AMBIENTAL
ENVIRONMENTAL ASSESSMENT
a company of Royal HaskoningDHV

Technical Note

Project:	55 Parkfield Road, Ickenham UB10 8LW
Reference:	6709
Prepared for:	KDA Designs Ltd.

Rev.	Date	Purpose	Author	Document Check	Authorisation
Draft 1	09/06/2022	ICC	Oliver Harvey	Debra Griffin	Steven Brown

IQC: Internal Quality Check | ICC: Issued for Client Comment | ISC: Issued for Stakeholder Comment | IaA: Issued as Approved

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10/06/2022
Planning Application: 43036/APP/2021/4156
Our Reference: 6709
Revision: v1

This technical note is in response to Condition 5 of planning application 43036/APP/2021/4156. The application is for the development is for the erection of a two storey dwelling and alterations to existing boundary, following the demolition of existing bungalow at 55 Parkfield Road, Ickenham UB10 8LW.

Condition 5 of the planning application (43036/APP/2021/4156) is replicated below:

No *development approved by this permission shall be commenced until a scheme for the provision of sustainable water management and water efficiency has been submitted to and approved in writing by the Local Planning Authority. The scheme shall:*

I. *Provide information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters*
II. *Include a timetable for its implementation*
III. *Provide a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime. The scheme shall also demonstrate the use of methods to minimise the use of potable water through water collection, reuse and recycling and will:*
IV. *Provide details of water collection facilities to capture excess rainwater*
V. *Provide details of how rain and grey water will be recycled and reused in the development*
VI. *Provide details of how the dwelling will achieve a water efficiency standard of no more than 110 litres per person per day maximum water consumption (to include a fixed factor of water for outdoor use of 5 litres per person per day in accordance with the optional requirement defined within Approved Document G of the Building Regulations)*

Following a review of Condition 5 and the planning application, Ambiental have provided an NPPF compliant surface water drainage strategy and associated drawing/calculations. All required details can be found on the drawing sheet, this technical note provides a short summary of this information.

The existing residential dwelling totals approximately 110m^2, the proposed replacement dwelling will increase built footprint to approximately 170m^2, a total increase of approximately 60m^2. Permeable paving will be implemented on the hardstanding on site that totals approximately 95m^2. An additional allowance of 10% on the hardstanding and roof areas has been accounted for within the calculations. As such, the final drained area to be managed by SuDS will be 295m^2.

Policy SI13 of the London Plan requires that all developments must maximise the use of SuDS in accordance with the London Plan Drainage Hierarchy and the principles of a SuDS Management Train. With regard to sustainable drainage you are advised that the development must achieve Greenfield Runoff rates for 1 in 1 year and 1 in 100 year (plus climate change) events and utilise SuDS in accordance to the London Plan Drainage Hierarchy and the principles of a SuDS Management Train.

Particular types of sustainable drainage systems may not be practicable in all locations. The below discharge options should all be assessed for any site and the most appropriate option will be established within the Flood Risk Assessment/Drainage Strategy. Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable. See Table 1, overleaf.

SuDS DRAINAGE HEIRARCHY				
			Suitability	Comment
↓	1.	**Store rainwater for later use**	✓	Rainwater harvesting, in the form of water butts, are to be implemented into the proposed development.
	2.	**Use infiltration techniques, such as porous surfaces**	x	Desktop geology data indicates that infiltration would be unfeasible
	3.	**Attenuate rainwater in ponds or open water features for gradual release**	x	No space on site to provide open attenuation features
	4.	**Attenuate rainwater by storing in tanks or sealed water features for gradual release**	✓	Proposed to utilise Type C permeable paving to attenuate surface water runoff from the roof and hardstanding areas around the site.
	5.	**Discharge rainwater direct to a watercourse**	x	No watercourses or drainage ditches located close to the site
	6.	**Discharge rainwater to a surface water sewer/drain**	✓	A surface water public sewer is located underneath Parkfield Road. It is assumed that there is an existing connection associated with the existing building, and therefore it is recommended to reuse this connection.
	7.	**Discharge rainwater to Combined Sewer**	-	

Table 1: SuDS Drainage Hierarchy

There are a significant number of constraints on site which means that large scale SuDS features cannot be provided. As such, small-scale SuDS measures that can be retrofitted (rain planters, permeable paving, water butts etc.) have been considered to provide betterment over the existing situation. A summary of the suitability of various SuDS features are provided in Table 2, overleaf.

A of review of the geology of the site on the BGS maps which indicate that the site is not underlain by any superficial deposits. The bedrock geology underlying the site has been classified as being part of the London Clay Formation consisting of clay, silt, and sand. Soilscapes online mapping tool describes the soil in the area as slowly permeable seasonally wet loamy and clayey soils with impeded drainage. As such, it is highly unlikely infiltration techniques will be a suitable method to dispose of surface water runoff.

Furthermore, infiltration SuDS are not considered viable given the small nature of the site, proposed building and existing sewer that runs much of the site it is not possible to achieve the required set back (5m) under the Building Regulations Part H. There are no nearby watercourses and the site is only served by a separate foul and surface water system. It is assumed that the existing building, and adjacent buildings, have existing surface water and foul water connections into the public sewer. Therefore, it is considered that a connection into the public sewer is the most sustainable, and practical, option available.

Large scale SuDS measures (ponds, wetlands, swales, detention basins etc.) have been discounted due to the size constraints of the site.

SUITABILITY OF SuDS COMPONENTS		
SuDS Component	**Comment**	**Suitability**
Infiltrating SuDS	Site is located over London Clay with no superficial deposits. Soilscapes online mapping describes the soil in the area as being slowly permeable seasonally wet loamy and clayey soils. As such, it is highly unlikely infiltration techniques will be a suitable method to dispose of surface water runoff. Furthermore, given the space constraints on site it would be impossible to locate a soakaway 5m from the foundations of the existing building	x
Permeable Pavement	Permeable paving is suitable on and is proposed to be utilised on the front driveway area. Given the soil conditions on site any permeable paving would be required to be Type C (no infiltration)	✓
Green / Blue Roofs	Considered unsuitable for use on this site. Green roofs provide a very limited amount of attenuation storage and can't be placed on the majority of the roof areas of the roof because it is sloping/ pitched. Access onto the roof would be restricted and therefore an 'Extensive Green Roof' (which would require little to no maintenance) would be required. As outlined in table 12.1 (page 236) of the CiRIA SuDS Manual, this type of green roof has limited surface water retention benefits. The hydraulic performance of green roofs once saturated tends to be fairly similar to standard roofs. Therefore, any green roof that we provide would provide minimal benefit during the peak storm event (design scenario)	x
Rainwater Harvesting	It is recommended that Water Butts are implemented, where feasible and where there is space to do so. Water butts are to be connected to the existing rainwater downpipes and provide water for non-potable uses around the site. A 'leaky' water butt could be installed by having an overflow into an adjacent permeable area or rain garden	✓
Swales	Insufficient space to implement such conveyancing SuDS techniques	x
Rills and Channels	Insufficient space to implement such conveyancing SuDS techniques and would provide little benefit overall	x
Bioretention Systems	Small scale rain planters/bioretention systems could be retrofitted into the rear garden however space is constrained on site and the soil in the area would require bioretention systems to be lined	✓
Retention Ponds and Wetlands	Insufficient space on site to implement large scale SuDS techniques such as ponds/wetlands. These SuDS measures are better suited to large scale developments.	x
Detention Basins	Insufficient space on site to implement large scale SuDS techniques such as detention basins. These SuDS measures are better suited to large scale developments.	x
Geocellular Systems	As per the SuDS guidance, geocellular systems are not a preferred method of SuDS as they would require additional maintenance. Alternative more sustainable options should be considered first	x
Proprietary Treatment Systems	Roof runoff is considered to be largely uncontaminated and proprietary treatment systems wouldn't be required. Adequate treatment can be provided through the use of permeable paving for hardstanding areas.	x
Filter Drains and Filter Strips	Insufficient space on site and poor infiltration would result in filter drains/strips providing little overall benefit.	x

Table 2: Suitability of SuDS Components

It is proposed to limit runoff as close to greenfield as practicable through the use of attenuation SuDS. Based on the site proposals, Type C (lined) permeable paving has been considered as the most suitable means to capture, store and treat the hardstanding and roof runoff. Permeable paving offers a flexible attenuation control and treatment benefits while also acting as hardstanding for car parking and access.

Permeable Paving

Lined (Type C) permeable paving should be provided in all hardstanding areas, where possible, to aid interception, treatment, conveyance of runoff, whilst allowing for some attenuation. The Permeable Paving would be formed by the following layers:

- Permeable surfacing
- Laying course material
- Geotextile
- Sub-base: 6-20mm Clean Crushed Stone (Provide min. 0.45m sub-base depth to provide partial support for car traffic and surface water attenuation volume subject to CBR results). CBR testing should be undertaken in the car parking area and the pavement's construction amended as necessary to suit results potentially with additional capping layer under the permeable sub-base.
- Impermeable Membrane

The proposed permeable paving area totals approximately 95m^2. The calculated required storage to accommodate the 1:100+40%CC storm event is 12.60m^3. As such, a 450mm sub-base with a void ratio of 30% would provide adequate attenuation storage – 12.83m^3.

Ambiental have utilised Microdrainage to provide run-off calculations for 1 in 1, 1 in 30 and 1 in 100 (all including 40% for Climate Change). The outcome can be seen below in Table 1 below. See calculations within appendix C.

The proposed flow control device consists of a 15mm orifice flow control. A 15mm orifice plate is the minimum recommended size as per the Ciria SuDS manual and therefore it is not possible to reduce runoff rates any further.

SURFACE WATER DISCHARGE RATES SUMMARY					
	Area (m^2)	Discharge Rates (l/s)			
		1 year	Q_{BAR}	30 year	100 year
Greenfield Rates	980	0.1	0.2	0.4	0.6
Existing Brownfield	200	2.8	-	7.7	10.3
Limiting Runoff Rate	**290**	**0.4**	**-**	**0.7**	**0.9**
Betterment		**86%**		**91%**	**91%**

Table 3: Runoff Rates Summary

In order to protect the downstream receiving water body, a key element of SuDS is that they have the potential to improve the quality of surface water discharged from a site. In order to assess this, the "Pollution hazard indices for different land use classifications", provided in the CIRIA SuDS Manual (C753) as table 26.2 has been reviewed. The indices use four different methods of assessing pollution potential based on the hazard level, total suspended solids (TSS), metals, and Hydrocarbons.

The pollution Hazard indices are summarized in Table 4 – Summary of pollution Hazard Indices for different Land use below.

