Flood Risk Assessment
Land off Wakefield Road, Dewsbury

For Whitshaws Builders

V1 – 19.11.2024

V2 – 26.11.2024

V3 – 24.01.2025

Contents:-

Introduction:-
Clifford Engineering were appointed to carry out a Flood Risk Assessment of the site at Wakefield Road, Dewsbury on behalf of Whitshaws Builders.

The Site:-
The site measures approximately 0.12hectares and is roughly rectangular in shape.

There are existing trees on site, with Wakefield Road to the North and Park View to the East. The site doesnt have any buildings or hard standing, but grassland with some trees to the rear.

Existing Drainage:-
There is an existing 150mm Ø combined sewer crossing the site, West to East. This changes to a 225mmØ at the manhole in Park View.

There is also an existing 150mmØ Surface Water sewer crossing the site, West to East. This looks to outfall into the combined manhole in Park View, where it upsizes to 225mmØ.

Yorkshire water provided a pre planning enquiry where they advised a 450mm x 375mm culverted watercourse is located to the east of the site

The existing site lies within Flood Zone 1 and is not in a source protection zone, so no further measures are required.

The proposals:-
Whiltshaws Builders are proposing to construct 5 new residential dwellings, with associated driveways, paths and vehicular access.

It has been calculated that the proposed impermeable area, comes to 0.087Ha.

Yorkshire Water has provided a Pre Planning Enquiry, dated 18th November 2024, and confirmed that the foul can discharge into the existing 150mmØ combined sewer crossing the site.
Yorkshire Water advise that the Surface water may be able to discharge into the culverted watercourse to the East. An email has been sent to Kirklees LLFA, but no reply has been received at the time of writing this report, so it is assumed we can not connect onto the culverted watercourse.

Yorkshire Water advise as a last resort, the surface water can discharge into the 150mmØ Surface Water sewer crossing the site at a rate of 3.5L/S.

Soakaways:-
As there isn't a watercourse close to the site, the next method for the discharge of Surface Water is via infiltration through a soakaways. 3 soakaway tests were undertaken on the 8th, 9th and 10th January 2024 and the results are as follows:-

	Hole # 1		Test Date	Test #	Start Water Depth	Start Time	End Time	End Depth
Length	1800mm		08/01/2024	1	950mm	12:07	16:07	950mm
Width	700mm		09/01/2024	2	950mm	11:37	15:37	940mm
Depth	1500mm		10/01/2024	3	950mm	09:05	13:05	940mm

The results show that once the excavations were filled and left for around 4 hours, the water level hadn't moved on the 8th Jan. On the 9th and 10th, it had only dropped by 10mm in the same timeframe.
In conclusion, soakaways do not work on the site.

Attenuation:-
We are assuming the surface water is to discharge into the existing 150mmØ Surface Water Sewer crossing the site at a rate of 3.5L/S.

