

26th September 2023

Mr. C. Housley
AT Contracting & Plant Hire Ltd
Moor Barns Lane
Lutterworth
Leicestershire
LE17 4JD



[Emailed to: adrian@lightwatertpc.co.uk & carl@atcontracting.co.uk]

LAND AT KNOWSLEY VILLAGE STABLES, KNOWSLEY LANE, PRESCOT DRAINAGE MANAGEMENT STATEMENT

This Drainage Management Statement has been commissioned by Mr. C. Housley, referred to hereafter as 'the client'. This statement has been prepared to support a planning application for the construction of residential development off Knowsley Lane in Prescott (see location plan in **Appendix A**).

The purpose of this statement is to consider both the current drainage regime on the site for surface water and the identify the most appropriate option(s) for managing both surface water and foul water post-development. This is to ensure that there is no increased flood risk because of the development in line with the National Planning Policy Framework/Planning Practice Guidance. The use of Sustainable Drainage Systems (SuDS) to manage surface water run-off has also been considered as part of the assessment in line with the Non-Statutory Standards, although given the scale and density of development proposed there will be limited scope to use large-scale SuDS systems on these proposals.

EXISTING DRAINAGE SITUATION

The total site covers 0.351ha, however, the development area covers a smaller 0.254ha and is 100% permeable at present. At present, the site is mostly made up of permeable surfaces and comprises of the wider grassed field area, a permeable surfaced menage and a gravel/hardcore access road. It is understood that the site naturally drains in a north-westerly direction (with the existing topography) towards Knowsley Brook. Run-off on the site that is unable to convey to the nearby watercourse due to levels would conveying to existing low-lying areas within the wider site and essentially drain to ground over extended periods of time. An Existing Drainage Plan has been included in **Figure 1** for reference.

Pre-Development Surface Water Run-Off

The peak greenfield rates and volumes of run-off have been calculated using the FEH Method for the events shown in **Table 1**. The full calculations in **Appendix B** are based on an area of 1ha and those in **Table 1** are calculated pro-rata for the proposed development area of 0.254ha.

Dev. Area	Run-Off Rates				Run-Off Volumes	
	1 In 1yr	1 In 30yr	1 In 100yr	QBar	1 In 1yr	1 In 100yr
0.254ha	0.8l/s	1.6l/s	1.9l/s	0.9l/s	18.5cu.m	51.0cu.m

Table 1: Pre-Development Surface Water Run-Off Rates (Betts Hydro, 2023)

In accordance with national and local planning policies it is necessary to restrict surface water run-off rates where at all practical to mimic a pre-development greenfield situation. The proposals in accordance with policy would be to discharge surface water run-off from site mimicking the pre-development rate where practical as detailed in **Table 1**.

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Figure 1: Existing Drainage Plan (Betts Hydro, 2023)

METHODS OF SURFACE WATER MANAGEMENT

There are three methods that have been reviewed for the management and discharge of surface water. These may be applied individually or collectively to form a complete strategy and should be applied in the order of priority listed below:

- Discharge via infiltration.
- Discharge to watercourse.
- Discharge to the public sewerage system.

Discharge via Infiltration: Any impermeable areas that can drain to soakaway or an alternative method of infiltration would significantly improve the sustainability of any new surface water systems. The published online datasets and FEH catchment data suggest that infiltration may support an infiltration-based surface water management regime at the site.

To confirm infiltration rates at the site, it is recommended that Soakaway Testing (to BRE365) is undertaken at an early stage. Testing will need to confirm the specific onsite underlying ground conditions and suitability of such to achieve a full infiltration-based drainage solution at the site. Where infiltration rates are suitable and a design can be constructed to consider the suitability and stability of the underlying strata, then the primary means of dealing with surface water run-off generated by the development would be to drain to ground.

The proposals would be to utilise a combination of permeable surfacing within all non-adopted areas, rainwater butts and raised planters on domestic downpipes, domestic

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Old Marsh Farm Barns
Welsh Road, Sealand
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soakaways (where these can be installed to take into account building regulations) and dispersal drains within the permeable surfacing where practical to avoid point loading on the infiltration-based infrastructure (as illustrated in **Figure 2**).