POLLUTION HAZARD INDICES FOR DIFFERENT LAND USE CLASSIFICATIONS				
LAND USE	**Pollution Hazard Level**	**Total suspended solids (TSS)**	**Metals**	**Hydrocarbons**
Residential Roofs	Very Low	0.2	0.2	0.05
Individual Property Driveways	Low	0.5	0.4	0.4

Table 4: Summary of pollution hazard indices for different land use

INDICATIVE SuDS MITIGATION INDICIES			
SuDS Component	Total suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7
Proprietary Treatment Systems	Details should be provided at the detailed design phase to account for the final SuDS strategy layout and wider construction design details.		

Table 5: Indicative SuDS Mitigation Indices

Runoff from roof areas is considered to generally be uncontaminated. However, to prevent potential sediment from impacting the SuDS system, Sediment Traps should be provided on the downpipes' outlet to the storage structure to prevent sedimentation, with rodding access provided either side for cleaning and maintenance. Ideally all downpipes should be equipped with water butts or rain planters (that can act as sediment and silt traps). The permeable paving should provide sufficient treatment for the surface water before discharging.

Maintenance schedule of the proposed below ground drainage is shown in Table 6 and 7 below. All SuDS will be privately maintained by the landowner.

TYPICAL KEY SUDS COMPONENTS OPERATION AND MAINTENANCE ACITIVIES													
Operation and Maintenance Activity	**SuDS Component**												
	Pond	**Wetlands**	**Detention Basin**	**Infiltration Basin**	**Soakaway**	**Infiltration Trench**	**Filter Drain**	**Modular Storage**	**Pervious pavement**	**Swale/Bioretention**	**Filter Strip**	**Green Roofs**	**Proprietary Treatment**
Regular Maintenance													
Inspection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Litter/debris removal	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	x	-
Grass cutting	✓	✓	✓	✓	-	✓	✓	-	-	✓	✓	x	x
Weed/invasive plant control	-	-	-	-	x	-	-	x	-	x	-	✓	x
Shrub management	-	-	-	-	x	x	x	x	-	-	-	x	x
Shoreline vegetation management	✓	✓	-	x	x	x	x	x	x	x	x	x	x
Aquatic vegetation management	✓	✓	-	x	x	x	x	x	x	x	x	x	x
Occasional Maintenance													
Sediment management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vegetation replacement	-	-	-	-	x	x	x	x	x	-	-	✓	x
Vacuum sweeping and brushing	x	x	x	x	x	x	x	x	✓	x	x	x	x
Remedial Maintenance													
Structure rehabilitation/repair	-	-	-	-	-	-	-	-	-	-	-	-	x
Infiltration surface reconditioning	x	x	x	-	-	-	-	x	-	-	-	x	x
Key:													
Will be Required	✓	May be Required					-	Not Normally Required					x

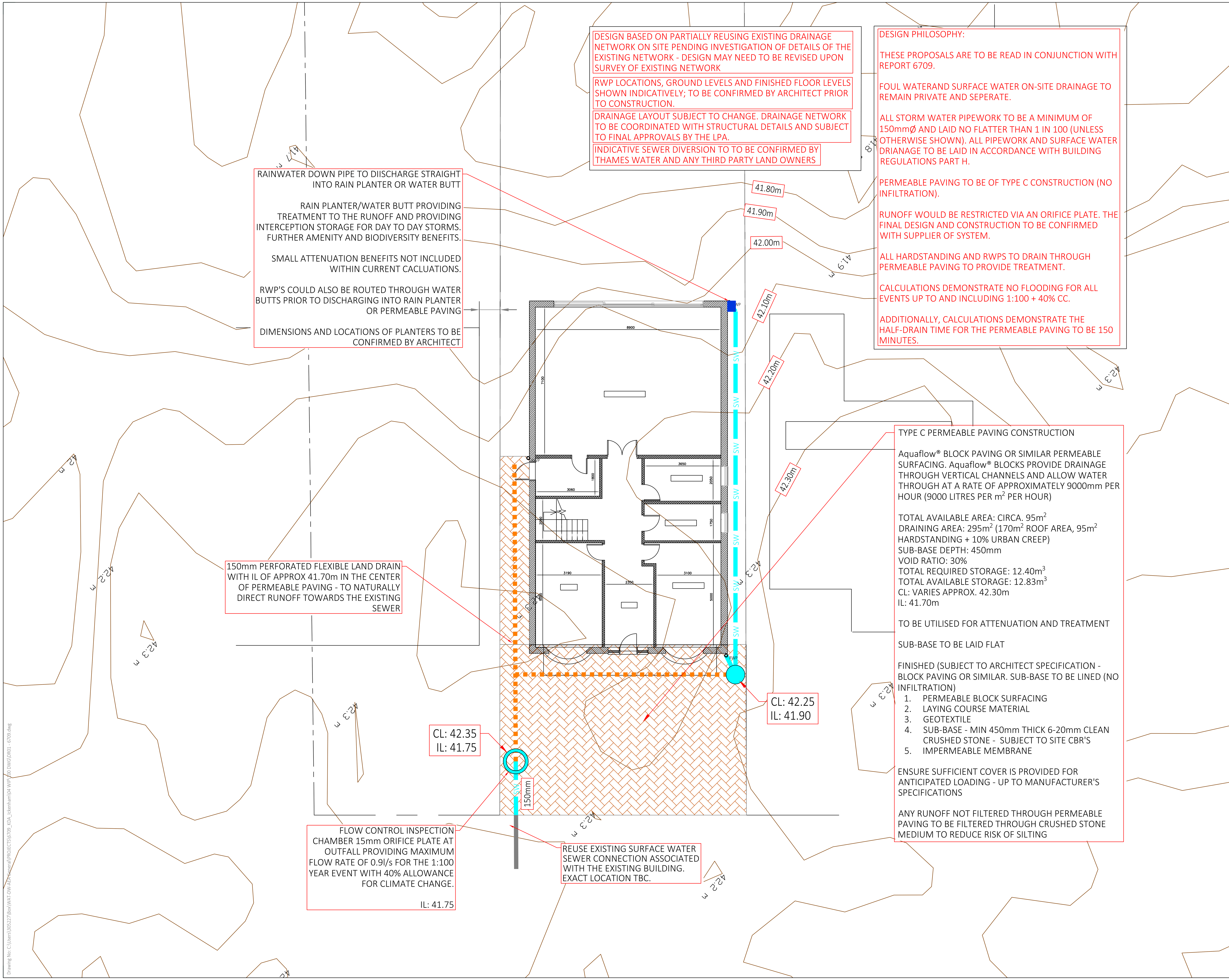
Table 6: General Maintenance Requirements (Source: CIRIA SuDS Manual C753)

SPECIFIC MAINTENANCE REQUIREMENTS		
Maintenance Schedule	Required Action	Typical Frequency
PERMEABLE PAVING		
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or

		manufacturer's recommendations
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeks by an applicator rather than a sprayer	As required
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper structure by remedial sweeping	Every 10 to 15 years as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually
PROPRIETARY TREATMENT SYSTEM		
Routine Maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial Actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

Table 7: Specific Maintenance Requirements (Source: CIRIA SuDS Manual C753)

Appendix A – Proposed Drainage Layout and Details



1. GENERAL
   a. THIS DRAWING IS NOT TO BE SCALED, WORK TO FIGURED DIMENSIONS ONLY, CONFIRMED ON SITE.
   b. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL DRAWINGS, DETAILED SPECIFICATIONS WHERE APPLICABLE AND ALL ASSOCIATED DRAWINGS IN THIS SERIES.
   c. ANY DISCREPANCY ON THIS DRAWING IS TO BE REPORTED IMMEDIATELY TO THE PARTNERSHIP FOR CLARIFICATION.
   d. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKS AND FOR THE STABILITY OF THE WORKS IN PROGRESS.
   e. CDM REGULATIONS 2015. ALL CURRENT DRAWINGS AND SPECIFICATIONS MUST BE READ IN CONJUNCTION WITH THE DESIGNER'S HAZARD RISK AND ENVIRONMENT ASSESSMENT RECORD. DESIGN HAS BEEN PRODUCED BASED ON INFORMATION PROVIDED BY THE CLIENT/PRINCIPLE DESIGNER AVAILABLE AT TIME OF ISSUE. CONTRACTOR TO REVIEW DRAWING AND SPECIFICATION IN CONTEXT WITH THE WIDER SITE AND SPECIFIC SITE INVESTIGATION, CONTAMINATION ASSESSMENT, ASBESTOS SURVEY, ENVIRONMENTAL SURVEY, UXO SURVEY AND ANY OTHER RELEVANT INFORMATION AND MANAGE RISKS RELATING TO THE WORKS OUTLINED IN THE DRAWINGS AND SPECIFICATION. PRINCIPLE CONTRACTOR TO MAKE DESIGNER AND CLIENT AWARE OF SITE SPECIFIC RISKS THAT MAY AFFECT THE DRAWING AND SPECIFICATION.
   f. CDM REGULATIONS 2015. FOR GENERIC MAINTENANCE AND MANAGEMENT RISKS REFER TO CHAPTER 36 OF CIRIA 752 SUDS MANUAL. FOR PROPRIETARY SYSTEMS SEE MANUFACTURER'S MANAGEMENT AND MAINTENANCE DETAILS AND RISK ASSESSMENT WITH REGARDS TO MAINTENANCE OF PROPRIETARY SYSTEMS.