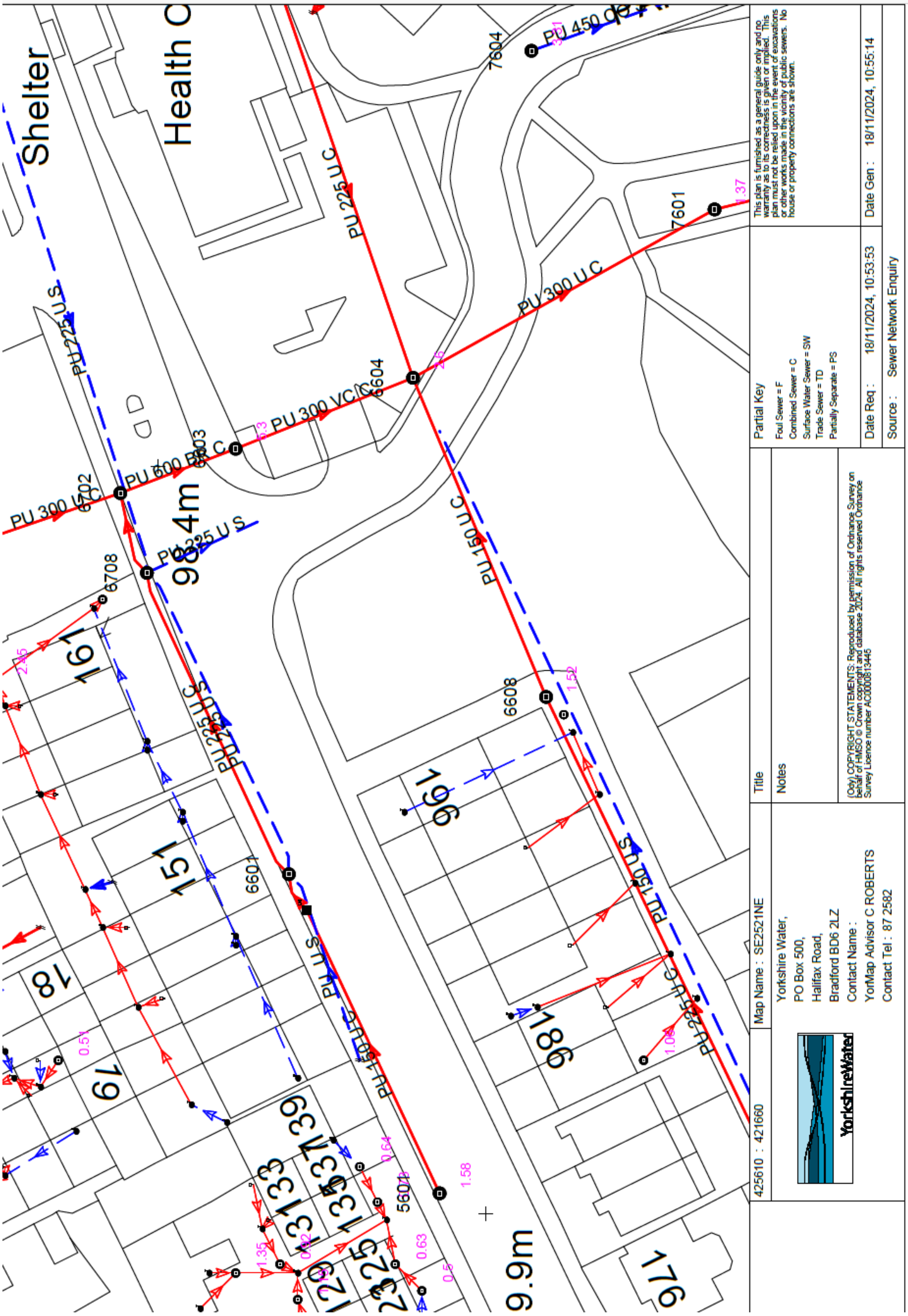
As such, with the impermeable area of 0.087Ha over the 0.12Ha site, it is calculated that the 1:100yr attenuation volume required is 29.5m^3.

The Surface Water attenuation is proposed, in the form of crates situated under the new private drive. The new properties are proposed to discharge into the storage crates and to be throttled using a flow control system on the downstream manhole.

Conclusions:-

- Foul to discharge into existing 150mmØ combined crossing the site
- Soakaway test provided that soakaways do not work
- Surface water is to discharge into existing 150mmØ Surface Water Sewer crossing the site at 3.5L/S
- Attenuation volume calculated to be 29.5m^3

Yorkshire Water Drainage Map



Yorkshire Water Pre Planning Enquiry

YorkshireWater

Mr B Tidmarsh
Clifford Engineering Limited
R Stride & Co LLP
Rear Of
Eastville Terrace
Harrogate
HG1 3HJ

Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482

Email: technical.sewerage@yorkshirewater.co.uk

Your Ref:
Our Ref: A005234

For telephone enquiries ring: Chris Roberts on 0345 120 8482

18th November 2024

Dear Mr Tidmarsh,

411 - Wakefield Road, Dewsbury, WF12 8AH - Pre-Planning Sewerage Enquiry V662464

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Existing Infrastructure

There is a 150 mm diameter public surface water sewer recorded crossing the site. No buildings, or other obstructions, are to be erected within 3 (three) metres is required at each side of the sewer centre-line, no trees planted within 5 (five) metres of this public sewer.

There is a 150 mm diameter public combined water sewer recorded crossing the site. No buildings, or other obstructions, are to be erected within 3 (three) metres is required at each side of the sewer centre-line, no trees planted within 5 (five) metres of this public sewer.

It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120 84 82.

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

YorkshireWater

Foul water domestic waste can discharge to the 150 mm diameter public combined sewer recorded crossing the site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

It is understood that a 450 x 375 mm culverted watercourse is located to the east of the site. This appears to be the obvious place for surface water disposal (if SuDS are not viable). Please note Yorkshire Water cannot provide plans of culverted watercourses or highway drains. To obtain plans please contact the Lead Local Flood Authority for more details.

As a last resort and subject to providing satisfactory evidence as to why the other methods of surface water disposal have been discounted, curtilage surface water may discharge to the 150 mm diameter public surface water sewer recorded crossing the site.

