thatcham
RG18 4JS

Client:
Sandstone Estates Ltd

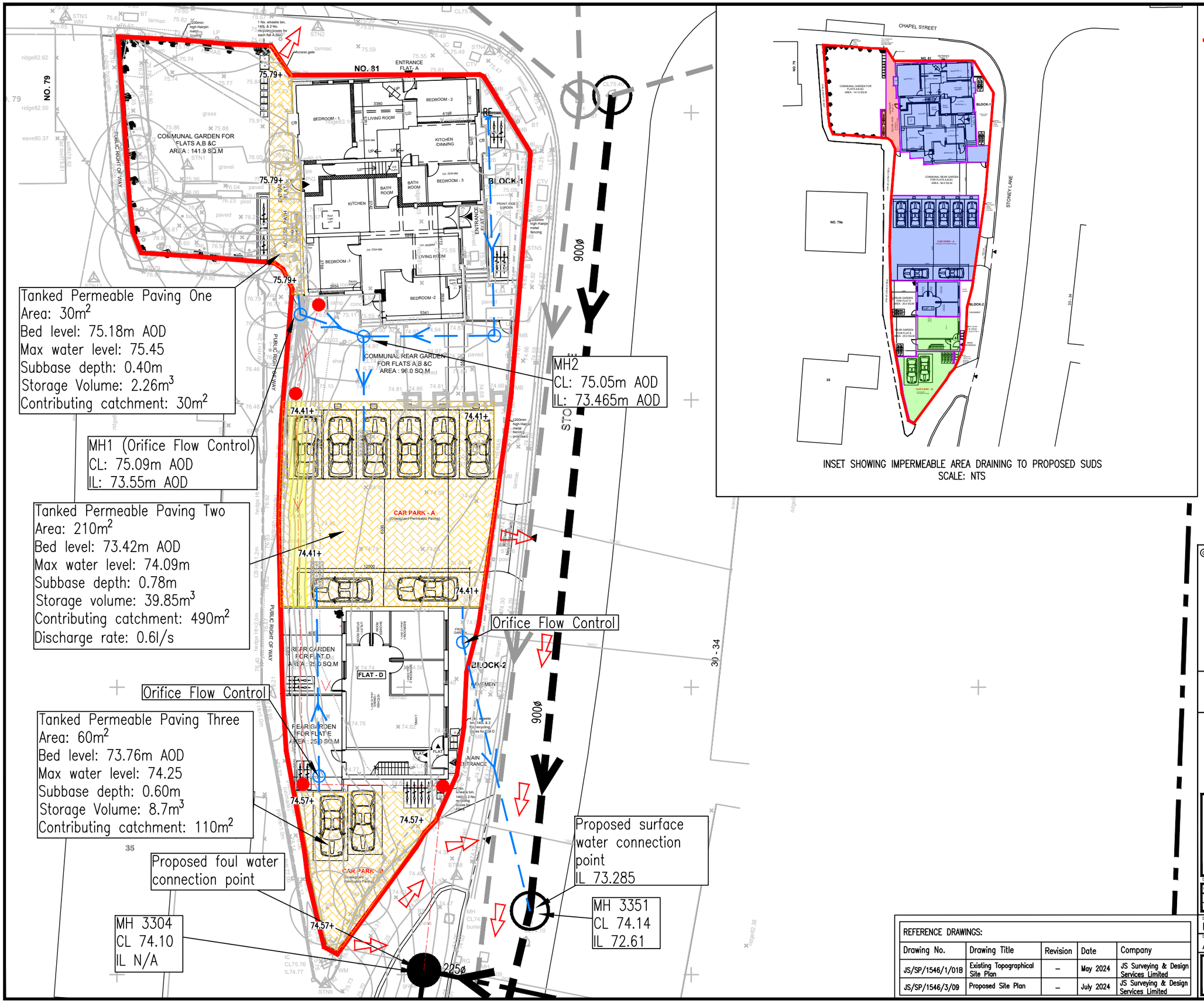
Drawing Status:

CONSTRUCTION AT CLIENT AND/OR CONTRACTOR RISK	FOR COMMENT	
	FOR PLANNING	X
	FOR TENDER	
	FOR APPROVAL	
	FOR CONSTRUCTION	
	AS BUILT	

Drawing Title:
Site Location Plan

Drawn By	Date Drawn	Scale
BT	March 2024	As Shown (A4)

Checked By	Drawing No.	Revision
JP	9773/500 Figure 1	-



INSET SHOWING IMPERMEABLE AREA DRAINING TO PROPOSED SUDS
SCALE: NTS

Key:

- Site boundary
- Proposed impermeable area Area: 0.063 ha
- Area draining to TPP1
- Area draining to TPP2
- Area draining to TPP3
- Proposed surface water drain and inspection chamber
- Proposed foul water drain and inspection chamber
- RE — Proposed rodding eye
- Proposed tanked permeable paving
- Proposed service strip
- Proposed permavoid distribution tank (outlet to permeable paving systems)
- 74.41+ — Proposed finished external level
- Design exceedance route
- Existing public foul sewer
- Existing public surface water sewer
- Existing drain/Culverted watercourse
- 74.62+ — Existing ground level

NOTES

1. All levels are in metres above Ordnance datum
2. Surface water drainage systems designed to accommodate the 1 in 100 year critical storm including a 40% allowance for climate change
3. Public sewer details based on records provided by Thames Water in April 2024
4. This drainage strategy is indicative only and is subject to detailed design

REFERENCE DRAWINGS:

Drawing No.	Drawing Title	Revision	Date	Company
JS/SP/1546/1/01B	Existing Topographical Site Plan	–	May 2024	JS Surveying & Design Services Limited
JS/SP/1546/3/09	Proposed Site Plan	–	July 2024	JS Surveying & Design Services Limited

Cole Easdon
01793 619 965 | cec@ColeEasdon.com | www.ColeEasdon.com

Client: Sandstone Estates Ltd

Job Title: Proposed Residential Development
The Plough Inn, 81 Chapel Street
Thatcham
RG18 4JS

Drawing Title: Proposed Drainage Strategy

Drawing Status:

FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT
	X				

CONSTRUCTION AT CLIENT / CONTRACTOR RISK

Designed by:	Drawn by:	Checked by:
BT	BT	JP

Date: August 2024
Scale: 1:200 @ A3

Drg. No.: 9773/501
Rev.: -

Appendix 2

Asset Location Search

Thames Water Property Searches

Cole Easdon Consultants Limited
Unit 2,York House Dorcan Way,York House

SWINDON
SN3 3RB

Search address supplied

Plough Inn
81
Chapel Street
Thatcham
RG18 4JS

Your reference 9773 The Plough 81 Chapel Street

Our reference ALS/ALS Standard/2024_4971229

Search date 9 April 2024

Notification of Price Changes

From 1st April 2024 Thames Water Property Searches will be increasing the prices of its CON29DW Residential and Commercial searches along with the Asset Location Search. Costs will rise in line with RPI as per previous years, which is sat at 6%.

Customers will be emailed with the new prices by February 28th 2024.