2. CONSTRUCTION NOTE
   a. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.
   b. THE MAIN CONTRACTOR IS RESPONSIBLE FOR ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.
   c. ANY INFORMATION GIVEN REGARDING EXISTING UNDERGROUND SERVICES IS GIVEN IN GOOD FAITH AFTER CONSULTATION WITH THE RELEVANT AUTHORITY, HOWEVER ACCURACY IS NOT CERTAIN. THE MAIN CONTRACTOR IS RESPONSIBLE FOR CHECKING ALL INFORMATION ON SITE PRIOR TO WORK COMMENCING AND TAKING DUE CARE AND ATTENTION WHILST UNDERTAKING THE WORKS.
   d. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.
   e. ALL PRODUCTS SPECIFIED SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS. IF THERE ARE DISCREPANCIES BETWEEN THAT INFORMATION AND THE DETAILS ON ANY AMBIENTAL DRAWINGS, THE MANUFACTURERS INSTRUCTIONS MUST BE USED

3. BELOW GROUND DRAINAGE
   a. PIPEWORK TO BE UPVC-U PIPES TO BS 4660 : 2000 AND INSPECTION CHAMBERS TO BS 7158 : 2001.
   b. ALL ADOPTABLE DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH 'SEWERS FOR ADOPTION' 7TH EDITION AND THE RELEVANT COUNCIL DESIGN GUIDE.
   c. ALL PRIVATE SURFACE WATER SEWERS TO BE LAID AT 1 IN 100 UNLESS OTHERWISE STATED ON THE DRAWING.
   d. ALL PRIVATE FOUL WATER SEWERS TO BE LAID AT 1 IN 40 AT THE HEAD OF PIPE RUNS AND 1 IN 80 ELSEWHERE UNLESS OTHERWISE STATED.
   e. ALL PRIVATE FOUL SEWER PIPES TO BE 150MM DIAMETER UNLESS OTHERWISE STATED ON THE DRAWING. ALL PRIVATE SURFACE WATER SEWER PIPES TO BE 100MM DIAMETER FROM DOWNPIPES AND 150MM DIAMETER ELSEWHERE UNLESS OTHERWISE STATED ON THE DRAWING.
   f. ALLOW FOR RODDING ACCESS ABOVE GROUND WHERE RAINWATER DOWNPIPES DO NOT HAVE A DIRECT CONNECTION TO AN INSPECTION CHAMBER. EXISTING SEWER PIPE TO BE RE-USED TO BE SURVEYED AND LEVELLED PRIOR TO COMMENCEMENT OF THE DRAINAGE WORKS AND REFURBISHED IF NECESSARY.
   g. CONNECTIONS TO AN ADOPTED SEWER ONLY TO BE MADE FOLLOWING APPROVAL FROM THE RELEVANT ADOPTING AUTHORITY.
   h. ALL DRAINS, SEWER PIPES AND MANHOLES TO BE CLEANED AND TESTED FOR WATER TIGHTNESS ON COMPLETION OF CONSTRUCTION.

4. MANHOLE COVERS AND FRAMES
   a. MANHOLE COVERS TO BE CLASS D400 IN HIGHWAYS, CLASS B125 IN FOOTWAYS AND VERGES, CLASS A15 IN NON-TRAFFICKED AREAS.
   b. MANHOLE COVER AND FRAME TO BE BEDDED AND SURROUNDED IN 1:3 MORTAR.

LEGEND

- PRIVATE SURFACE WATER DRAIN
- PERFORATED SURFACE WATER DRAIN
- PRIVATE FOUL WATER DRAIN
- TYPE 3 INSPECTION CHAMBER
- TYPE 4 INSPECTION CHAMBER
- RWP — RAIN WATER PIPE
- PERMEABLE PAVING
- HYDROBRAKE MANHOLE
- EXCEEDANCE FLOWS

REV	DATE	BY	CKD	APPDDESCRIPTION
##	XX.XX.XX	...	...	...

PRELIMINARY DRAWING
FOR INFORMATION ONLY. NOT FOR CONSTRUCTION.

Client
KDA Designs Ltd.

AMBIENTAL
ENVIRONMENTAL ASSESSMENT
a company of Royal HaskoningDHV

Project
55 PARKFIELD ROAD
ICKENHAM UB10 8LW

Drawing
SURFACE WATER DRAINAGE STRATEGY
DRAINAGE LAYOUT

Drawn by: OH
Date: JUNE - 2022

Drawing No.
6709 - DR01

Revision
-

Drawing Scale: 1:100 @ A1
0 1m 2m 3m 4m 5m

Appendix B – Supporting Documents

0 1 2 3 4 5 6 7 8 9 10

SCALE 1:50

EXTG
OUTBUILDING

PROPOSED NEW BOUNDARY

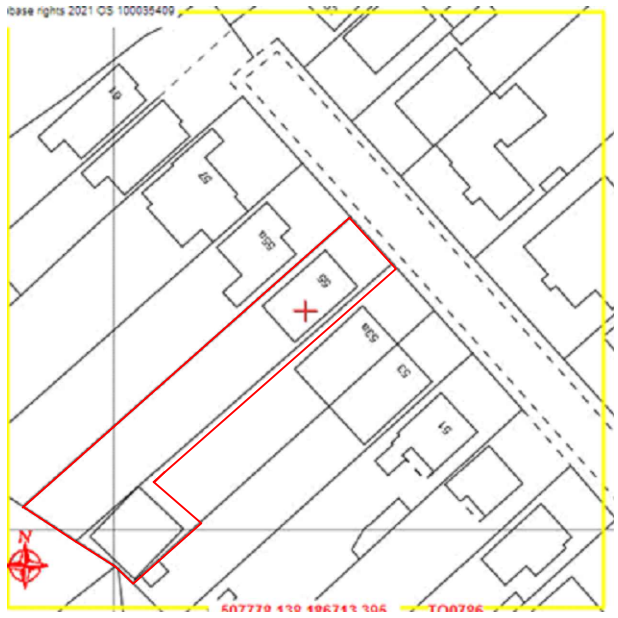
EXISTING BOUNDARY
REPOSITIONED

1400

1000

PROPOSED BLOCK PLAN

1:200



SITE LOCATION PLAN

1:1250

Rev	Description	Date

KDA Designs Ltd.
Architectural & Structural Services
T:020 8909 9433
M:07739 427023
kevin@kdadesigns.co.uk

Project

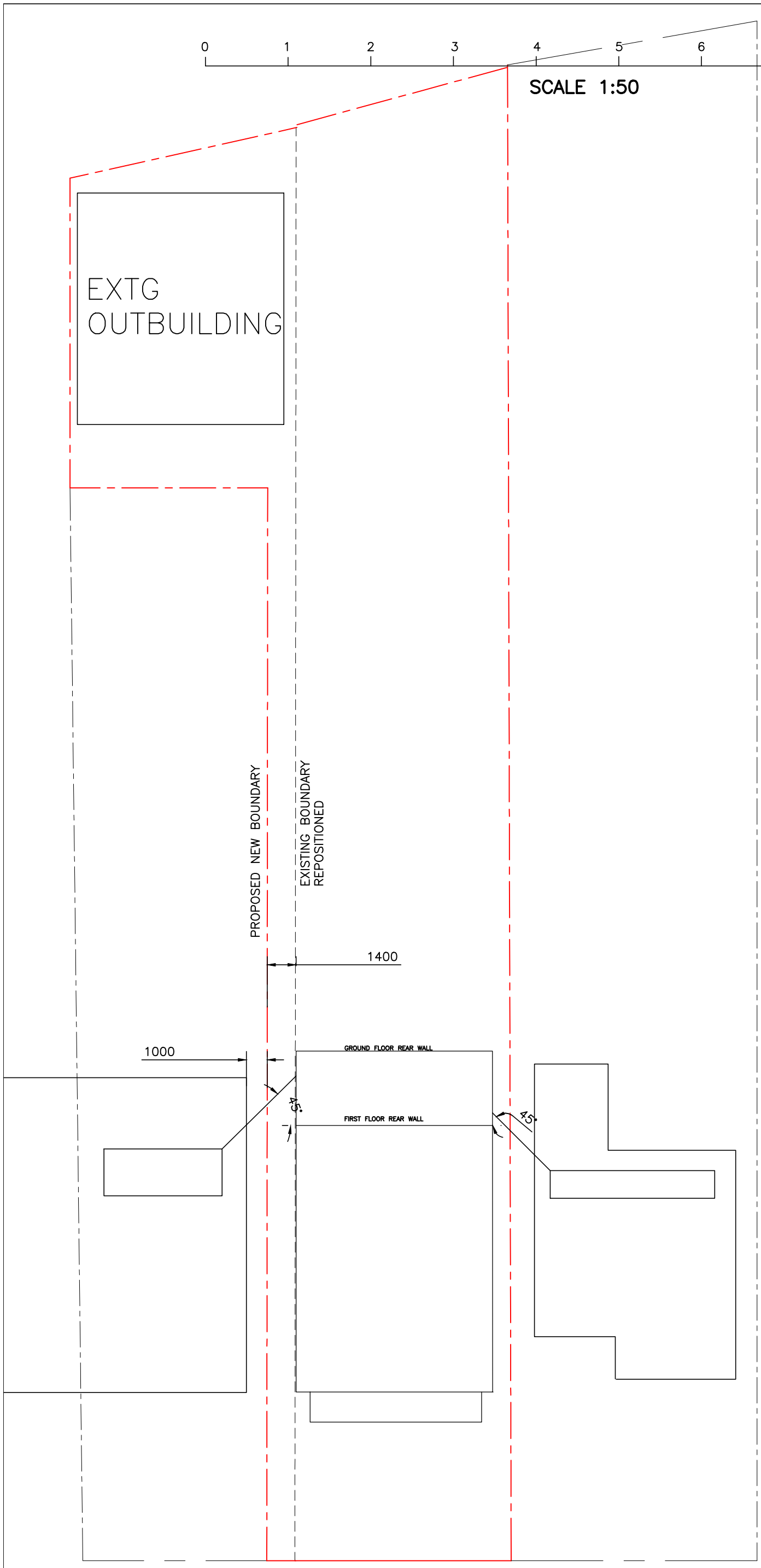
PROPOSED DEMOLITION OF EXISITNG BUNGALOW & ERECTION OF NEW TWO STOREY DWELLING

55 PARKFIELD ROAD
ICKENHAM
UB10 8LW

Drawing

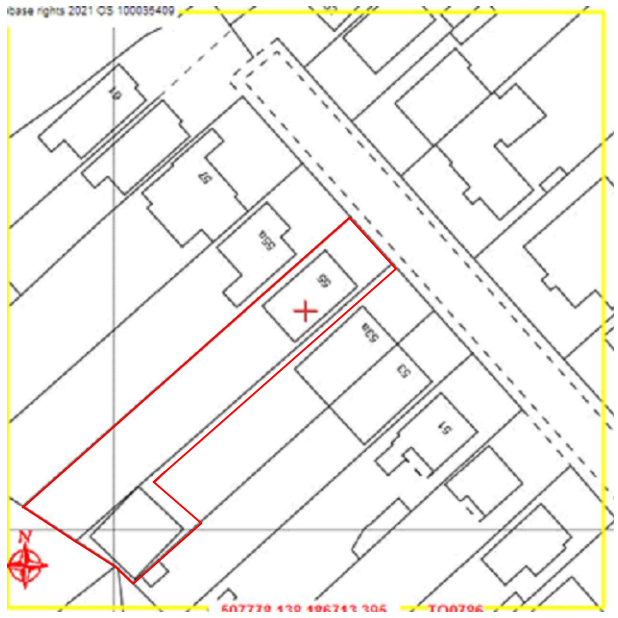
PROPOSED BLOCK PLAN

Drawn KDA	Checked
Scale A3@1:50	Date NOV 2021
	Drg. No.