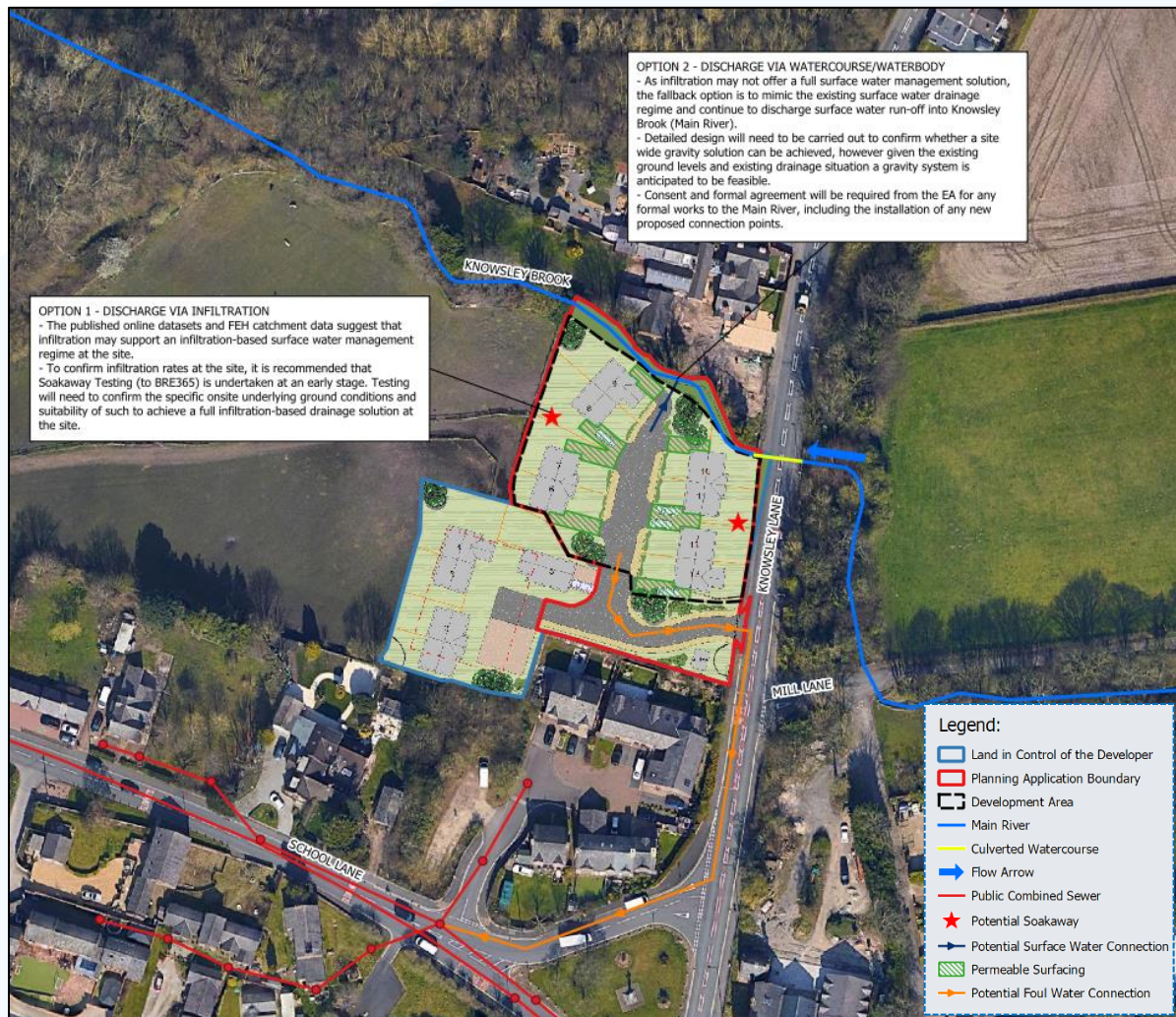


Figure 2: Drainage Outfall Options Plan (Betts Hydro, 2023)

In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Discharge rates are limited by the rate of infiltration and the proposed discharge rates for the development do not exceed that of the existing greenfield situation.

If designed appropriately the SuDS features such as those proposed can aid with both conveyance and attenuation, along with providing added benefits in terms of water quality, biodiversity, and amenity value. Detailed design should confirm suitability for incorporation of SuDS measures following more detailed analysis of levels, ground conditions and attenuation.

Discussion with Knowsley Metropolitan Borough Council will be required to ensure that the proposed infiltration methods conform to their design requirements as well as those set out in the SuDS Manual. As with any drainage system, it is important that should any drainage systems not be offered for adoption, then an appropriate maintenance regime should be scheduled with a suitably qualified management company for any drainage systems remaining in private ownership.