Any orders received with a higher payment prior to the 1st April 2024 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: Plough Inn, 81, Chapel Street, Thatcham, RG18 4JS

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 search provides 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

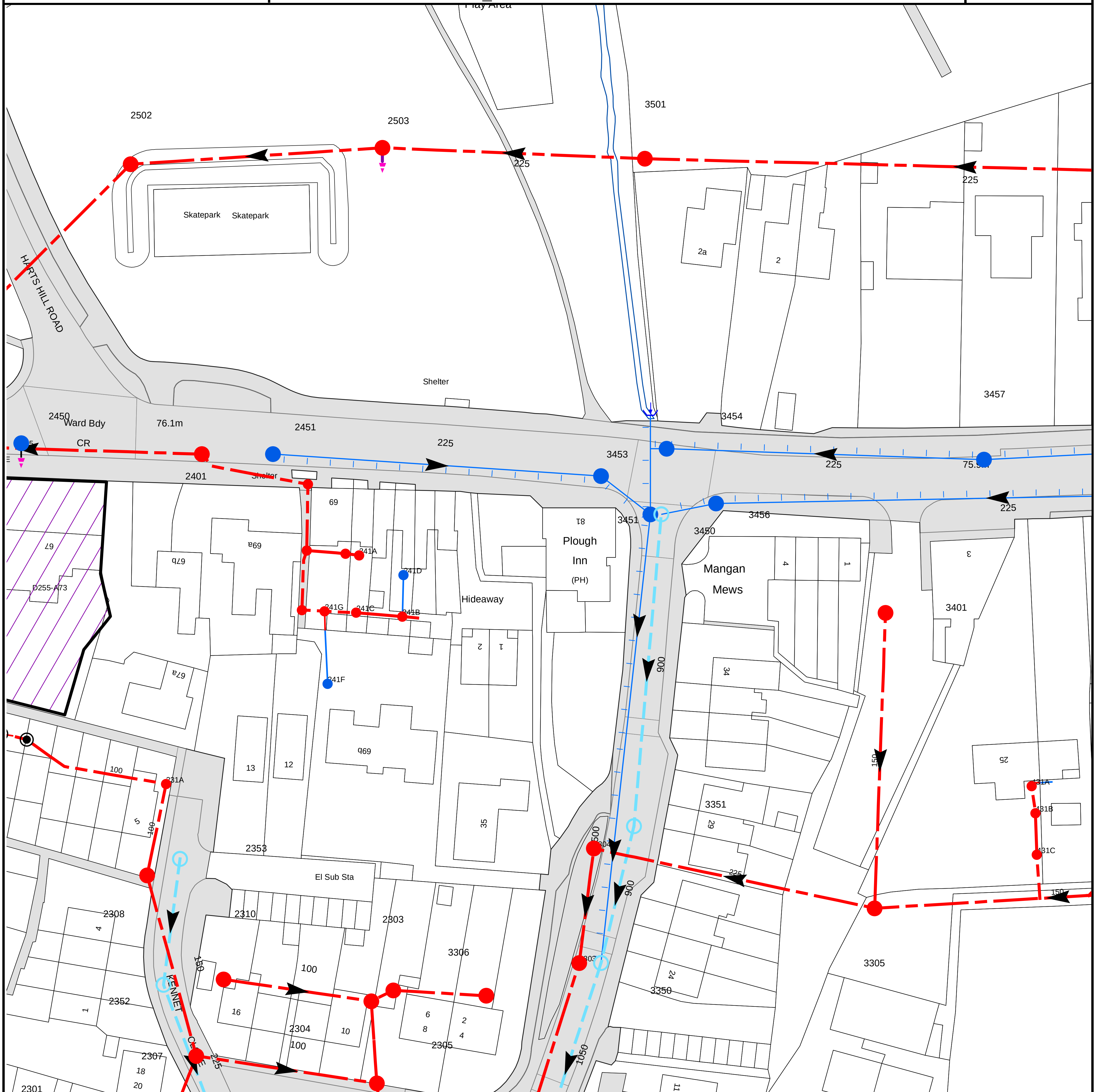
Clean Water queries

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/2024_4971229



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 452314,167435

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.

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
3453	75.5	74.69
3501	n/a	n/a
3451	75.34	73.6
3450	75.38	73.04
3454	75.58	74.36
3456	75.57	74.51
3457	75.88	74.85
2502	77.38	75.36
2401	76.16	75.36
2451	75.97	n/a
2503	n/a	n/a
241D	n/a	n/a
2305	75.28	73.76
2307	75.51	74.28
2304	75.53	74.52
3306	n/a	n/a
2303	75.38	74.73
2352	75.67	73.93
2310	n/a	n/a
3350	73.89	72.04
3303	73.88	72.17
3305	n/a	n/a
2353	76.03	74.43
431C	n/a	n/a
3304	74.1	n/a
3351	74.14	72.61
431B	n/a	n/a
431A	n/a	n/a
3401	75.98	73.92
2450	76.64	n/a
2308	76.02	74.53
231A	n/a	n/a
2452	n/a	n/a
2453	n/a	n/a
2454	n/a	n/a
241G	n/a	n/a
241F	n/a	n/a
2455	n/a	n/a
241C	n/a	n/a
241A	n/a	n/a
241B	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

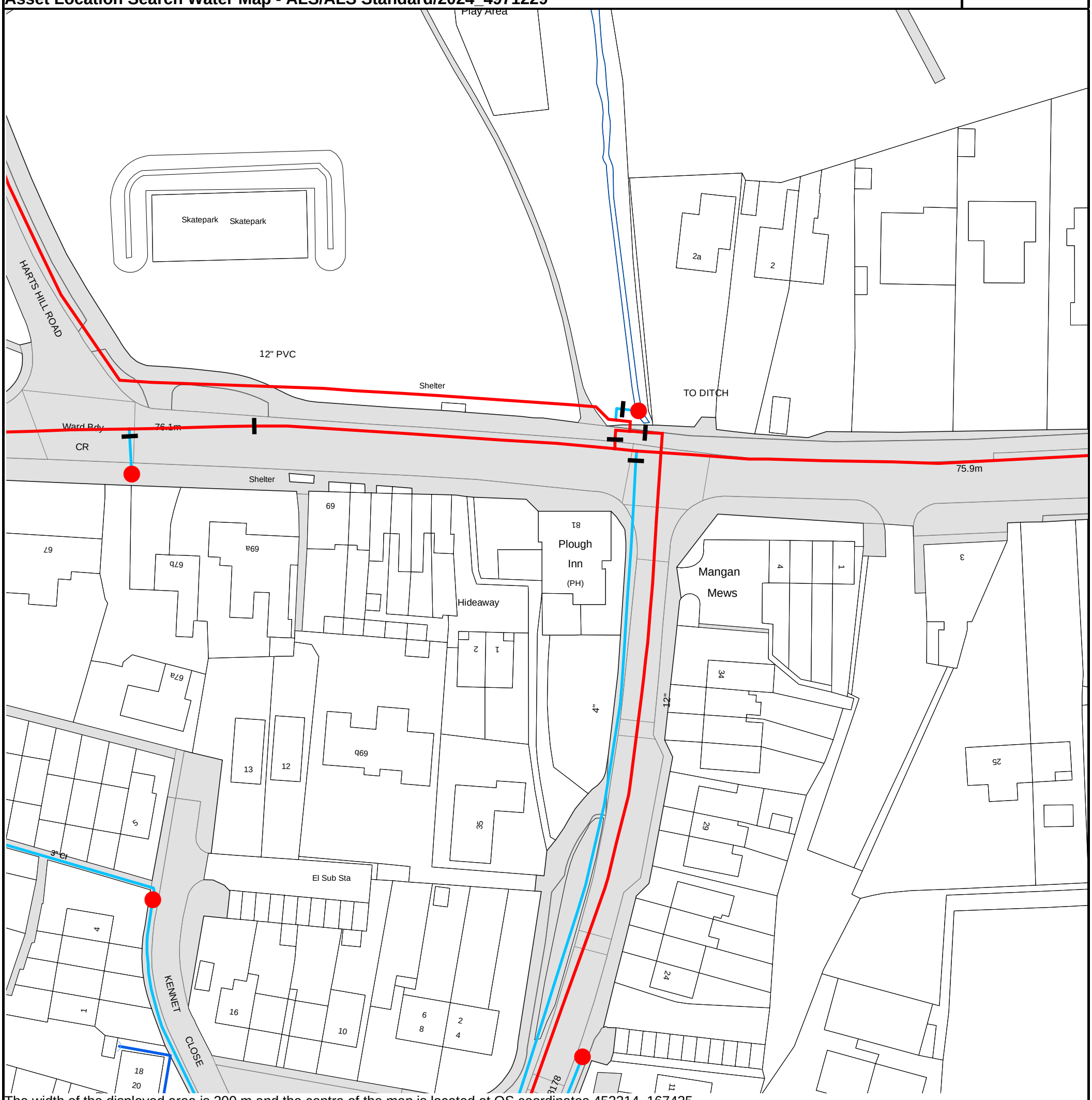
Ducts may contain high voltage cables. Please check with Thames Water.