PROPOSED BLOCK PLAN

1:200



SITE LOCATION PLAN

1:1250

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PROPOSED DEMOLITION OF EXISITNG BUNGALOW & ERECTION OF NEW TWO STOREY DWELLING

55 PARKFIELD ROAD
ICKENHAM
UB10 8LW

Drawing

PROPOSED BLOCK PLAN

Drawn	KDA	Checked	
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		Drg. No.	55PR/P100

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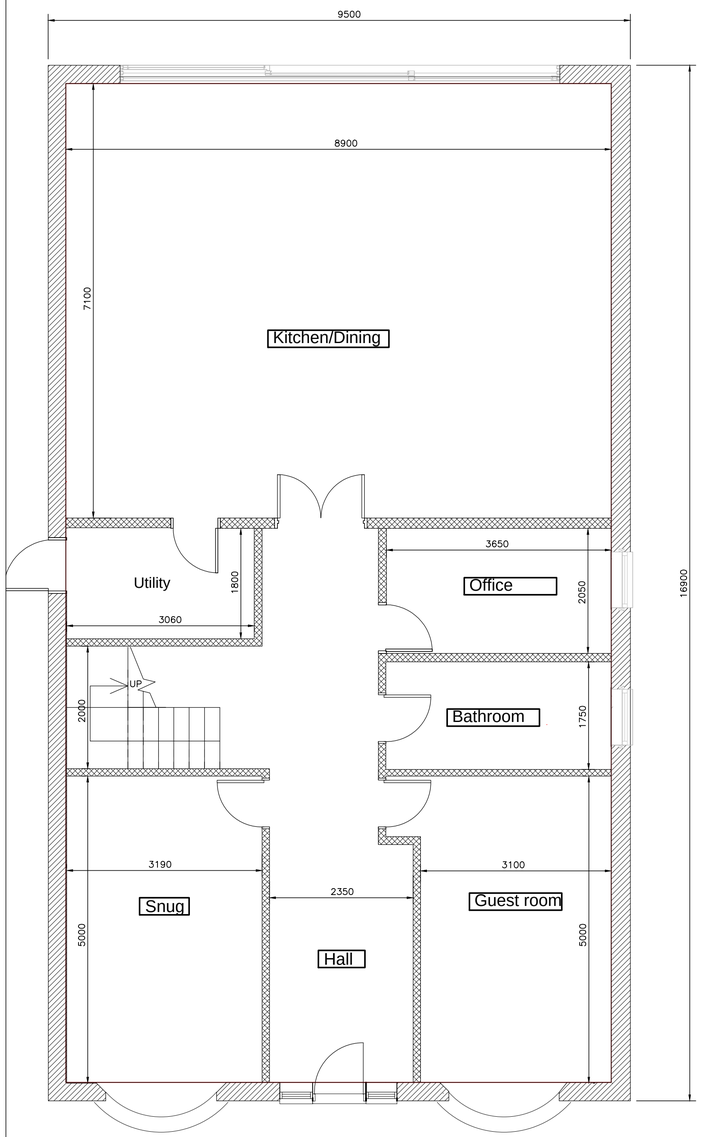
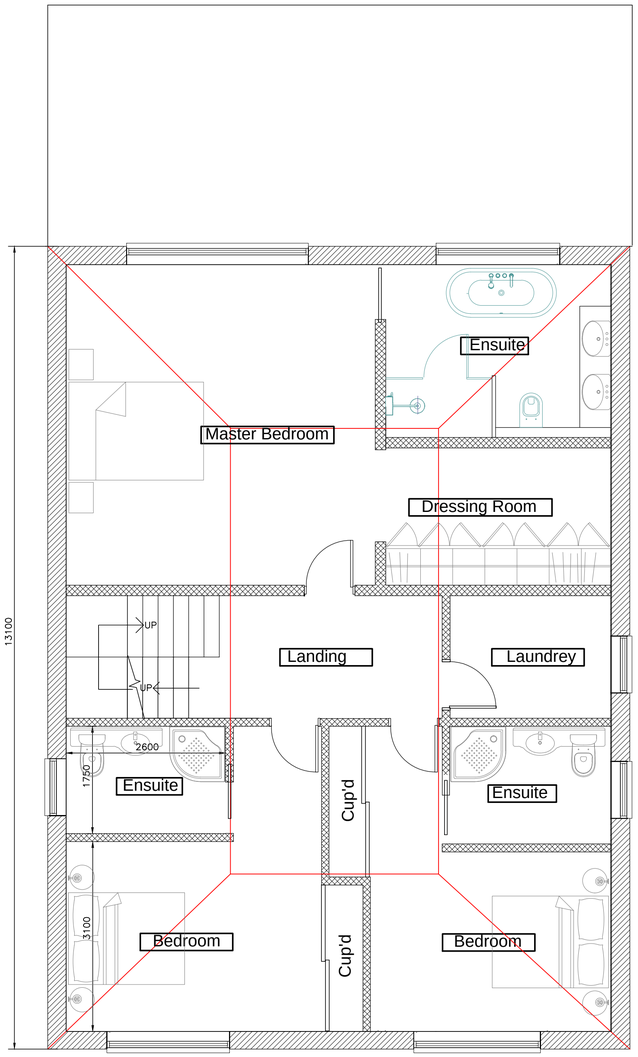
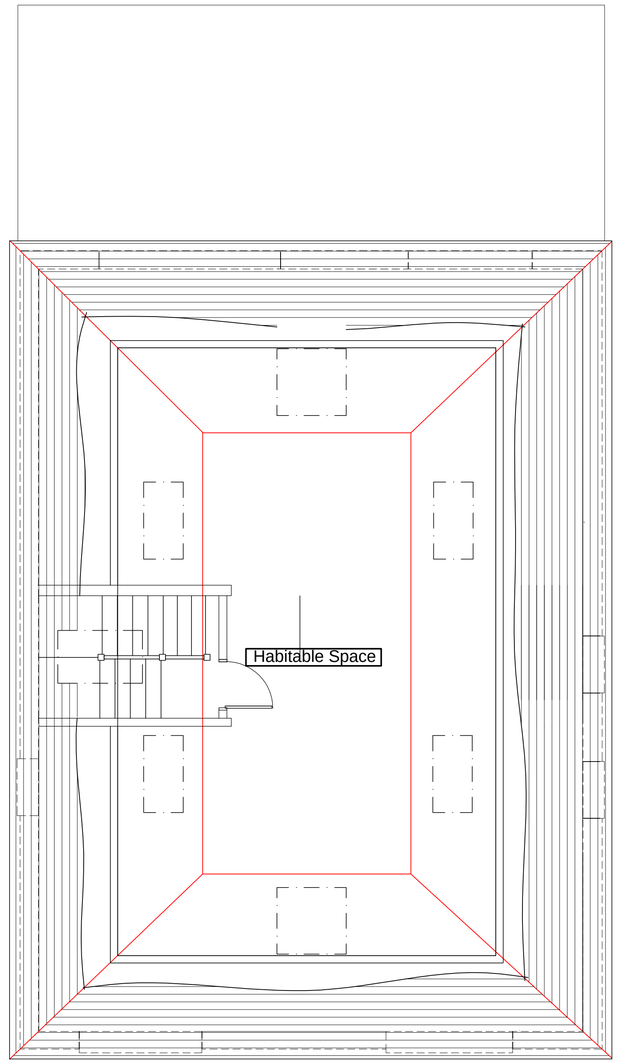
SCALE 1:50



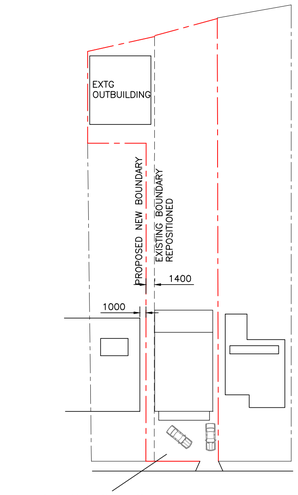
PROPOSED GROUND FLOOR PLAN



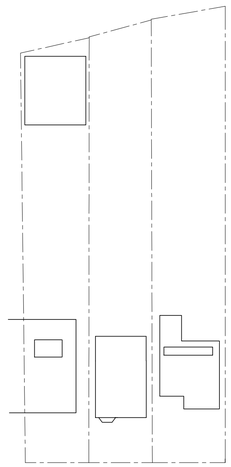
PROPOSED FIRST FLOOR PLAN



PROPOSED 2nd FLOOR PLAN



PROPOSED BLOCK PLAN
1:500



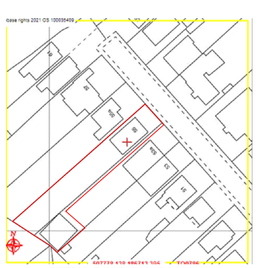
EXISTING BLOCK PLAN
1:500

FLOOR AREAR CALCULATION

Ground floor area = 145m2
First floor area = 111m2
2nd floor area = 61m2
TOTAL FLOOR AREA = 317m2
75% of 317m2 = 237m2

Total floor area @2.5metres height = 145m2 + 111m2 + 24m2 = 280m2
(Ground) (First) (Second)