Discharge via Watercourse/Waterbody: As infiltration may not offer a full surface water management solution, the fallback option is to mimic the existing surface water drainage regime and continue to discharge surface water run-off into Knowsley Brook, as illustrated in **Figure 2** (see **Figure 2** full plan in **Appendix C**). The specific infrastructure to be implemented will be confirmed during the detailed design stage, although a brief summary is noted below.

A new connection to the watercourse would be required to serve the new development proposals and this will need to include stormwater storage within the wider site to ensure that the rate and volume of run-off leaving the site does not exceed that of the existing pre-development situation.

The proposals are still to utilise permeable surfaces in external areas even if a full infiltration solution is not viable, the permeable surfaces will be lined with a connection to the proposed main drainage system serving the new development. The presence of the permeable surfaces will still allow the first 5mm of rainfall to be dealt with at source as identified in the SuDS Manual (CIRIA 753).

Detailed design will need to be carried out to confirm whether a site wide gravity solution can be achieved, however given the existing ground levels and existing drainage situation a gravity system is anticipated to be feasible. Consent and formal agreement will be required from the EA for any formal works to the Main River, including the installation of any new proposed connection points, an illustrative location has been shown in Figure 2 previously.

In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Based on the development area, the pre-development greenfield rate (Qbar) is calculated to be 0.9l/s (3.61l/s/ha) using the FEH Statistical Method. Restricting the rate of discharge will generate a requirement to provide onsite stormwater storage for the extreme rainfall events.

The overall surface water drainage regime will be designed to manage the run-off generated in the storm events up to and including the 1 in 100 year return period event with a 45% allowance for climate change. Formal consents and agreement will need to be obtained in due course from the EA and the LLFA (Knowsley Metropolitan Borough Council).

Discharge via the Public Sewer Network: There are no proposals to discharge surface water run-off into a public surface water sewer, highway drain or any other drainage system at this time.

FOUL WATER DRAINAGE MANAGEMENT

United Utilities sewer records have identified public sewer infrastructure within proximity of the site. The nearest foul water compatible sewer is a public combined sewer (225mm dia.) within School Lane (sewer records included in **Appendix D**).

The proposals are to discharge foul water flows from the site into the public combined sewer within School Lane, as illustrated within **Figure 2** (see previously). Based on the proposals for the construction of 8no. residential dwellings, the approximate peak foul water flows generated by the site have been calculated at 0.4l/s, based on 4000 litres per dwelling per 24 hours as per the guidance contained within Sewers for Adoption.

Detailed design will be required to confirm feasibility of the strategy based on the topographic levels following further detailed investigations and confirmation of engineering levels. Consents and relevant agreements will be required from UU prior to commencement of works. Early consultation with UU is recommended to identify any additional constraints.

CONCLUSION

The focus of this initial assessment is on the sustainable management of surface water run-off to ensure no increased flood risk results from the development proposals. The surface water run-off management options have been assessed in accordance with the sustainable drainage hierarchy.

The published online datasets suggest that infiltration may support an infiltration-based surface water management regime onsite. It is recommended that infiltration testing (to BRE365) is undertaken at an early stage to determine if discharging to ground is feasible for managing surface water post-development. Should infiltration testing identify that this is not feasible, then the alternative option is to discharge into Knowsley Brook (Main River) which is located onsite parallel to the northern boundary.

I trust that the above information clearly identifies the required approach, however if you have any further queries, please do not hesitate to contact us.

Yours sincerely,



Hannah Buchanan BSc (Hons) MSc GradCIWEM
Graduate Flood Risk Analyst

Attached:

Appendix A – Location Plan
Appendix B – Surface Water Run-Off Calculations
Appendix C – Drainage Options Plan
Appendix D – United Utilities Sewer Records

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APPENDIX A – LOCATION PLAN

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LOCATION PLAN

Land at Knowsley Village Stables, Knowsley Lane, Prescot



OS X (Eastings)	343434
OS Y (Northings)	396073
Nat Grid	SJ434960 / SJ4343496073
Nearest Post Code	L34 9BD
Lat (WGS84)	N53:27:30 (53.45835484182)
Long (WGS84)	W2:51:12 (-2.85338093583189)
Lat, Long (WGS84)	53.45835484182,-2.85338093583189
Lat (OSGB36)	N53:27:29 (53.45811253575117)
Long (OSGB36)	W2:51:07 (-2.8520161135221667)
Lat, Long (OSGB36)	53.45811253575117,-2.8520161135221667



APPENDIX B – SURFACE WATER RUN-OFF CALCULATIONS

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Calculated by:	Hannah Buchanan
Site name:	Knowsley Village Stables
Site location:	Prescot

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:	53.45829° N
Longitude:	2.85332° W
Reference:	3302950732
Date:	Sep 05 2023 10:53

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha):	1
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Methodology

Q _{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.614
Q _{MED} (l/s):	
Q _{BAR} / Q _{MED} factor:	1.08

Hydrological characteristics

	Default	Edited
SAAR (mm):	871	871
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

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 $SPR/SPRHOST \leq 0.3$?