- 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/2024_4971229



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 452314, 167435.

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 - 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

[redacted]
Cole Easdon Consultants Limited
160 Aztec, Aztec West
Almondsbury
Bristol
South Gloucestershire
BS32 4TU

Wastewater pre-planning
Our ref DS6122140

22 July 2024

Pre-planning enquiry: Confirmation of sufficient capacity

Site: The Plough Inn, 81 Chapel Street, Thatcham, West Berkshire, RG18 4JS

Dear Mr Thornton,

Thank you for your pre-planning application for the construction of 5 residential flats.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

Foul Water

Foul water discharging by gravity flow into manhole SU5267 **3304**.

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent foul water sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Surface Water

Proposed surface water run-off discharging by gravity flow into manhole SU5267 **3351**.

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.

The disposal hierarchy being:

1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2) rainwater infiltration to ground at or close to source
3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4) rainwater discharge direct to a watercourse (unless not appropriate)
5) controlled rainwater discharge to a surface water sewer or drain
6) controlled rainwater discharge to a combined sewer.

Where connection to the public sewerage network is required to manage surface water flows we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

If the above surface water hierarchy has been followed and if the flows are restricted to a total of **0.6 l/s** then Thames Water would not have any objections to the proposal.

Please see our FAQ's leaflet for additional information.

Capacity at STW?

The receiving network is served by NEWBURY STW and there is capacity to serve the development currently.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact us on 0800 009 3921.

Yours sincerely

[redacted]

[redacted]

Adoption Engineer
Developer Services

Appendix 3

COLE EASDON CONSULTANTS

The Rational Formula

$Q_p = CiA/0.36$

Q_p	**4.7l/s**	Peak discharge from catchment
A	0.075ha	Catchment area
i	17.5mm/hr	Average rainfall intensity
C	1.3mm/hr	Dimensionless coefficient

Determination of C

Value of C_V

C_V	1	Volumetric runoff coefficient

Value of C_R

C_R	1.3	Routing coefficient

Determination of i

Determination of M5-60 min and r

M5-60min	19mm	5 year - 60 minute rainfall depth
r	0.371	Ratio of the 5 year - 60 minute rainfall depth to the 5 year - 2 day rainfall depth
D	30min	Rainfall duration
T	1year	Return period

Determination of M5-D

Z_1	0.79	
M5-D	15.0mm	rainfall depth of 5 year return period for required duration

Determination of MT-D

Z_2	0.62	
MT-D	9.30mm	rainfall depth of the required return period

Determination of point rainfall intensities

i	18.6mm/hr

Aplication of areal reduction factor

A	0.0008km²
ARF	0.94
i	**17.5mm/hr**

COLE EASDON CONSULTANTS

The Rational Formula

$Q_p = CiA/0.36$

Q_p	**11.7l/s**	Peak discharge from catchment
A	0.075ha	Catchment area
i	43.1mm/hr	Average rainfall intensity
C	1.3mm/hr	Dimensionless coefficient

Determination of C

Value of C_V

C_V	1	Volumetric runoff coefficient

Value of C_R

C_R	1.3	Routing coefficient

Determination of i

Determination of M5-60 min and r

M5-60min	19mm	5 year - 60 minute rainfall depth
r	0.371	Ratio of the 5 year - 60 minute rainfall depth to the 5 year - 2 day rainfall depth
D	30min	Rainfall duration
T	30year	Return period

Determination of M5-D

Z_1	0.79	
M5-D	15.0mm	rainfall depth of 5 year return period for required duration

Determination of MT-D

Z_2	1.53	
MT-D	22.95mm	rainfall depth of the required return period

Determination of point rainfall intensities

i	45.9mm/hr

Aplication of areal reduction factor

A	0.0008km²
ARF	0.94
i	**43.1mm/hr**

COLE EASDON CONSULTANTS

The Rational Formula

$Q_p=CiA/0.36$

Q_p	**15.2l/s**	Peak discharge from catchment
A	0.075ha	Catchment area
i	56.1mm/hr	Average rainfall intensity
C	1.3mm/hr	Dimensionless coefficient

Determination of C

Value of C_V

C_V	1	Volumetric runoff coefficient

Value of C_R

C_R	1.3	Routing coefficient

Determination of i

Determination of M5-60 min and r

M5-60min	19mm	5 year - 60 minute rainfall depth
r	0.371	Ratio of the 5 year - 60 minute rainfall depth to the 5 year - 2 day rainfall depth
D	30min	Rainfall duration
T	100year	Return period

Determination of M5-D

Z_1	0.79	
M5-D	15.0mm	rainfall depth of 5 year return period for required duration

Determination of MT-D

Z_2	1.99	
MT-D	29.85mm	rainfall depth of the required return period

Determination of point rainfall intensities

i	59.7mm/hr

Aplication of areal reduction factor

A	0.0008km²
ARF	0.94
i	**56.1mm/hr**

9773 - Proposed Residential Development : The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS QMED Calculation	Date: 24/07/2024		
	Designed by: BT	Checked by: JP	Approved By: DF
Report Title: UK and Ireland Rural Runoff Calculator	Company Address:		

Cole Easdon

FEH

Details

Site Location	GB 452300 167350 SU 52300 67350
Rainfall Version	2022
Data Type	Catchment

Area (ha)	0.063
SAAR (mm)	706.0
SPRHOST (%)	35.59
URBEXT 1990	0.0069
BFIHOST	0.466
FARL	1.000

Results

QMED Rural (L/s)	0.6
QMED Urban (L/s)	0.6

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Ben Thornton
Site name:	9773 The Plough Inn
Site location:	81 Chapel Street, Thatcham

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.40339° N
Longitude:	1.24924° W
Reference:	2742160503
Date:	Jul 24 2024 10:05

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 0.063

Methodology

Q_{MED} estimation method:	Specify QMed manually
Q_{MED} (l/s):	0.6
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm):	709	709
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):		0.68
1 in 1 year (l/s):		0.58
1 in 30 years (l/s):		1.57
1 in 100 year (l/s):		2.17
1 in 200 years (l/s):		2.55

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

9773 - Proposed Residential Development : The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS Storage Calculation	Date: 21/08/2024			Cole Easdon
	Designed by: BT	Checked by: JP	Approved By: DF	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			