280m2>237m2



SITE LOCATION PLAN
1:1250

Rev	Description	Date

KDA Designs Ltd.
Architectural & Structural Services
kevin@kdadesigns.co.uk

Project
PROPOSED DEMOLITION OF EXISITNG BUNGALOW & ERECTION OF NEW TWO STOREY DWELLING

55 PARKFIELD ROAD
ICKENHAM
UB10 8LW

Drawing
PROPOSED PLANS

Drawn	KDA	Checked	
Scale	A1@1:50	Date	NOV 2021

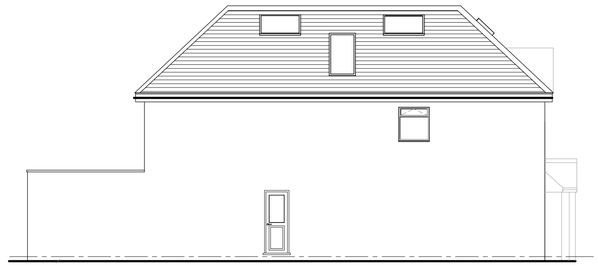
Stage	Drg. No.	Rev
P	55PR/P200	A

0 1 2 3 4 5 6 7 8 9 10

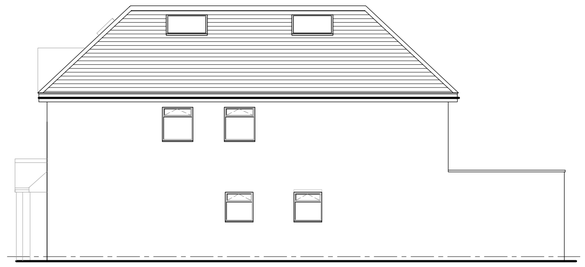
SCALE 1:50

PROPOSED FRONT ELEVATION
1:100

PROPOSED REAR ELEVATION
1:100

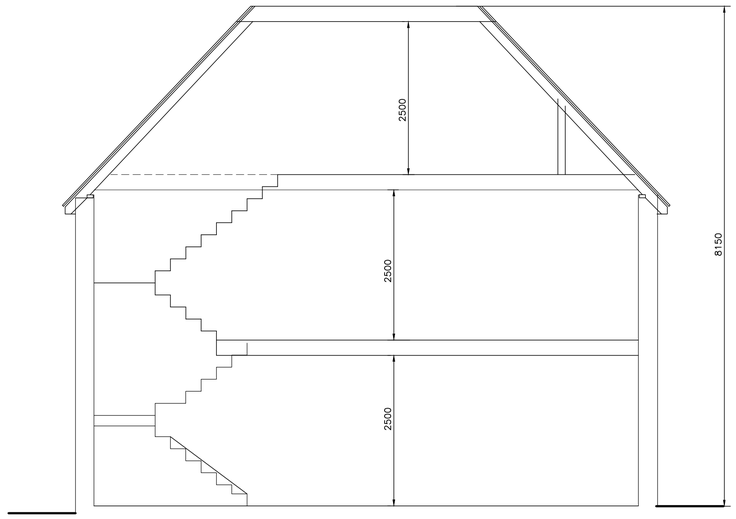


PROPOSED SIDE ELEVATION
1:100

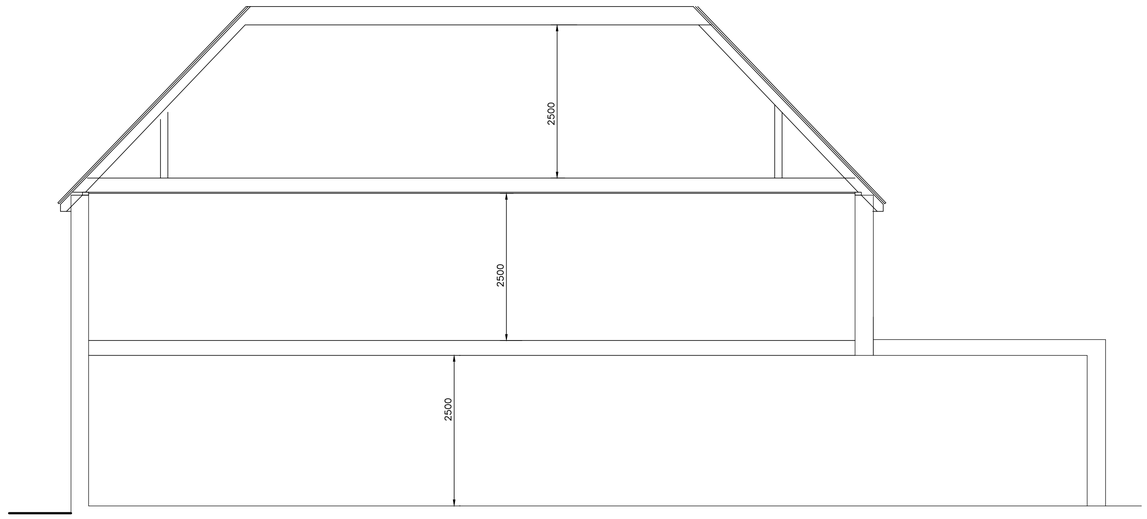


PROPOSED SIDE ELEVATION
1:100

PROPOSED STREET SCENE
1:100



SECTION A – A



SECTION B – B

Rev	Description	Date

KDA Designs Ltd.
Architectural & Structural Services
kevin@kdadesigns.co.uk

Project
PROPOSED DEMOLITION OF EXISITNG BUNGALOW & ERECTION OF NEW TWO STOREY DWELLING

55 PARKFIELD ROAD
ICKENHAM
UB10 8LW

Drawing
PROPOSED ELEVATIONS & SECTIONS

Drawn	Checked
KDA	
Scale	Date
A1@1:50	NOV 2021

Stage	Drg. No.	Rev
P	55PR/P300	B

Asset location search

Property Searches

Ambiental Environmental Assessment
Science Park Square
BRIGHTON
BN1 9SB

Search address supplied Parkfield Road
55
Parkfield Road
Ickenham
Uxbridge
UB10 8LW

Your reference 6709

Our reference ALS/ALS/24/2022_4667699

Search date 21 June 2022

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

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

0800 009 4540

Asset location search

Property Searches

Search address supplied: Parkfield Road, 55, Parkfield Road, Ickenham, Uxbridge, UB10 8LW

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

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.

With regard to the fresh water supply, this site falls within the boundary of another water company. For more information, please redirect your enquiry to the following address:

Affinity Water Ltd
Tamblin Way
Hatfield

Asset location search

Thames Water Property Searches

AL10 9EZ
Tel: 0345 3572401

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

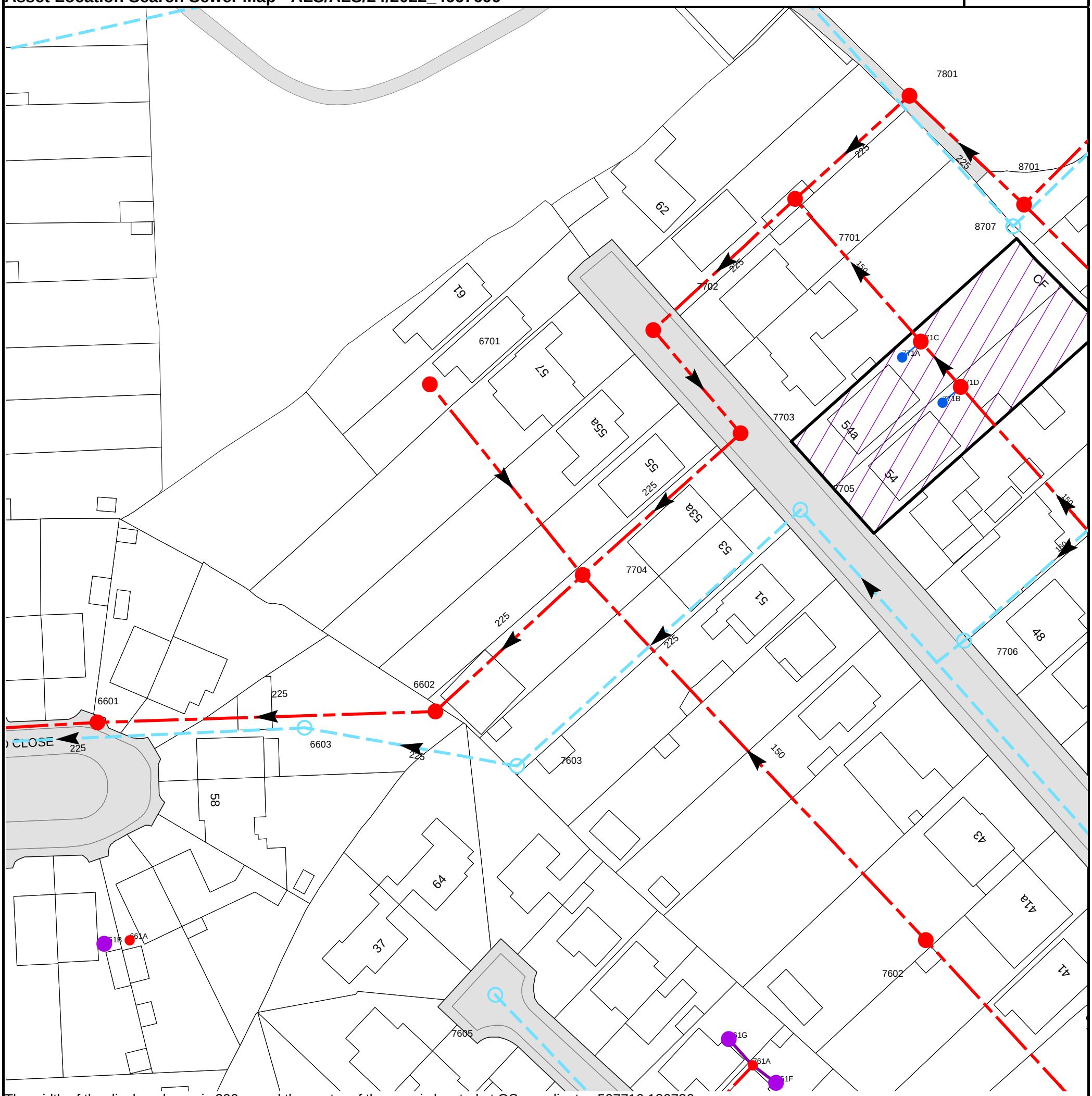
Clean Water queries

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/24/2022_4667699



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 507716,186726

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.

Based on the Ordnance Survey Map (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

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
761F	n/a	n/a
761G	n/a	n/a
8707	n/a	n/a
8701	42.71	39.46
7701	42.69	39.27
7801	42.74	39.36
7603	n/a	n/a
7704	n/a	n/a
7702	42.33	39.16
7703	42.12	39.08
761A	n/a	n/a
7705	n/a	n/a
771A	n/a	n/a
771C	n/a	n/a
7602	41.19	39.63
771B	n/a	n/a
771D	n/a	n/a
7706	n/a	n/a
6601	40.72	38.6
661B	n/a	n/a
661A	n/a	n/a
6603	n/a	n/a
6701	42.09	41.33
6602	40.69	38.13
7605	41.68	40.34

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.