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

Q_{BAR} (l/s):		3.61
1 in 1 year (l/s):		3.14
1 in 30 years (l/s):		6.14
1 in 100 year (l/s):		7.51
1 in 200 years (l/s):		8.55

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.

SURFACE WATER RUN-OFF CALCULATION SHEET

Development Knowsley Village Stables, Knowsley Lane, Prescot
Project No. HYD878

Revision A **Completed by** HB
Date 05/09/2023 **Checked by** KH

Areas

Total Site	0.351	ha
Development Area ¹	0.254	ha
Existing Impermeable		ha
Existing Impermeable ²		ha
Existing Pervious	0.351	ha
Existing Pervious ²	0.000	ha
Proposed total impermeable	0.126	ha 50%

Catchment Characteristics

SAAR	861	mm
SPR	0.3	
BFI	0.614	
i_1	16.5	mm/hr
i_{30}	30.2	mm/hr
i_{100}	40.2	mm/hr
d_1	22.9	mm
d_{30}	41.8	mm
d_{100}	51.3	mm

Run-off Rates

Pre-development			
Impermeable -----	1yr	0.0	l/s
	30yr	0.0	l/s
	100yr	0.0	l/s
	50mm/hr ³	0.0	l/s
Pervious ⁴ -----	1yr	0.8	l/s
	30yr	1.6	l/s
	100yr	1.9	l/s
	QBar ⁵	0.9	l/s
Total -----	1yr	0.8	l/s
	30yr	1.6	l/s
	100yr	1.9	l/s
Post-development (without control)			
Impermeable ⁶ -----	1yr	5.8	l/s
	30yr	10.6	l/s
	100yr+40%CC	19.7	l/s

Volumes

Pre-development			
Impermeable -----	1yr	0.0	cu.m
	30yr	0.0	cu.m
	100yr	0.0	cu.m
Pervious ⁴ -----	1yr	18.5	cu.m
	30yr	35.7	cu.m
	100yr	51.0	cu.m
Total -----	1yr	18.5	cu.m
	30yr	35.7	cu.m
	100yr	51.0	cu.m
Post-development			
Impermeable ⁶ -----	1yr	28.9	cu.m
	30yr	52.6	cu.m
	100yr	64.6	cu.m

Stormwater Storage Estimates

Based on Greenfield run-off QBar

Microdrainage Quick Storage Estimates

(using FEH catchment data)

Return Period	Rate	lower	upper	mean
1yr	5.0 l/s	4.4	9.7	7.05 cu.m
30yr	5.0 l/s	16	27	21.5 cu.m
100yr+40%CC	5.0 l/s	44	65	54.5 cu.m

1/ The 'development area' removes areas of POS and/or landscaped areas of the wider site that are to remain as existing.

2/ On occasion the existing impermeable area cannot be evidenced to connect and a reduction is applied.

3/ 50mm/hr is used for BRegs calculations and often used by Water Companies when considering allowable post-development rates of discharge. (Rational Method)

4/ The Greenfield rates and of run-off have been calculated using the UK SUDS Calculator

5/ QBar is the estimated flood flow for the 2.33yr return period event and is often used as a post-development rate restriction.

6/ Post-development run-off is only considered from the impermeable area when the proposed post-development impermeable area >50% in accordance with the EA Guidance Preliminary rainfall runoff management for developments (WS-074/A/TR1/1 rev E (2012)).

NB. The catchment characteristics are from the FEH catchment, the UK SUDS Calculator and Microdrainage.