Catchment Area (5) Type : Catchment Area

Area (ha)	0.022

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment Area (4) Type : Catchment Area

Area (ha)	0.021

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment Area (1) Type : Catchment Area

Area (ha)	0.007

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment Area (3)

Type : Catchment Area

Area (ha)	0.005

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment Area (2)

Type : Catchment Area

Area (ha)	0.004

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment Area (6)

Type : Catchment Area

Area (ha)	0.003

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.900
Time of Concentration (mins)	5
Percentage Impervious (%)	100

9773 - Proposed Residential Development :	Date:		
The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS Storage Calculation	21/08/2024		
	Designed by: BT	Checked by: JP	Approved By: DF
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		

Cole Easdon

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
MH1	Manhole	452312.736	167425.953	75.090	1.540	73.550	Circular	0.600
MH2	Manhole	452317.041	167424.192	75.050	1.585	73.465	Circular	0.600

Name	Lock
MH1	None
MH2	None

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
MH1	Outlet	1.001	Free Discharge
MH2	Outlet	1.002	Free Discharge

Tanked Permeable Paving Two

Type : Porous Paving

Dimensions

Exceedance Level (m)	74.410
Depth (m)	0.990
Base Level (m)	73.420
Paving Layer Depth (mm)	210
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	21.000
Long. Slope (1:X)	1000.00
Width (m)	10.000
Total Volume (m³)	49.140

Outlets

Outlet

Outgoing Connection	(None)
Outlet Type	Orifice
Diameter (m)	0.019
Coefficient of Discharge	0.600
Invert Level (m)	73.420

Advanced

Conductivity (m/hr)	400.0

Tanked Permeable Paving Three

Type : Porous Paving

Dimensions

Exceedance Level (m)	74.570
Depth (m)	0.810
Base Level (m)	73.760
Paving Layer Depth (mm)	210
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	10.000
Long. Slope (1:X)	1000.00
Width (m)	6.000
Total Volume (m³)	10.800

Outlets

Outlet

Outgoing Connection	2.000
Outlet Type	Orifice
Diameter (m)	0.012
Coefficient of Discharge	0.600
Invert Level (m)	73.760

Advanced

Conductivity (m/hr)	400.0

9773 - Proposed Residential Development : The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS Storage Calculation	Date: 21/08/2024		
	Designed by: BT	Checked by: JP	Approved By: DF
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		

Cole Easdon

Tanked Permeable Paving One

Type : Porous Paving

Dimensions

Exceedance Level (m)	75.790
Depth (m)	0.610
Base Level (m)	75.180
Paving Layer Depth (mm)	210
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	15.000
Long. Slope (1:X)	1000.00
Width (m)	2.000
Total Volume (m³)	3.600

Outlets

Outlet (1)

Outgoing Connection	1.000
Outlet Type	Orifice

Diameter (m)	0.008
Coefficient of Discharge	0.600
Invert Level (m)	75.180

Advanced

Conductivity (m/hr)	400.0

9773 - Proposed Residential Development :	Date:		
The Plough Inn, 81 Chapel Street	21/08/2024		
Thatcham, RG18 4JS	Designed by:	Checked by:	Approved By:
Storage Calculation	BT	JP	DF
Report Details:	Company Address:		
Type: Connections			
Storm Phase: Phase			

Cole Easdon

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
2.000	14.499	Pipe	42.644		0.6	100	74.580	73.760
1.000	1.450	Pipe	0.890		0.6	100	75.805	75.180
1.001	4.651	Pipe	54.721		0.6	100	75.090	73.550
1.002	4.063	Pipe	90.284		0.6	100	75.050	73.465

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)
2.000	74.431	73.420		None	0.23
1.000	75.090	73.550		None	0.08
1.001	75.050	73.465		None	
1.002	74.431	73.420		None	

9773 - Proposed Residential Development : The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS Storage Calculation	Date: 21/08/2024		
	Designed by: BT	Checked by: JP	Approved By: DF
Report Details: Type: Inflow Summary Storm Phase: Phase	Company Address:		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area (1)	Tanked Permeable Paving Three		Time of Concentration	0.007	100	0	100	0.007
Catchment Area (2)	Tanked Permeable Paving Three		Time of Concentration	0.004	100	0	100	0.004
Catchment Area (3)	Tanked Permeable Paving Two		Time of Concentration	0.005	100	0	100	0.005
Catchment Area (4)	Tanked Permeable Paving Two		Time of Concentration	0.021	100	0	100	0.021
Catchment Area (5)	Tanked Permeable Paving Two		Time of Concentration	0.022	100	0	100	0.022
Catchment Area (6)	Tanked Permeable Paving One		Time of Concentration	0.003	100	0	100	0.003
TOTAL		**0.0**		**0.063**				**0.063**

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 452300 167350 SU 52300 67350
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

9773 - Proposed Residential Development : The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS Storage Calculation	Date: 21/08/2024		
	Designed by: BT	Checked by: JP	Approved By: DF
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH1	FEH: 100 years: +40 %: 15 mins: Winter	75.090	73.550	73.962	0.412	1.5	0.116	0.000	0.3	0.159	Surcharged
MH2	FEH: 100 years: +40 %: 15 mins: Winter	75.050	73.465	73.961	0.496	2.9	0.140	0.000	0.5	0.742	Surcharged

9773 - Proposed Residential Development : The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS Storage Calculation	Date: 21/08/2024		
	Designed by: BT	Checked by: JP	Approved By: DF
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Tanked Permeable Paving Two	FEH: 100 years: +40 %: 600 mins: Winter	74.089	74.036	0.648	0.616	3.5	39.847	0.000	0.000	0.6	31.715	741	18.911
Tanked Permeable Paving Three	FEH: 100 years: +40 %: 360 mins: Winter	74.252	74.246	0.482	0.486	1.2	8.709	0.000	0.000	0.1	4.499	688	19.361
Tanked Permeable Paving One	FEH: 100 years: +40 %: 240 mins: Winter	75.452	75.422	0.257	0.242	0.5	2.261	0.000	0.000	0.1	1.411	366	37.207