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 14 days from due 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. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. 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'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. 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 not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

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 0121 345 1000 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**	**Cheque**
Call **0800 009 4540** quoting your invoice number starting CBA or ADS / OSS	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	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Appendix C – Proposed Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	0.098	Urban	0.000
SAAR (mm)	689	Region Number	Region 6

Results l/s

QBAR Rural	0.2
QBAR Urban	0.2
Q100 years	0.6
Q1 year	0.1
Q30 years	0.4
Q100 years	0.6

Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	42.064	0.064	2.8	0.1	O K
30 min Summer	42.056	0.056	2.6	0.1	O K
60 min Summer	42.048	0.048	1.9	0.1	O K
120 min Summer	42.037	0.037	1.3	0.0	O K
180 min Summer	42.031	0.031	1.0	0.0	O K
240 min Summer	42.028	0.028	0.8	0.0	O K
360 min Summer	42.024	0.024	0.6	0.0	O K
480 min Summer	42.022	0.022	0.5	0.0	O K
600 min Summer	42.021	0.021	0.4	0.0	O K
720 min Summer	42.020	0.020	0.4	0.0	O K
960 min Summer	42.019	0.019	0.3	0.0	O K
1440 min Summer	42.016	0.016	0.2	0.0	O K
2160 min Summer	42.013	0.013	0.2	0.0	O K
2880 min Summer	42.012	0.012	0.1	0.0	O K
4320 min Summer	42.010	0.010	0.1	0.0	O K
5760 min Summer	42.010	0.010	0.1	0.0	O K
7200 min Summer	42.009	0.009	0.1	0.0	O K
8640 min Summer	42.008	0.008	0.1	0.0	O K
10080 min Summer	42.007	0.007	0.1	0.0	O K
15 min Winter	42.063	0.063	2.8	0.1	O K
30 min Winter	42.053	0.053	2.3	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	31.358	0.0	1.2	10
30 min Summer	20.400	0.0	1.5	18
60 min Summer	12.872	0.0	1.9	34
120 min Summer	7.956	0.0	2.4	62
180 min Summer	5.975	0.0	2.7	90
240 min Summer	4.871	0.0	2.9	122
360 min Summer	3.630	0.0	3.3	186
480 min Summer	2.938	0.0	3.5	242
600 min Summer	2.493	0.0	3.7	304
720 min Summer	2.180	0.0	3.9	364
960 min Summer	1.764	0.0	4.2	474
1440 min Summer	1.310	0.0	4.7	714
2160 min Summer	0.973	0.0	5.3	1080
2880 min Summer	0.787	0.0	5.7	1468
4320 min Summer	0.584	0.0	6.3	2132
5760 min Summer	0.473	0.0	6.8	2872
7200 min Summer	0.401	0.0	7.2	3544
8640 min Summer	0.351	0.0	7.6	4256
10080 min Summer	0.314	0.0	7.9	5496
15 min Winter	31.358	0.0	1.3	10
30 min Winter	20.400	0.0	1.7	18

Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	42.043	0.043	1.6	0.0	O K
120 min Winter	42.031	0.031	1.0	0.0	O K
180 min Winter	42.027	0.027	0.7	0.0	O K
240 min Winter	42.024	0.024	0.6	0.0	O K
360 min Winter	42.021	0.021	0.4	0.0	O K
480 min Winter	42.020	0.020	0.4	0.0	O K
600 min Winter	42.019	0.019	0.3	0.0	O K
720 min Winter	42.018	0.018	0.3	0.0	O K
960 min Winter	42.015	0.015	0.2	0.0	O K
1440 min Winter	42.013	0.013	0.2	0.0	O K
2160 min Winter	42.011	0.011	0.1	0.0	O K
2880 min Winter	42.010	0.010	0.1	0.0	O K
4320 min Winter	42.009	0.009	0.1	0.0	O K
5760 min Winter	42.007	0.007	0.1	0.0	O K
7200 min Winter	42.008	0.008	0.1	0.0	O K
8640 min Winter	42.007	0.007	0.1	0.0	O K
10080 min Winter	42.007	0.007	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	12.872	0.0	2.2	32
120 min Winter	7.956	0.0	2.7	62
180 min Winter	5.975	0.0	3.0	90
240 min Winter	4.871	0.0	3.3	120
360 min Winter	3.630	0.0	3.7	186
480 min Winter	2.938	0.0	3.9	238
600 min Winter	2.493	0.0	4.2	286
720 min Winter	2.180	0.0	4.4	364
960 min Winter	1.764	0.0	4.7	478
1440 min Winter	1.310	0.0	5.3	722
2160 min Winter	0.973	0.0	5.9	1000
2880 min Winter	0.787	0.0	6.3	1468
4320 min Winter	0.584	0.0	7.1	2128
5760 min Winter	0.473	0.0	7.6	3552
7200 min Winter	0.401	0.0	8.1	3032
8640 min Winter	0.351	0.0	8.5	4696
10080 min Winter	0.314	0.0	8.9	5024

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Shortest Storm (mins)	15
Ratio R	0.408	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.020

Time (mins) From:	To:	Area (ha)
0	4	0.020

Model Details

Storage is Online Cover Level (m) 42.300

Pipe Structure

Diameter (m)	0.300	Length (m)	1.000
Slope (1:X)	150.000	Invert Level (m)	42.000

Pipe Outflow Control

Diameter (m)	0.300	Entry Loss Coefficient	0.500
Slope (1:X)	150.0	Coefficient of Contraction	0.600
Length (m)	1.000	Upstream Invert Level (m)	42.000
Roughness k (mm)	0.600		

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	42.125	0.125	7.7	0.2	O K
30 min Summer	42.111	0.111	6.8	0.1	O K
60 min Summer	42.087	0.087	4.8	0.1	O K
120 min Summer	42.060	0.060	2.8	0.1	O K
180 min Summer	42.052	0.052	2.3	0.1	O K
240 min Summer	42.047	0.047	1.8	0.1	O K
360 min Summer	42.038	0.038	1.3	0.0	O K
480 min Summer	42.034	0.034	1.1	0.0	O K
600 min Summer	42.030	0.030	0.9	0.0	O K
720 min Summer	42.028	0.028	0.8	0.0	O K
960 min Summer	42.025	0.025	0.6	0.0	O K
1440 min Summer	42.022	0.022	0.5	0.0	O K
2160 min Summer	42.019	0.019	0.3	0.0	O K
2880 min Summer	42.018	0.018	0.3	0.0	O K
4320 min Summer	42.014	0.014	0.2	0.0	O K
5760 min Summer	42.013	0.013	0.2	0.0	O K
7200 min Summer	42.012	0.012	0.1	0.0	O K
8640 min Summer	42.011	0.011	0.1	0.0	O K
10080 min Summer	42.010	0.010	0.1	0.0	O K
15 min Winter	42.122	0.122	7.7	0.1	O K
30 min Winter	42.101	0.101	6.0	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	76.950	0.0	2.9	10
30 min Summer	49.929	0.0	3.7	17
60 min Summer	30.968	0.0	4.6	30
120 min Summer	18.643	0.0	5.6	64
180 min Summer	13.709	0.0	6.2	92
240 min Summer	10.975	0.0	6.6	122
360 min Summer	8.005	0.0	7.2	188
480 min Summer	6.396	0.0	7.7	246
600 min Summer	5.371	0.0	8.1	298
720 min Summer	4.655	0.0	8.4	358
960 min Summer	3.713	0.0	8.9	486
1440 min Summer	2.696	0.0	9.7	730
2160 min Summer	1.956	0.0	10.6	1084
2880 min Summer	1.556	0.0	11.2	1448
4320 min Summer	1.127	0.0	12.2	2188
5760 min Summer	0.896	0.0	12.9	2840
7200 min Summer	0.749	0.0	13.5	3664
8640 min Summer	0.647	0.0	14.0	4224
10080 min Summer	0.572	0.0	14.4	4976
15 min Winter	76.950	0.0	3.2	10
30 min Winter	49.929	0.0	4.2	17

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	42.081	0.081	4.1	0.1	O K
120 min Winter	42.052	0.052	2.3	0.1	O K
180 min Winter	42.044	0.044	1.7	0.1	O K
240 min Winter	42.040	0.040	1.4	0.0	O K
360 min Winter	42.031	0.031	0.9	0.0	O K
480 min Winter	42.027	0.027	0.8	0.0	O K
600 min Winter	42.025	0.025	0.7	0.0	O K
720 min Winter	42.024	0.024	0.6	0.0	O K
960 min Winter	42.022	0.022	0.5	0.0	O K
1440 min Winter	42.019	0.019	0.3	0.0	O K
2160 min Winter	42.016	0.016	0.2	0.0	O K
2880 min Winter	42.014	0.014	0.2	0.0	O K
4320 min Winter	42.012	0.012	0.1	0.0	O K
5760 min Winter	42.011	0.011	0.1	0.0	O K
7200 min Winter	42.010	0.010	0.1	0.0	O K
8640 min Winter	42.010	0.010	0.1	0.0	O K
10080 min Winter	42.009	0.009	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	30.968	0.0	5.2	34
120 min Winter	18.643	0.0	6.3	64
180 min Winter	13.709	0.0	6.9	92
240 min Winter	10.975	0.0	7.4	110
360 min Winter	8.005	0.0	8.1	180
480 min Winter	6.396	0.0	8.6	250
600 min Winter	5.371	0.0	9.0	308
720 min Winter	4.655	0.0	9.4	374
960 min Winter	3.713	0.0	10.0	496
1440 min Winter	2.696	0.0	10.9	680
2160 min Winter	1.956	0.0	11.8	1060
2880 min Winter	1.556	0.0	12.6	1468
4320 min Winter	1.127	0.0	13.6	2116
5760 min Winter	0.896	0.0	14.5	2904
7200 min Winter	0.749	0.0	15.1	3376
8640 min Winter	0.647	0.0	15.7	4264
10080 min Winter	0.572	0.0	16.2	5280

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Shortest Storm (mins)	15
Ratio R	0.408	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.020

Time (mins) From:	To:	Area (ha)
0	4	0.020

Model Details

Storage is Online Cover Level (m) 42.300

Pipe Structure

Diameter (m)	0.300	Length (m)	1.000
Slope (1:X)	150.000	Invert Level (m)	42.000

Pipe Outflow Control

Diameter (m)	0.300	Entry Loss Coefficient	0.500
Slope (1:X)	150.0	Coefficient of Contraction	0.600
Length (m)	1.000	Upstream Invert Level (m)	42.000
Roughness k (mm)	0.600		