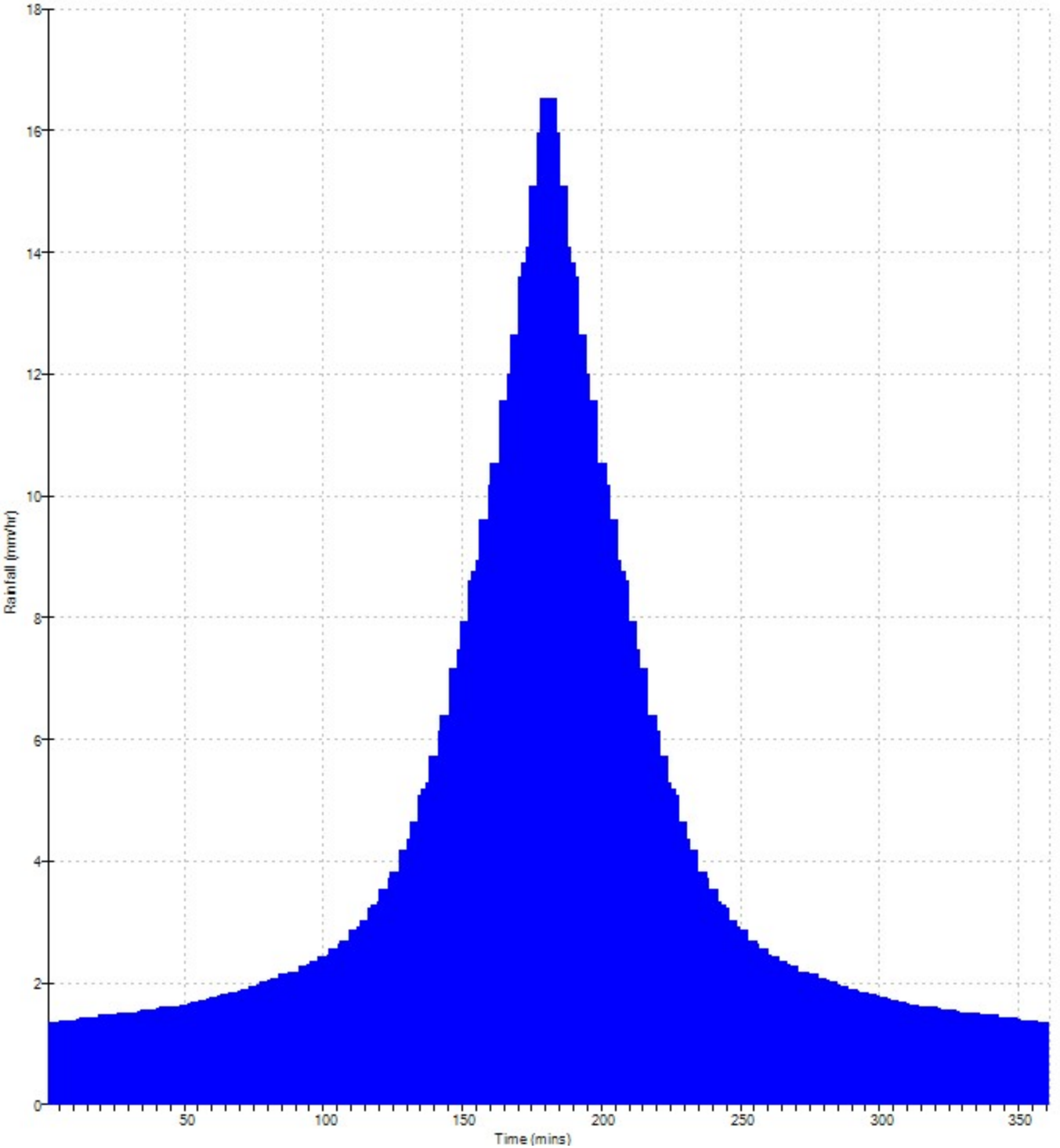
NB. The rainfall intensities and depths are calculated for the 6hr duration rainfall event (peak summer intensity)

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Old Marsh Farm Barns	Knowsley Village Stables	
Welsh Road	Knowsley Lane	
Sealand Flintshire CH5 2LY	Prescot	
Date 22/09/2023	Designed by HB	
File	Checked by KH	
Micro Drainage	Network 2020.1.3	

Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 343427 396085 SJ 43427 96085
Data Type	Point
Peak Intensity (mm/hr)	16.535
Ave. Intensity (mm/hr)	4.218
Return Period (years)	2.0