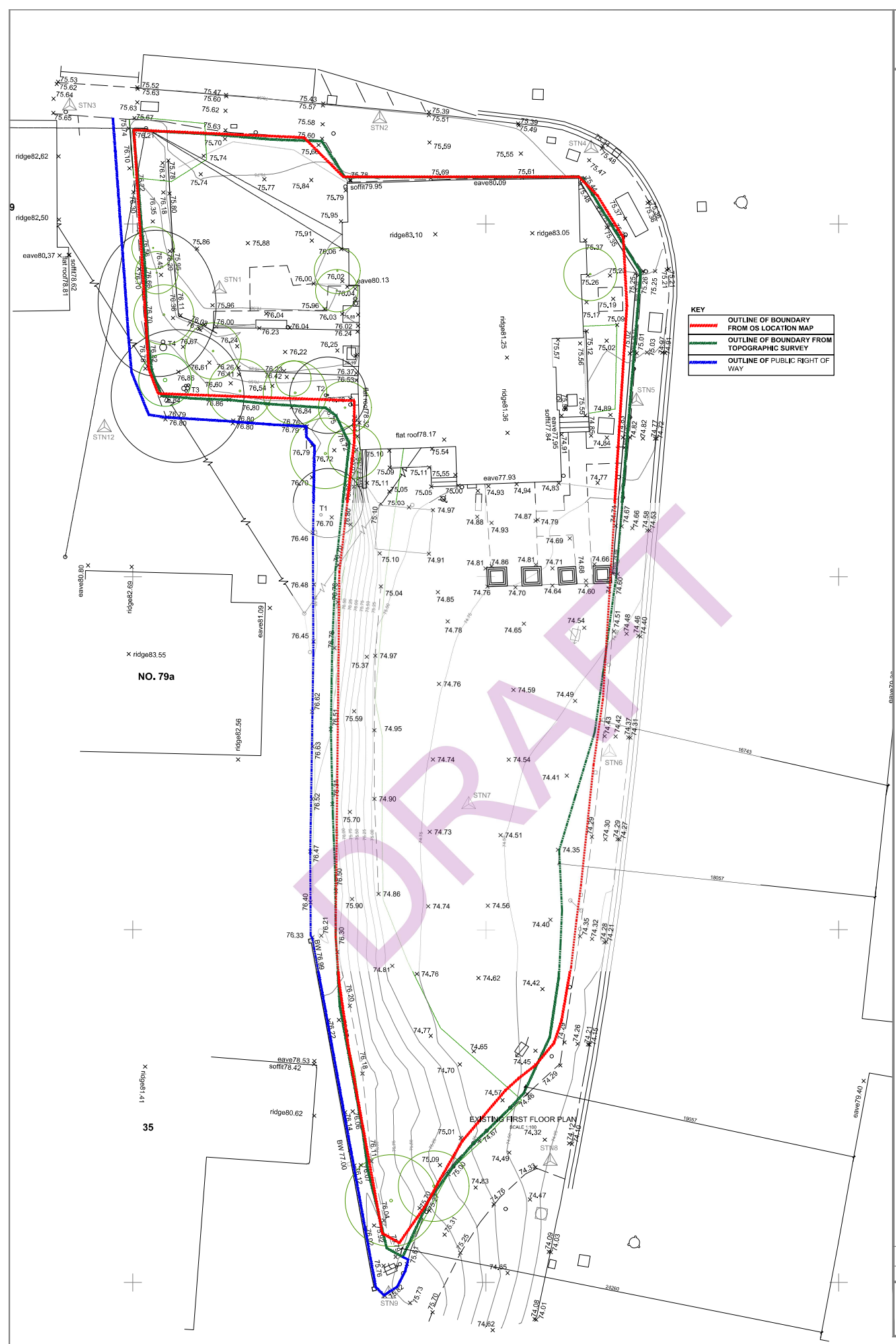
Status
OK
OK
OK

9773 - Proposed Residential Development : The Plough Inn, 81 Chapel Street Thatcham, RG18 4JS Storage Calculation	Date: 21/08/2024			Cole Easdon
	Designed by: BT	Checked by: JP	Approved By: DF	
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:			

Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.000	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	Tanked Permeable Paving Three	Tanked Permeable Paving Two	74.580	73.995	0.100	0.014	0.0	0.03	0.3	Surcharged
1.000	FEH: 100 years: +40 %: 240 mins: Winter	Pipe	Tanked Permeable Paving One	MH1	75.805	75.431	0.100	1.408	0.1	0	0.1	Surcharged
1.001	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	MH1	MH2	75.090	73.962	0.100	0.000	0.0	0.03	0.3	Surcharged
1.002	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	MH2	Tanked Permeable Paving Two	75.050	73.961	0.100	0.000	0.1	0.08	0.5	Surcharged

Appendix 4



EXISTING SITE / TOPOGRAPHIC PLAN
SCALE 1:100

N

METRES @ 1:100
10m 9m 8m 7m 6m 5m 4m 3m 2m 1m 0m

REV	DATE	COMMENT	DRN

Surveying & Design Services Limited
110 GOODMAYES ROAD, ILFORD, ESSEX IG3 9UZ TEL: 020 8590 2248
E.mail: info@jssd.co.uk

PLANNING ISSUE

SITE ADDRESS: THE PLOUGH INN, 81 CHAPEL STREET, THATCHAM RG18 4JS

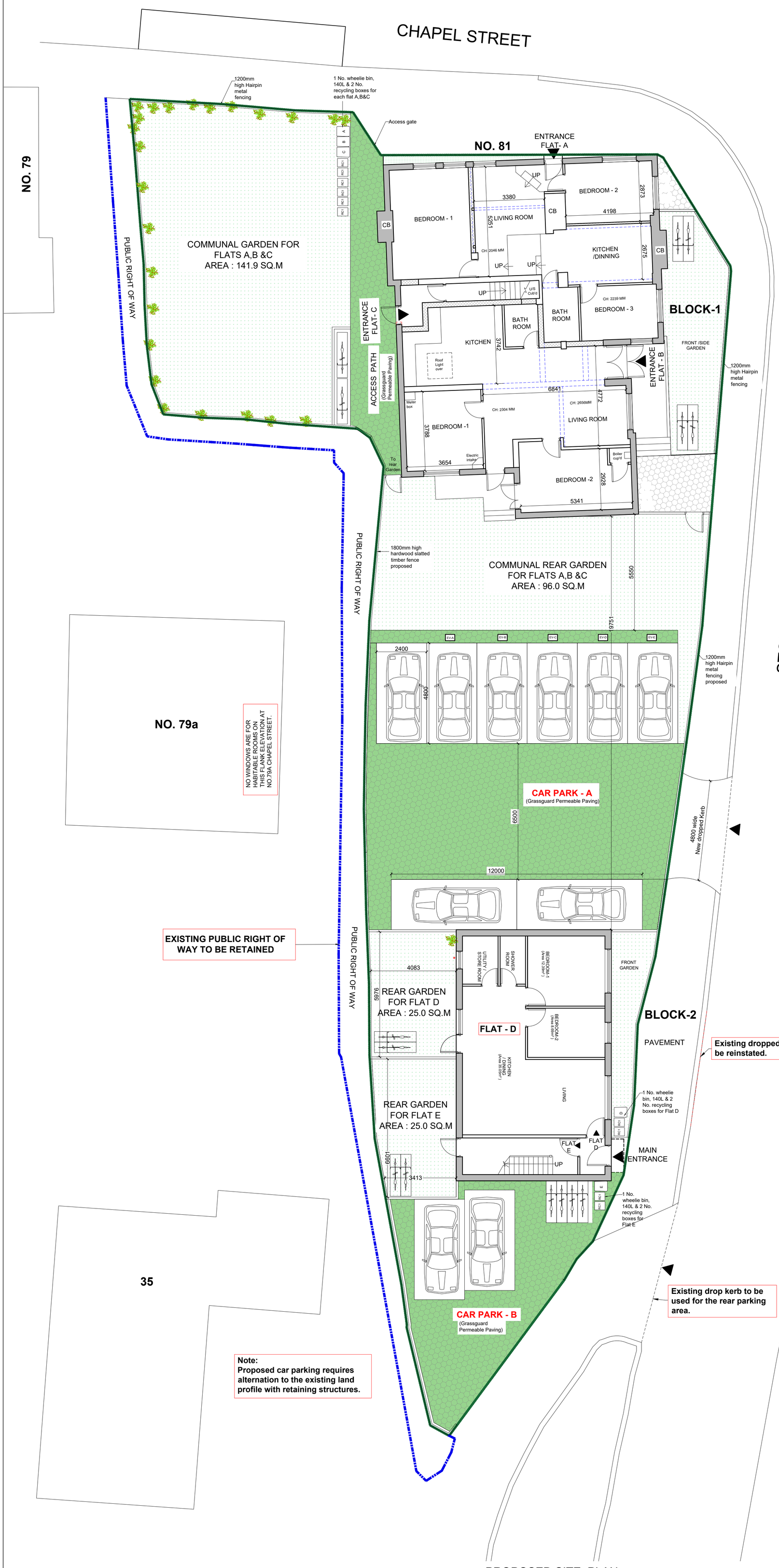
SUBJECT: EXISTING TOPOGRAPHICAL SITE PLAN

DRAWING NO: JS/SP/1546/1/01B

SCALE: 1:100 @ A1 | DATE: MAY 2024

DRAWN BY: SA | CHECKED BY: JS

REV:



PROPOSED SITE PLAN
SCALE 1:100

N

METRES @ 1:100

10m 9m 8m 7m 6m 5m 4m 3m 2m 1m 0m

Total Site area: 955.53 sq.m

Existing Builtup area : 197.23 sq.m
New Builtup area : 88.93 sq.m
Total Builtup area : 286.16 sq.m

Total car parking area: 260.28 sq.m

PARKING PROVISION:
CAR PARK - A
8 Car parkings for flat A,B,C,D & E. Each flat / unit has 2 cycle parking at front /side or rear garden.

REFUSE BINS:
Each unit has 1 No. wheelie bin, 140L & 2 No. recycling boxes at front /side garden .

PARKING PROVISION:
CAR PARK - B
1 car Parking for Flat E.
1 Car & 4 Cycle parkings for visitors.

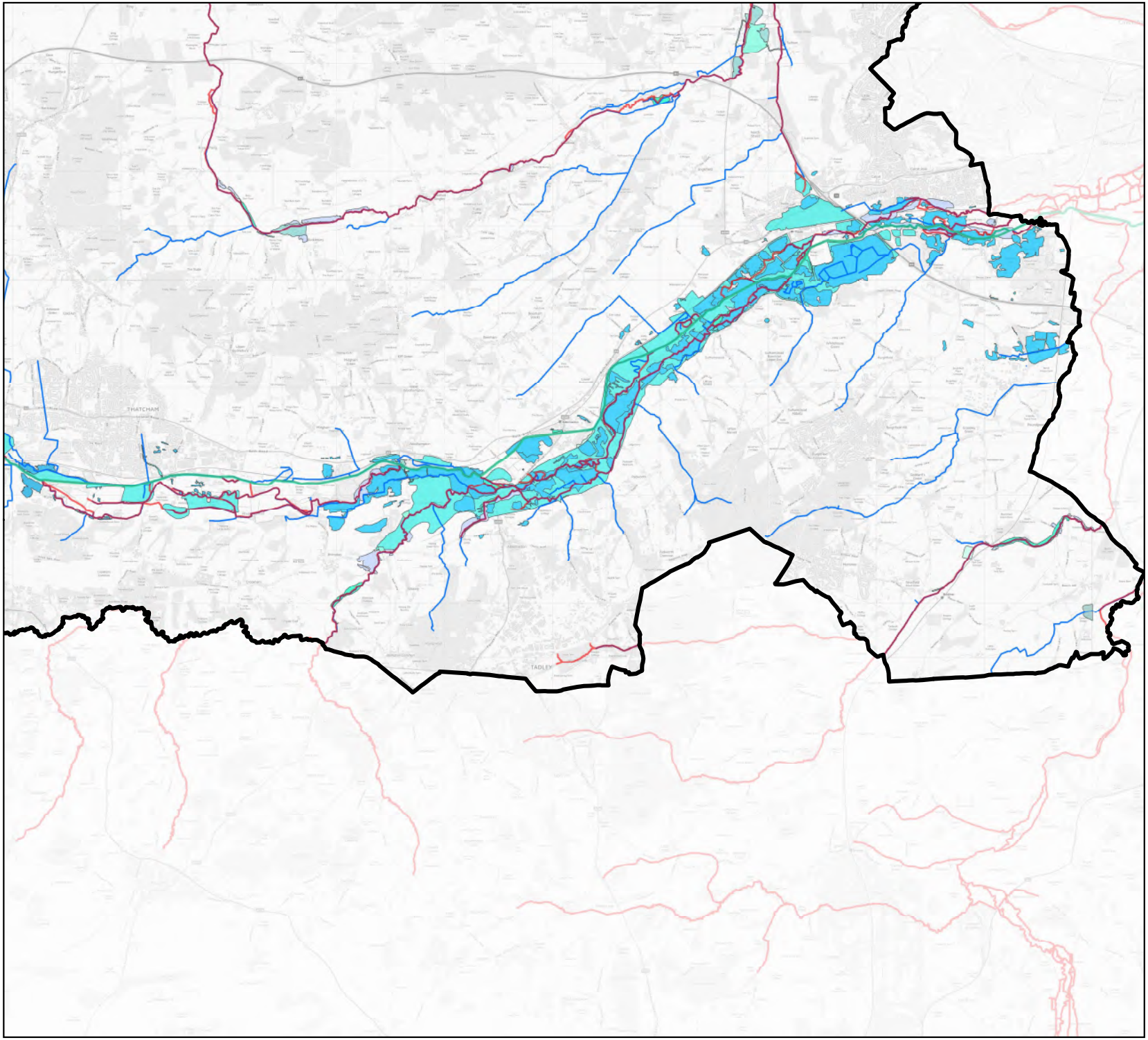
REV	DATE	COMMENT	DRN

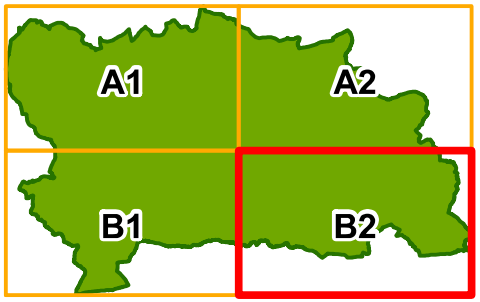
Surveying & Design Services Limited
110 GOODMAYES ROAD, ILFORD, ESSEX IG3 9UZ TEL: 020 8590 2248
E.mail: info@jssd.co.uk

PLANNING ISSUE

SITE ADDRESS:	THE PLOUGH INN, 81 CHAPEL STREET, THATCHAM RG18 4JS
SUBJECT:	PROPOSED SITE PLAN
DRAWING NO:	JS/SP/1546/3/09
SCALE:	1:100 @ A1
DATE:	JULY 2024
DRAWN BY:	SA
CHECKED BY:	JS
REV:	

Appendix 5





North

0 1 2 4 Km

Legend

- West Berkshire Boundary
- Canal Centreline
- Main Rivers
- Ordinary Watercourses