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	42.153	0.153	10.3	0.2	Flood Risk
30 min Summer	42.137	0.137	8.5	0.2	O K
60 min Summer	42.106	0.106	6.4	0.1	O K
120 min Summer	42.077	0.077	3.8	0.1	O K
180 min Summer	42.064	0.064	2.8	0.1	O K
240 min Summer	42.053	0.053	2.3	0.1	O K
360 min Summer	42.045	0.045	1.7	0.1	O K
480 min Summer	42.040	0.040	1.4	0.0	O K
600 min Summer	42.037	0.037	1.2	0.0	O K
720 min Summer	42.032	0.032	1.0	0.0	O K
960 min Summer	42.028	0.028	0.8	0.0	O K
1440 min Summer	42.024	0.024	0.6	0.0	O K
2160 min Summer	42.021	0.021	0.4	0.0	O K
2880 min Summer	42.019	0.019	0.3	0.0	O K
4320 min Summer	42.017	0.017	0.2	0.0	O K
5760 min Summer	42.014	0.014	0.2	0.0	O K
7200 min Summer	42.013	0.013	0.2	0.0	O K
8640 min Summer	42.012	0.012	0.1	0.0	O K
10080 min Summer	42.012	0.012	0.1	0.0	O K
15 min Winter	42.147	0.147	9.4	0.2	O K
30 min Winter	42.121	0.121	7.2	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	99.910	0.0	3.7	9
30 min Summer	65.368	0.0	4.9	17
60 min Summer	40.718	0.0	6.1	30
120 min Summer	24.497	0.0	7.3	60
180 min Summer	17.956	0.0	8.1	92
240 min Summer	14.318	0.0	8.6	124
360 min Summer	10.382	0.0	9.3	186
480 min Summer	8.263	0.0	9.9	238
600 min Summer	6.917	0.0	10.4	300
720 min Summer	5.979	0.0	10.8	362
960 min Summer	4.748	0.0	11.4	488
1440 min Summer	3.425	0.0	12.3	736
2160 min Summer	2.467	0.0	13.3	1068
2880 min Summer	1.952	0.0	14.1	1464
4320 min Summer	1.402	0.0	15.1	2152
5760 min Summer	1.108	0.0	16.0	2848
7200 min Summer	0.922	0.0	16.6	3600
8640 min Summer	0.794	0.0	17.2	4328
10080 min Summer	0.699	0.0	17.6	5032
15 min Winter	99.910	0.0	4.2	10
30 min Winter	65.368	0.0	5.5	18

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	42.091	0.091	4.8	0.1	O K
120 min Winter	42.064	0.064	2.8	0.1	O K
180 min Winter	42.052	0.052	2.3	0.1	O K
240 min Winter	42.046	0.046	1.8	0.1	O K
360 min Winter	42.037	0.037	1.3	0.0	O K
480 min Winter	42.032	0.032	1.0	0.0	O K
600 min Winter	42.029	0.029	0.8	0.0	O K
720 min Winter	42.027	0.027	0.8	0.0	O K
960 min Winter	42.024	0.024	0.6	0.0	O K
1440 min Winter	42.021	0.021	0.4	0.0	O K
2160 min Winter	42.019	0.019	0.3	0.0	O K
2880 min Winter	42.017	0.017	0.2	0.0	O K
4320 min Winter	42.014	0.014	0.2	0.0	O K
5760 min Winter	42.012	0.012	0.1	0.0	O K
7200 min Winter	42.011	0.011	0.1	0.0	O K
8640 min Winter	42.010	0.010	0.1	0.0	O K
10080 min Winter	42.010	0.010	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	40.718	0.0	6.8	32
120 min Winter	24.497	0.0	8.2	64
180 min Winter	17.956	0.0	9.0	102
240 min Winter	14.318	0.0	9.6	120
360 min Winter	10.382	0.0	10.5	184
480 min Winter	8.263	0.0	11.1	230
600 min Winter	6.917	0.0	11.6	312
720 min Winter	5.979	0.0	12.1	368
960 min Winter	4.748	0.0	12.8	482
1440 min Winter	3.425	0.0	13.8	736
2160 min Winter	2.467	0.0	14.9	1156
2880 min Winter	1.952	0.0	15.7	1432
4320 min Winter	1.402	0.0	17.0	2240
5760 min Winter	1.108	0.0	17.9	2688
7200 min Winter	0.922	0.0	18.6	3512
8640 min Winter	0.794	0.0	19.2	4088
10080 min Winter	0.699	0.0	19.7	4928

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Shortest Storm (mins)	15
Ratio R	0.408	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.020

Time (mins) From:	To:	Area (ha)
0	4	0.020

Model Details

Storage is Online Cover Level (m) 42.300

Pipe Structure

Diameter (m)	0.300	Length (m)	1.000
Slope (1:X)	150.000	Invert Level (m)	42.000

Pipe Outflow Control

Diameter (m)	0.300	Entry Loss Coefficient	0.500
Slope (1:X)	150.0	Coefficient of Contraction	0.600
Length (m)	1.000	Upstream Invert Level (m)	42.000
Roughness k (mm)	0.600		

Summary of Results for 1 year Return Period (+40%)

Half Drain Time : 88 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	41.762	0.062	0.0	0.3	0.3	1.8	O K
30 min Summer	41.781	0.081	0.0	0.3	0.3	2.3	O K
60 min Summer	41.796	0.096	0.0	0.4	0.4	2.7	O K
120 min Summer	41.806	0.106	0.0	0.4	0.4	3.0	O K
180 min Summer	41.810	0.110	0.0	0.4	0.4	3.1	O K
240 min Summer	41.811	0.111	0.0	0.4	0.4	3.2	O K
360 min Summer	41.808	0.108	0.0	0.4	0.4	3.1	O K
480 min Summer	41.803	0.103	0.0	0.4	0.4	2.9	O K
600 min Summer	41.797	0.097	0.0	0.4	0.4	2.8	O K
720 min Summer	41.791	0.091	0.0	0.4	0.4	2.6	O K
960 min Summer	41.781	0.081	0.0	0.3	0.3	2.3	O K
1440 min Summer	41.766	0.066	0.0	0.3	0.3	1.9	O K
2160 min Summer	41.751	0.051	0.0	0.3	0.3	1.5	O K
2880 min Summer	41.742	0.042	0.0	0.2	0.2	1.2	O K
4320 min Summer	41.734	0.034	0.0	0.2	0.2	1.0	O K
5760 min Summer	41.729	0.029	0.0	0.1	0.1	0.8	O K
7200 min Summer	41.726	0.026	0.0	0.1	0.1	0.8	O K
8640 min Summer	41.724	0.024	0.0	0.1	0.1	0.7	O K
10080 min Summer	41.723	0.023	0.0	0.1	0.1	0.6	O K
15 min Winter	41.771	0.071	0.0	0.3	0.3	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	43.901	0.0	1.9	18
30 min Summer	28.560	0.0	2.6	32
60 min Summer	18.021	0.0	3.4	58
120 min Summer	11.139	0.0	4.3	88
180 min Summer	8.365	0.0	4.9	122
240 min Summer	6.820	0.0	5.4	156
360 min Summer	5.082	0.0	6.1	224
480 min Summer	4.113	0.0	6.6	290
600 min Summer	3.490	0.0	7.0	356
720 min Summer	3.052	0.0	7.3	420
960 min Summer	2.470	0.0	7.9	542
1440 min Summer	1.833	0.0	8.8	782
2160 min Summer	1.362	0.0	9.7	1148
2880 min Summer	1.102	0.0	10.4	1500
4320 min Summer	0.817	0.0	11.4	2204
5760 min Summer	0.662	0.0	12.2	2936
7200 min Summer	0.562	0.0	12.8	3672
8640 min Summer	0.492	0.0	13.2	4408
10080 min Summer	0.439	0.0	13.6	5136
15 min Winter	43.901	0.0	2.2	18

Summary of Results for 1 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	41.793	0.093	0.0	0.4	0.4	2.7	O K
60 min Winter	41.810	0.110	0.0	0.4	0.4	3.1	O K
120 min Winter	41.820	0.120	0.0	0.4	0.4	3.4	O K
180 min Winter	41.822	0.122	0.0	0.4	0.4	3.5	O K
240 min Winter	41.821	0.121	0.0	0.4	0.4	3.5	O K
360 min Winter	41.814	0.114	0.0	0.4	0.4	3.2	O K
480 min Winter	41.804	0.104	0.0	0.4	0.4	3.0	O K
600 min Winter	41.796	0.096	0.0	0.4	0.4	2.7	O K
720 min Winter	41.788	0.088	0.0	0.4	0.4	2.5	O K
960 min Winter	41.774	0.074	0.0	0.3	0.3	2.1	O K
1440 min Winter	41.756	0.056	0.0	0.3	0.3	1.6	O K
2160 min Winter	41.740	0.040	0.0	0.2	0.2	1.1	O K
2880 min Winter	41.734	0.034	0.0	0.2	0.2	1.0	O K
4320 min Winter	41.727	0.027	0.0	0.1	0.1	0.8	O K
5760 min Winter	41.724	0.024	0.0	0.1	0.1	0.7	O K
7200 min Winter	41.722	0.022	0.0	0.1	0.1	0.6	O K
8640 min Winter	41.720	0.020	0.0	0.1	0.1	0.6	O K
10080 min Winter	41.718	0.018	0.0	0.1	0.1	0.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	28.560	0.0	3.0	31
60 min Winter	18.021	0.0	3.9	58
120 min Winter	11.139	0.0	4.9	94
180 min Winter	8.365	0.0	5.6	132
240 min Winter	6.820	0.0	6.1	170
360 min Winter	5.082	0.0	6.9	240
480 min Winter	4.113	0.0	7.4	310
600 min Winter	3.490	0.0	7.9	374
720 min Winter	3.052	0.0	8.3	440
960 min Winter	2.470	0.0	8.9	566
1440 min Winter	1.833	0.0	9.9	808
2160 min Winter	1.362	0.0	11.0	1148
2880 min Winter	1.102	0.0	11.8	1496
4320 min Winter	0.817	0.0	13.0	2248
5760 min Winter	0.662	0.0	13.9	2992
7200 min Winter	0.562	0.0	14.5	3640
8640 min Winter	0.492	0.0	15.1	4336
10080 min Winter	0.439	0.0	15.5	5240

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Shortest Storm (mins)	15
Ratio R	0.408	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.029

Time (mins) From:	To:	Area (ha)
0	4	0.029

Model Details

Storage is Online Cover Level (m) 42.300

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.5
Max Percolation (l/s)	26.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	41.700	Membrane Depth (m)	0

Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 41.700

Summary of Results for 30 year Return Period (+40%)