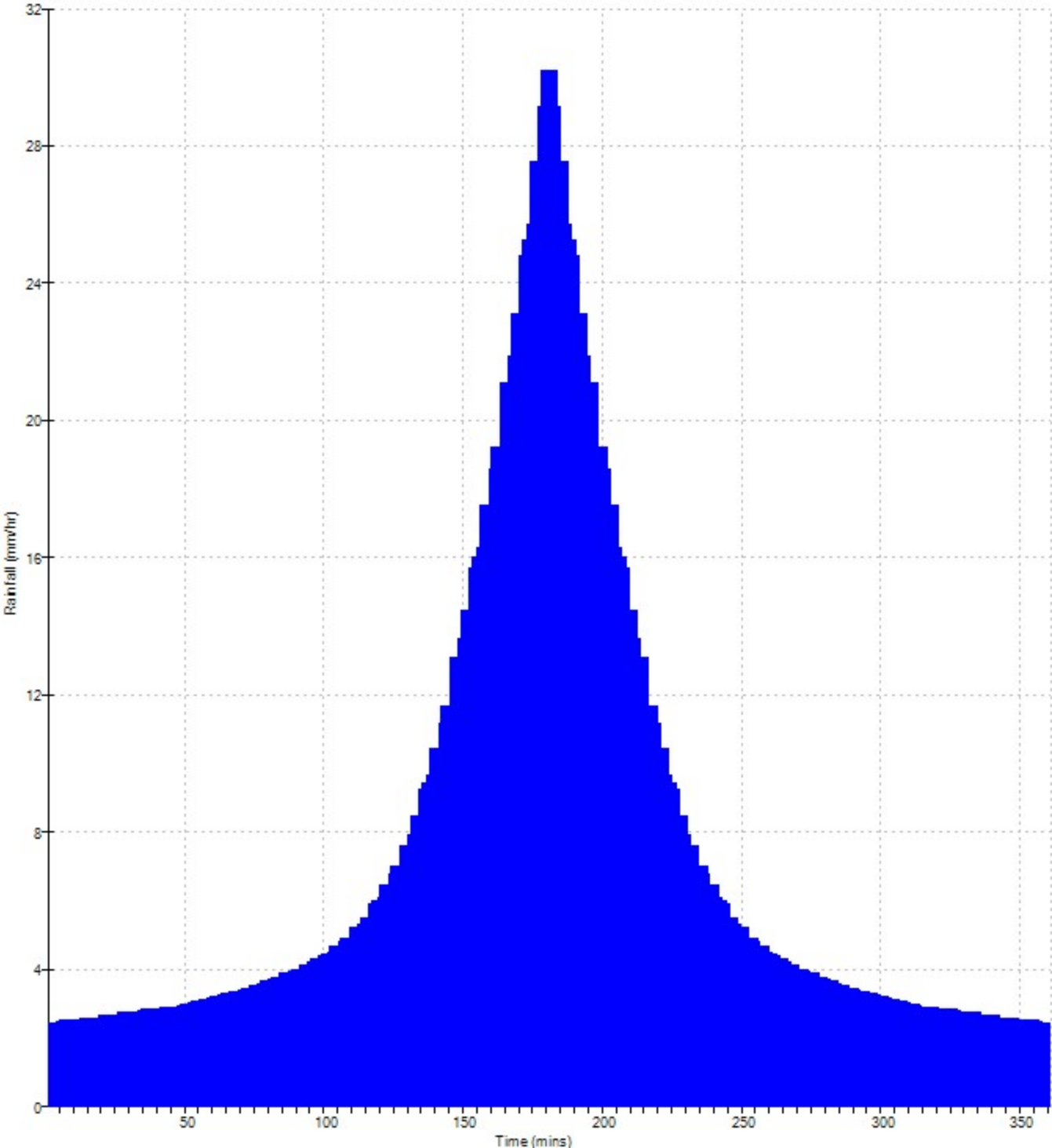


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Date 22/09/2023	Designed by HB	
File	Checked by KH	
Micro Drainage	Network 2020.1.3	

Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 343427 396085 SJ 43427 96085
Data Type	Point
Peak Intensity (mm/hr)	30.196
Ave. Intensity (mm/hr)	7.703
Return Period (years)	30.0