Recorded Flood Outlines

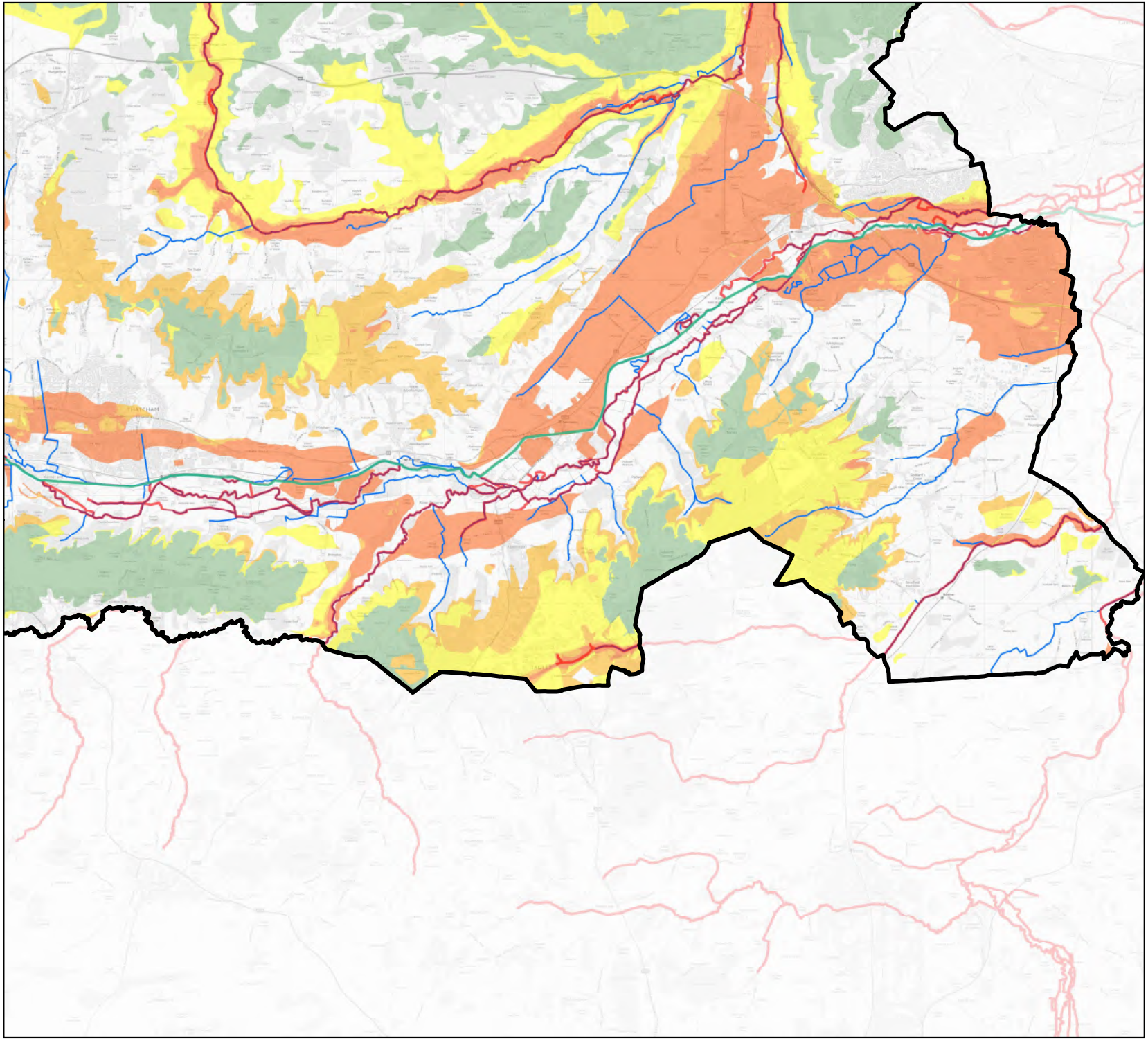
Date

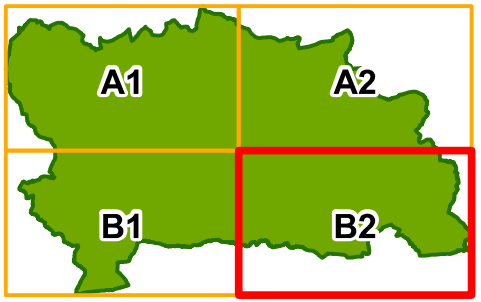
- 01/01/1947
- 01/01/1971
- 01/01/1979
- 01/01/1990
- 01/01/1992
- 01/01/1993
- 09/02/2009
- 12/01/2008
- 19/07/2007
- 23/12/2002

Strategic Flood Risk Assessment - Level 1
Appendix E - Recorded Flood Outlines

West Berkshire Council

JBA consulting





0 1 2 4 Km

North

Legend

- West Berkshire Boundary
- Canal Centreline
- Main Rivers
- Ordinary Watercourses

JBA Groundwater Map

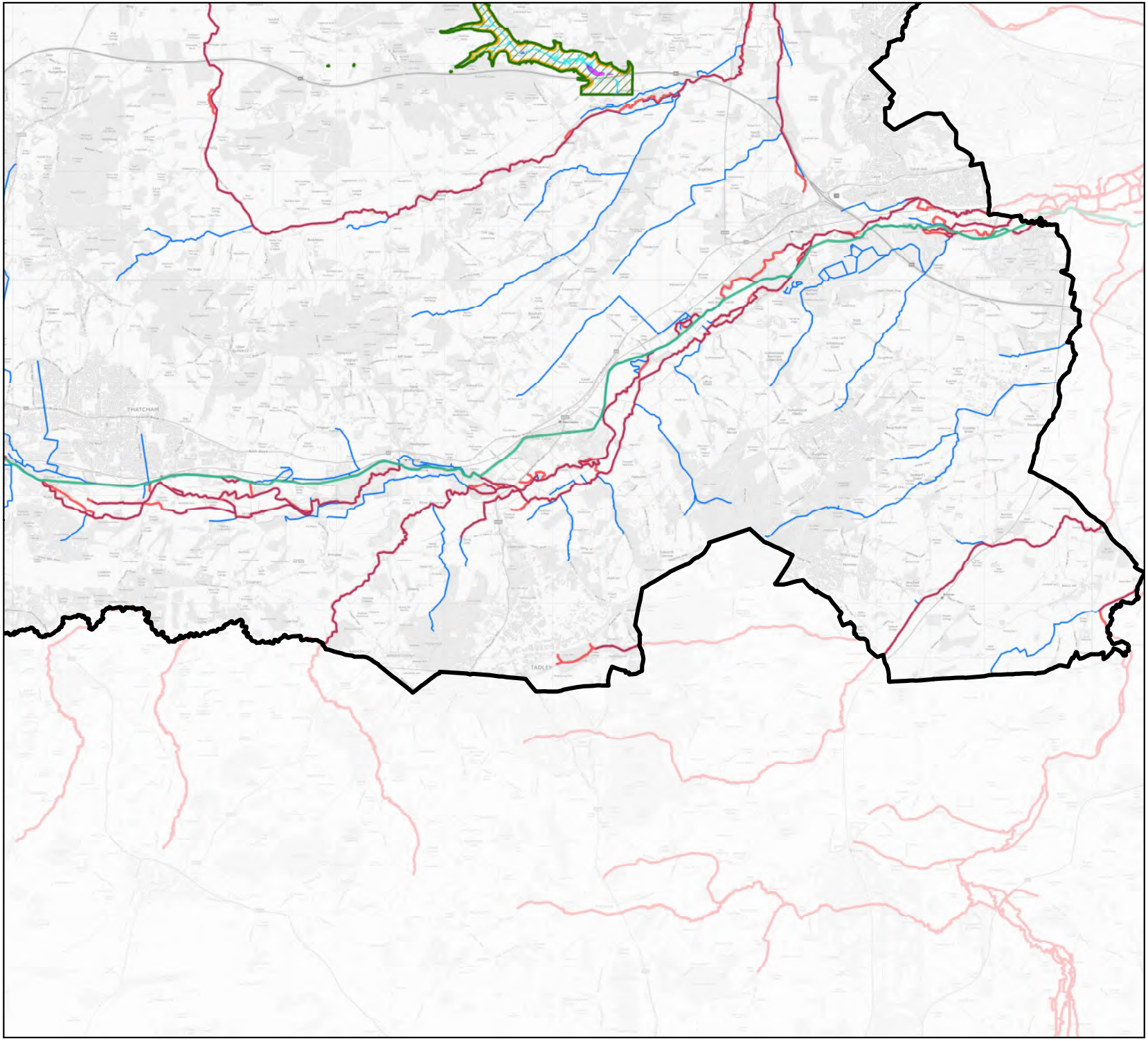
Depth below ground surface in a 1 in 100 year event