Half Drain Time : 128 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	41.878	0.178	0.0	0.5	0.5	5.1	O K
30 min Summer	41.927	0.227	0.0	0.6	0.6	6.5	O K
60 min Summer	41.966	0.266	0.0	0.7	0.7	7.6	O K
120 min Summer	41.984	0.284	0.0	0.7	0.7	8.1	O K
180 min Summer	41.987	0.287	0.0	0.7	0.7	8.2	O K
240 min Summer	41.985	0.285	0.0	0.7	0.7	8.1	O K
360 min Summer	41.974	0.274	0.0	0.7	0.7	7.8	O K
480 min Summer	41.961	0.261	0.0	0.7	0.7	7.4	O K
600 min Summer	41.947	0.247	0.0	0.6	0.6	7.0	O K
720 min Summer	41.934	0.234	0.0	0.6	0.6	6.7	O K
960 min Summer	41.909	0.209	0.0	0.6	0.6	6.0	O K
1440 min Summer	41.870	0.170	0.0	0.5	0.5	4.9	O K
2160 min Summer	41.831	0.131	0.0	0.4	0.4	3.7	O K
2880 min Summer	41.804	0.104	0.0	0.4	0.4	3.0	O K
4320 min Summer	41.773	0.073	0.0	0.3	0.3	2.1	O K
5760 min Summer	41.755	0.055	0.0	0.3	0.3	1.6	O K
7200 min Summer	41.745	0.045	0.0	0.2	0.2	1.3	O K
8640 min Summer	41.738	0.038	0.0	0.2	0.2	1.1	O K
10080 min Summer	41.734	0.034	0.0	0.2	0.2	1.0	O K
15 min Winter	41.902	0.202	0.0	0.6	0.6	5.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	107.730	0.0	5.3	18
30 min Summer	69.901	0.0	7.1	32
60 min Summer	43.355	0.0	8.9	60
120 min Summer	26.100	0.0	10.8	100
180 min Summer	19.193	0.0	12.0	132
240 min Summer	15.365	0.0	12.8	166
360 min Summer	11.207	0.0	14.1	234
480 min Summer	8.954	0.0	15.0	302
600 min Summer	7.519	0.0	15.7	370
720 min Summer	6.517	0.0	16.4	434
960 min Summer	5.198	0.0	17.4	566
1440 min Summer	3.775	0.0	18.9	812
2160 min Summer	2.738	0.0	20.5	1188
2880 min Summer	2.179	0.0	21.7	1532
4320 min Summer	1.578	0.0	23.3	2248
5760 min Summer	1.254	0.0	24.6	2952
7200 min Summer	1.049	0.0	25.5	3680
8640 min Summer	0.906	0.0	26.2	4408
10080 min Summer	0.801	0.0	26.8	5136
15 min Winter	107.730	0.0	6.0	18

Summary of Results for 30 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	41.958	0.258	0.0	0.6	0.6	7.4	O K
60 min Winter	42.003	0.303	0.0	0.7	0.7	8.6	O K
120 min Winter	42.023	0.323	0.0	0.7	0.7	9.2	O K
180 min Winter	42.024	0.324	0.0	0.7	0.7	9.2	O K
240 min Winter	42.019	0.319	0.0	0.7	0.7	9.1	O K
360 min Winter	42.001	0.301	0.0	0.7	0.7	8.6	O K
480 min Winter	41.980	0.280	0.0	0.7	0.7	8.0	O K
600 min Winter	41.959	0.259	0.0	0.6	0.6	7.4	O K
720 min Winter	41.940	0.240	0.0	0.6	0.6	6.8	O K
960 min Winter	41.906	0.206	0.0	0.6	0.6	5.9	O K
1440 min Winter	41.855	0.155	0.0	0.5	0.5	4.4	O K
2160 min Winter	41.808	0.108	0.0	0.4	0.4	3.1	O K
2880 min Winter	41.780	0.080	0.0	0.3	0.3	2.3	O K
4320 min Winter	41.752	0.052	0.0	0.3	0.3	1.5	O K
5760 min Winter	41.738	0.038	0.0	0.2	0.2	1.1	O K
7200 min Winter	41.733	0.033	0.0	0.2	0.2	0.9	O K
8640 min Winter	41.730	0.030	0.0	0.2	0.2	0.8	O K
10080 min Winter	41.727	0.027	0.0	0.1	0.1	0.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	69.901	0.0	8.0	32
60 min Winter	43.355	0.0	10.1	60
120 min Winter	26.100	0.0	12.2	112
180 min Winter	19.193	0.0	13.5	140
240 min Winter	15.365	0.0	14.4	178
360 min Winter	11.207	0.0	15.8	254
480 min Winter	8.954	0.0	16.9	326
600 min Winter	7.519	0.0	17.7	396
720 min Winter	6.517	0.0	18.4	464
960 min Winter	5.198	0.0	19.6	596
1440 min Winter	3.775	0.0	21.3	852
2160 min Winter	2.738	0.0	23.1	1212
2880 min Winter	2.179	0.0	24.4	1560
4320 min Winter	1.578	0.0	26.3	2252
5760 min Winter	1.254	0.0	27.7	2960
7200 min Winter	1.049	0.0	28.8	3672
8640 min Winter	0.906	0.0	29.6	4416
10080 min Winter	0.801	0.0	30.3	5064

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Shortest Storm (mins)	15
Ratio R	0.408	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.029

Time (mins) From:	To:	Area (ha)
0	4	0.029

Model Details

Storage is Online Cover Level (m) 42.300

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.5
Max Percolation (l/s)	26.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	41.700	Membrane Depth (m)	0

Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 41.700

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 150 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	41.937	0.237	0.0	0.6	0.6	6.8	O K
30 min Summer	42.005	0.305	0.0	0.7	0.7	8.7	O K
60 min Summer	42.060	0.360	0.0	0.8	0.8	10.3	O K
120 min Summer	42.086	0.386	0.0	0.8	0.8	11.0	O K
180 min Summer	42.090	0.390	0.0	0.8	0.8	11.1	O K
240 min Summer	42.086	0.386	0.0	0.8	0.8	11.0	O K
360 min Summer	42.072	0.372	0.0	0.8	0.8	10.6	O K
480 min Summer	42.055	0.355	0.0	0.8	0.8	10.1	O K
600 min Summer	42.037	0.337	0.0	0.7	0.7	9.6	O K
720 min Summer	42.019	0.319	0.0	0.7	0.7	9.1	O K
960 min Summer	41.987	0.287	0.0	0.7	0.7	8.2	O K
1440 min Summer	41.936	0.236	0.0	0.6	0.6	6.7	O K
2160 min Summer	41.882	0.182	0.0	0.5	0.5	5.2	O K
2880 min Summer	41.845	0.145	0.0	0.5	0.5	4.1	O K
4320 min Summer	41.800	0.100	0.0	0.4	0.4	2.9	O K
5760 min Summer	41.775	0.075	0.0	0.3	0.3	2.1	O K
7200 min Summer	41.759	0.059	0.0	0.3	0.3	1.7	O K
8640 min Summer	41.749	0.049	0.0	0.3	0.3	1.4	O K
10080 min Summer	41.742	0.042	0.0	0.2	0.2	1.2	O K
15 min Winter	41.968	0.268	0.0	0.7	0.7	7.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	139.875	0.0	7.1	18
30 min Summer	91.515	0.0	9.4	32
60 min Summer	57.005	0.0	11.9	62
120 min Summer	34.296	0.0	14.4	106
180 min Summer	25.138	0.0	15.9	138
240 min Summer	20.046	0.0	16.9	170
360 min Summer	14.534	0.0	18.4	238
480 min Summer	11.568	0.0	19.5	306
600 min Summer	9.684	0.0	20.4	374
720 min Summer	8.371	0.0	21.2	442
960 min Summer	6.647	0.0	22.4	570
1440 min Summer	4.795	0.0	24.2	824
2160 min Summer	3.453	0.0	26.1	1192
2880 min Summer	2.733	0.0	27.5	1556
4320 min Summer	1.963	0.0	29.4	2252
5760 min Summer	1.551	0.0	30.8	2992
7200 min Summer	1.291	0.0	31.8	3680
8640 min Summer	1.111	0.0	32.6	4408
10080 min Summer	0.979	0.0	33.3	5144
15 min Winter	139.875	0.0	8.0	18

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	42.046	0.346	0.0	0.8	0.8	9.9	O K
60 min Winter	42.109	0.409	0.0	0.8	0.8	11.7	O K
120 min Winter	42.142	0.442	0.0	0.9	0.9	12.6	O K
180 min Winter	42.142	0.442	0.0	0.9	0.9	12.6	O K
240 min Winter	42.135	0.435	0.0	0.8	0.8	12.4	O K
360 min Winter	42.112	0.412	0.0	0.8	0.8	11.7	O K
480 min Winter	42.086	0.386	0.0	0.8	0.8	11.0	O K
600 min Winter	42.059	0.359	0.0	0.8	0.8	10.2	O K
720 min Winter	42.034	0.334	0.0	0.7	0.7	9.5	O K
960 min Winter	41.989	0.289	0.0	0.7	0.7	8.2	O K
1440 min Winter	41.920	0.220	0.0	0.6	0.6	6.3	O K
2160 min Winter	41.855	0.155	0.0	0.5	0.5	4.4	O K
2880 min Winter	41.815	0.115	0.0	0.4	0.4	3.3	O K
4320 min Winter	41.772	0.072	0.0	0.3	0.3	2.0	O K
5760 min Winter	41.751	0.051	0.0	0.3	0.3	1.5	O K
7200 min Winter	41.740	0.040	0.0	0.2	0.2	1.1	O K
8640 min Winter	41.734	0.034	0.0	0.2	0.2	1.0	O K
10080 min Winter	41.731	0.031	0.0	0.2	0.2	0.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	91.515	0.0	10.6	32
60 min Winter	57.005	0.0	13.4	60
120 min Winter	34.296	0.0	16.2	114
180 min Winter	25.138	0.0	17.8	144
240 min Winter	20.046	0.0	19.0	182
360 min Winter	14.534	0.0	20.7	258
480 min Winter	11.568	0.0	21.9	332
600 min Winter	9.684	0.0	23.0	404
720 min Winter	8.371	0.0	23.8	472
960 min Winter	6.647	0.0	25.2	606
1440 min Winter	4.795	0.0	27.2	866
2160 min Winter	3.453	0.0	29.4	1232
2880 min Winter	2.733	0.0	30.9	1588
4320 min Winter	1.963	0.0	33.1	2292
5760 min Winter	1.551	0.0	34.6	3000
7200 min Winter	1.291	0.0	35.8	3680
8640 min Winter	1.111	0.0	36.8	4384
10080 min Winter	0.979	0.0	37.6	5048

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Shortest Storm (mins)	15
Ratio R	0.408	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.029

Time (mins) From:	To:	Area (ha)
0	4	0.029

Model Details

Storage is Online Cover Level (m) 42.300

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.5
Max Percolation (l/s)	26.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	41.700	Membrane Depth (m)	0

Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 41.700