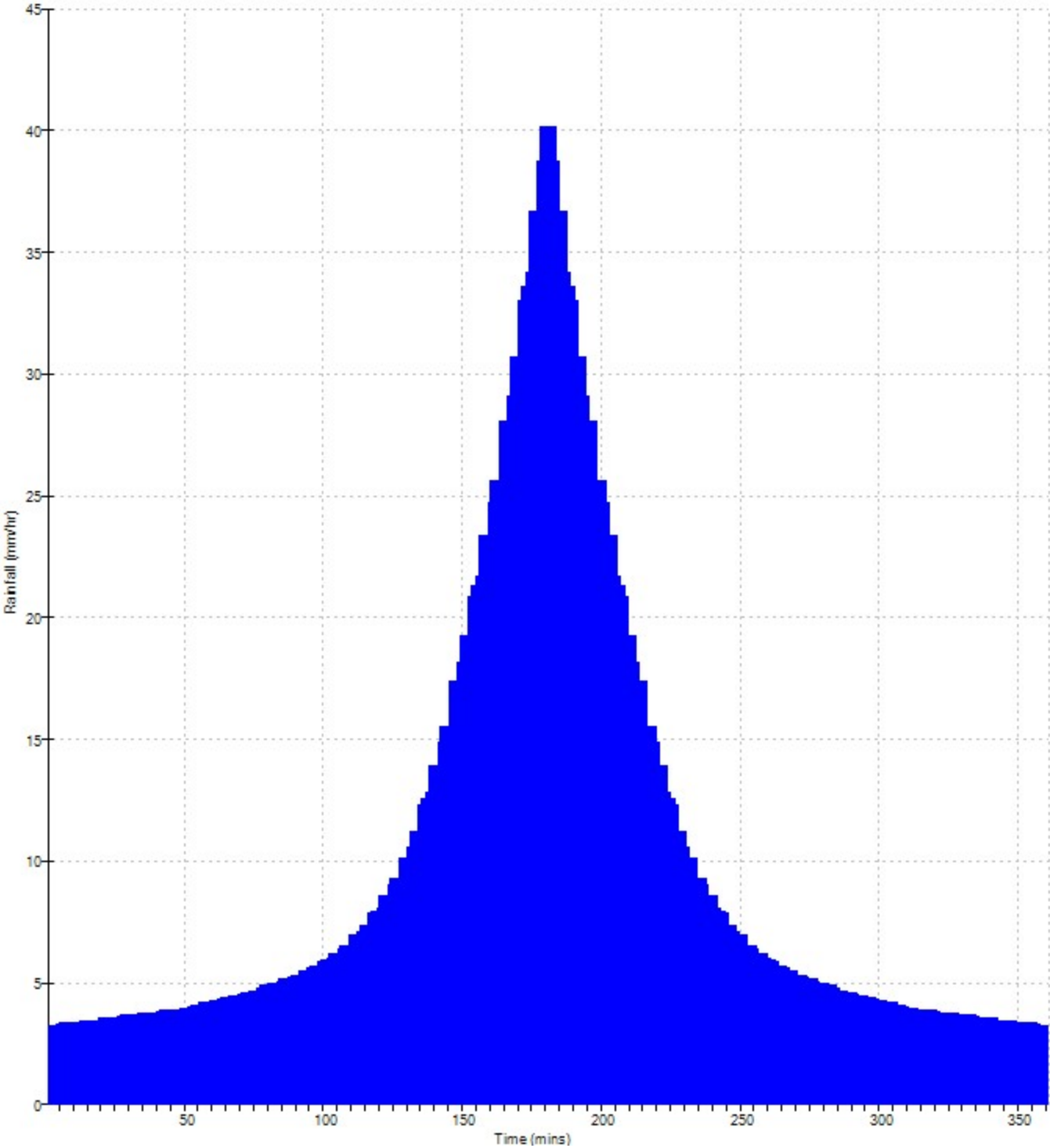


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Date 22/09/2023	Designed by HB	
File	Checked by KH	
Micro Drainage	Network 2020.1.3	

Rainfall profile

Storm duration (mins) 360

FEH Data
FEH Rainfall Version 2013
Site Location GB 343427 396085 SJ 43427 96085
Data Type Point
Peak Intensity (mm/hr) 40.166
Ave. Intensity (mm/hr) 10.246
Return Period (years) 100.0



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Date 22/09/2023	Designed by HB	
File	Checked by KH	
Micro Drainage		Source Control 2020.1.3

Greenfield Runoff Volume

FEH Data

Return Period (years)	2
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 343427 396085 SJ 43427 96085
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	0.254
SAAR (mm)	861
CWI	120.297
SPR Host	30.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	28.82
Greenfield Runoff Volume (m³)	18.529

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Date 22/09/2023	Designed by HB	
File	Checked by KH	
Micro Drainage		Source Control 2020.1.3

Greenfield Runoff Volume

FEH Data

Return Period (years)	30
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 343427 396085 SJ 43427 96085
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	0.254
SAAR (mm)	861
CWI	120.297
SPR Host	30.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	30.44
Greenfield Runoff Volume (m³)	35.737

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Date 22/09/2023	Designed by HB	
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Micro Drainage		Source Control 2020.1.3