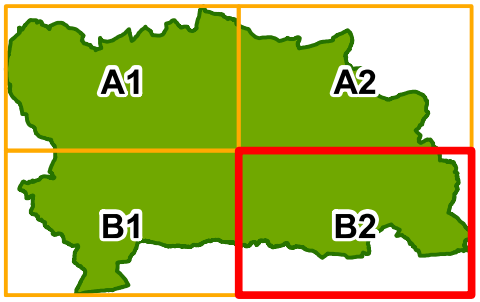
- Groundwater levels are either at very near (within 0.025m of) the ground surface
- Groundwater levels are between 0.025m and 0.5m below the ground surface
- Groundwater levels are between 0.5m and 5m below the ground surface
- Groundwater levels are at least 5m below the ground surface
- No risk

Strategic Flood Risk Assessment - Level 1
Appendix L - Groundwater Flood Mapping (JBA)

West Berkshire Council

JBA consulting





North

0 1 2 4 Km

Legend

- West Berkshire Boundary
- Canal Centreline
- Main Rivers
- Ordinary Watercourses

Groundwater Flood Depth

1 in 100-year (1% AEP)

- 0.0 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- >1.0
- Groundwater Emergence - 100-year event
- Groundwater Emergence - 30-year event

Strategic Flood Risk Assessment - Level 1
Appendix K - Groundwater Emergence Mapping
(Jacobs)

West Berkshire Council

JBA consulting

Appendix 6

Minor Applications Sustainable Drainage Strategy validation checklist

1 Site details

Site name	The Plough Inn, 81 Chapel Street, Thatcham, West Berkshire
Site location and coordinates	SU5232267425
Site description	Previously developed brownfield land housing an existing public house "The Plough Inn"
Total site area	0.075ha of previously developed brownfield land
Greenfield/previously developed?	Previously developed
Existing impermeable area	0.075ha
Proposed impermeable area	0.063ha
Type of development	Residential

The checklists should be completed by the applicant for developments of 3 to 9 dwellings and submitted as an appendix to the sustainable drainage strategy for the relevant planning application.

Completion notes:

This checklist covers both Outline and Full application requirements. Requirements have been colour coded as to whether they are needed at both Outline and Full stage, or at Full stage only. For those required at both, the level of detail expected will be higher for the Full application than the Outline.

Level of assessment	Detail required
Outline and Full	Requirement applies at both Outline and Full application stage to an appropriate level of detail.
Full only	Requirement applies at full application stage only

2 Plans and drawings

Plans and drawings will be required appropriate to the level of application (Outline/Full) and the size of the development.

	Evidence required	**Format**	**Submitted?** ✔ ✘
	Site location (minimum 1:2,500 scale)	Plan	Y
	Existing drainage layout	Plan, drawing	N
	Proposed sustainable drainage layout	Plan, drawing	Y
	Topographical survey of the site	Plan, drawing	Y
	Detailed drainage layout (minimum scale 1:500)	Drawing	Y

3 Design statement

A design statement will be required appropriate to the level of application (Outline/Full) and the size of the development. Requirements relate to the policies within Section 4 of the SPD, and are listed by Principle.

Evidence required		Format of evidence	Submitted? ✔ ✘
Principle 1: Replicate natural drainage and manage water quantity			
SuDS principles			
Assessment of natural drainage patterns and existing drainage infrastructure (e.g. capacity, condition).		Report	Y
Surface water is used as a resource, where appropriate (e.g. rainwater harvesting).		Report	Will be considered as part of detailed design
Justification of drainage discharge destination, following the discharge hierarchy. If discharge to a surface water sewer is proposed, details of agreed connection with sewerage undertaker are provided.		Report	Y
Management of runoff and volumes			
Peak runoff rate from the development for the following events does not exceed peak greenfield runoff rate for the same event: • 1 in 1 year • 1 in 100-year If not achievable, evidence must be provided and a suitable rate agreed with the LLFA.		Report calculations	Y
Runoff volume from the development for the 1 in 100-year, 6-hour rainfall event is limited to the greenfield runoff volume for the same event. If not achievable, any additional volume is dealt with through the provision of Long-Term Storage and discharged from the site at a suitable rate agreed with the LLFA.		Report, calculations	Y
Climate change (+40% uplift on rainfall estimates) been considered in post development calculations		Report, calculations	Y
Design of each SuDS element has been undertaken in accordance with good practice.		Report	Y
Details provided of connections to other drainage systems and between SuDS components, keeping water close to the surface.		Report, drawings, calculations	Y
Infiltration			
Infiltration assessment demonstrating feasibility (if infiltration is proposed)		Report	Infiltration not proposed due to underlaying clay strata
Flood risk			
All significant SuDS components are located outside any areas of significant flood risk.		Report, plan	Y
The SuDS system will not increase flood risk to the site or adjacent properties.		Report, calculations	Y
Principle 2: Improve water quality			
Treatment of runoff			
Surface water is adequately treated within the site.		Report, calculations	Y
Principle 3: Promote and encourage biodiversity			
Habitat provision			

The system is on the surface and contains vegetated components.		Report, plans	N
The drainage system will support, protect and enhance natural local habitats and species.		Report	N
Principle 4: Enhance the landscape			
Visual impact			
The drainage scheme enhances the visual character of the development.		Report, plans, photographs	
Principle 5: Make development future-proof			
Climate change			
Use of SuDS in moderating of temperatures through evaporative cooling, reflectance and shading has been exploited		Report	
Principle 6: Engage and benefit the local community			
Opportunities to enhance provision for recreation, health and wellbeing, education and play			
Where the drainage system serves more than one property, communal space is used in a beneficial way for the community.		Report	
The proposed components are safe for any proposed amenity use.		Report	

4 Maintenance and construction

Maintenance plans and construction method statements will be required appropriate to the level of application (Outline/Full) and the size of the development. Requirements relate to the policies within Section 4 of the SPD, and are listed by Principle.

Evidence Required		**Format of evidence**	**Submitted?** ✔ ✘
Principle 7: Ensure that SuDS are maintained for the lifetime of the development			
Operation and Maintenance			
Maintenance Plan for the proposed drainage system over its lifetime (100 years for residential, 60 years for commercial)		Report	Y
Whole life maintenance and monitoring costs for the proposed drainage system (100 years for residential, 60 years for commercial)		Report	
Evidence that the proposed components safe to construct, maintain and operate.		Report	
Principle 8: Adopting good practice in construction of SuDS			
Consents			
Record of all necessary consents obtained for on or off-site works		Certificate or letter/email correspondence	

5 Adoption arrangements

Evidence Required		Format of evidence	Submitted? ✔ ✘
Adoption			
Demonstrate that provision has been made for a suitable organisation or individual to adopt the scheme, including relevant evidence of commitments.		Report, letter/email correspondence	Y
Records			
As-constructed drawings of drainage system		Detailed drawings	
Record of easement agreements		Report, letter/email correspondence	
Record of commuted sums		Report, letter/email correspondence	