Greenfield Runoff Volume

FEH Data

Return Period (years)	100
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 343427 396085 SJ 43427 96085
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	0.254
SAAR (mm)	861
CWI	120.297
SPR Host	30.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	32.68
Greenfield Runoff Volume (m³)	51.024

APPENDIX C – DRAINAGE OPTIONS PLAN

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APPENDIX D – UNITED UTILITIES SEWER RECORDS

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Betts-Associates

Old Marsh Farm Barns
Old Marsh Farm Barns,
Flintshire,
CH5 2LY

FAO:

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

Your Ref: HYD878
Our Ref: UUPS-ORD-517842
Date: 11/09/2023

Dear Sirs

Location: Knowsley Village Stables Prescott

I acknowledge with thanks your request dated 08/09/2023 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



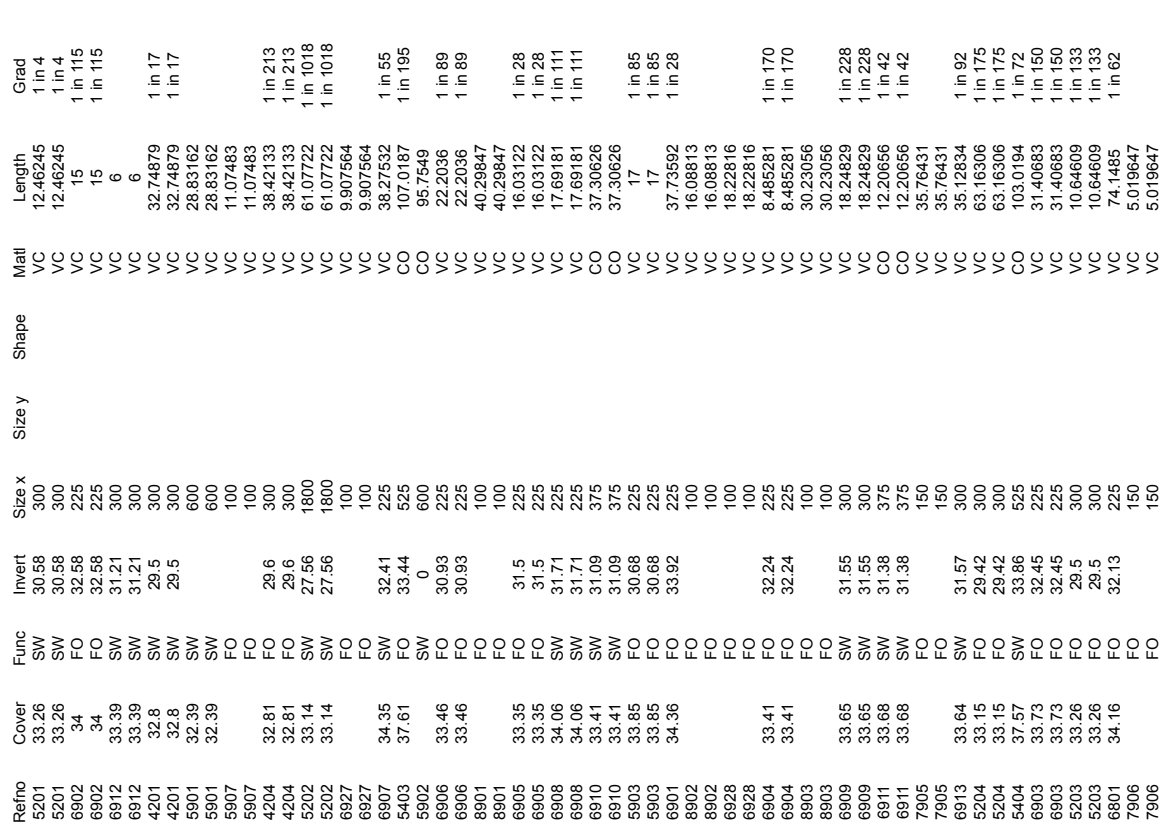
Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



MANHOLE FUNCTION	
FO	Foul
SW	Surface Water
CO	Combined
OY	Overflow
SEWER SHAPE	
CI	Circular
TR	Trapezoidal
EG	Egg
AR	Arch
OV	Oval
BA	Barrel
FT	Flat Top
HO	Horse Shoe
RE	Rectangular
UN	Unspecified
SQ	Square
SEWER MATERIAL	
AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culvert
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vertifired Clay
PP	Polypropylene
PF	Plex Fibre
IMC	Masonry, Coured
MAR	Masonry, Random
U	Unspecified

**SEWER
RECORDS**

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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