The surface water discharge from the site to be restricted to not greater than 3.5 (three point five) litres/second. This permission is not an acceptance in respect to any planning conditions imposed under the Grant of Planning Permission.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website - https://www.yorkshirewater.com/developers/sewerage/sewerage-connections/

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for Code for Adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption 2023/24, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.

YorkshireWater

An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/ for further information.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

YorkshireWater

Chris Roberts
Town Planning Technician
Land & Property
For any Pre-Planning correspondence please email -
technical.sewerage@yorkshirewater.co.uk
For any Planning correspondence please email -
planningconsultation@yorkshirewater.co.uk

EA Flood Map

Environment Agency

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**425658/421661**	**19 Nov 2024 0:25**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- **In an area with critical drainage problems as notified by the Environment Agency**
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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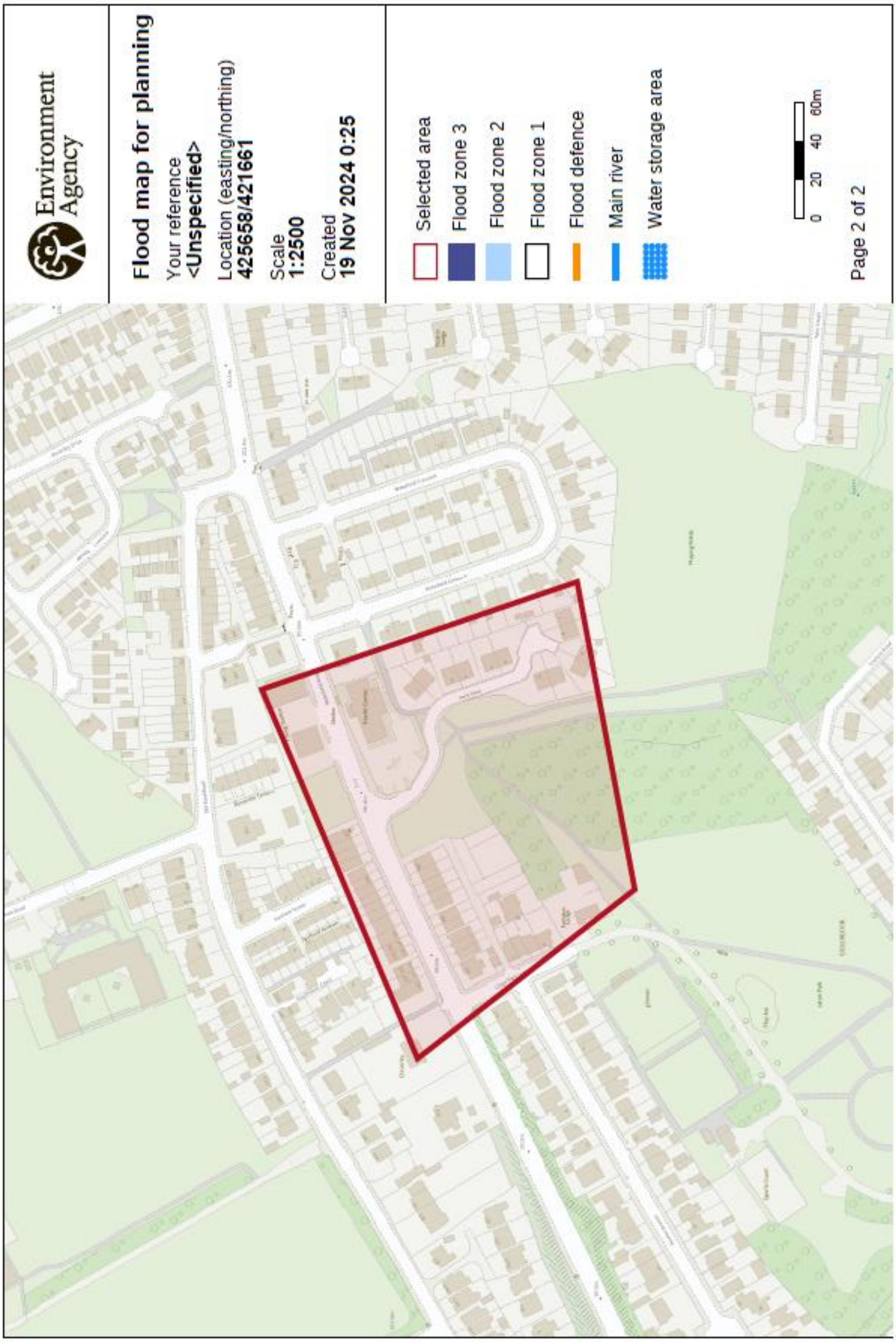
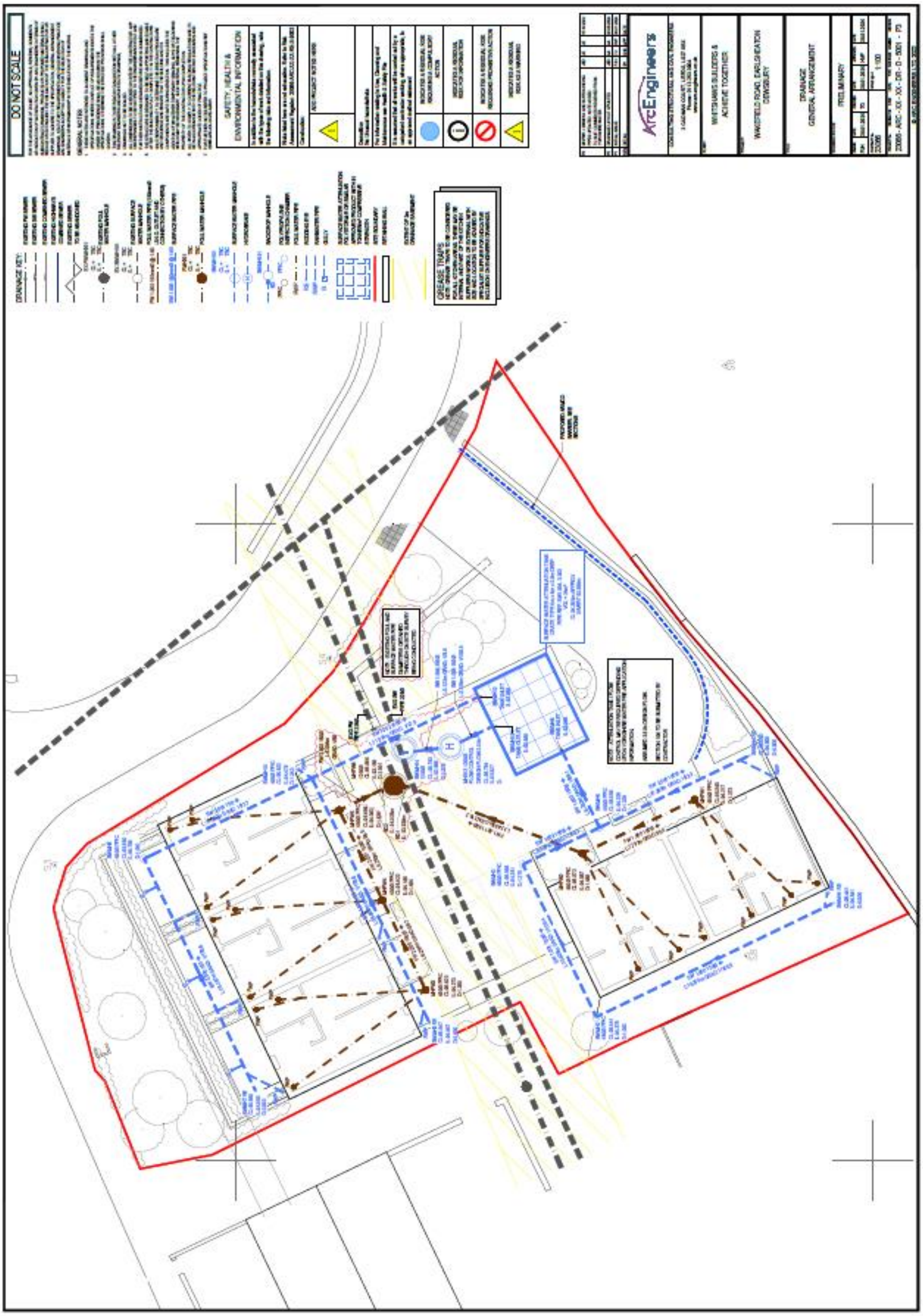

Environment Agency
Flood map for planning
Your reference
<Unspecified>
Location (easting/northing)
425658/421661
Scale
1:2500
Created
19 Nov 2024 0:25
Selected area
Flood zone 3
Flood zone 2
Flood zone 1
Flood defence
Main river
Water storage area
0 20 40 60m
Page 2 of 2

Proposed Drainage Plan



Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
PS4	0.010	0.450	Type 2	95.441	94.541	0.750	432643.429	385172.394
PS3	0.005	0.450	Type 2	95.441	94.328	0.963	432636.346	385187.213
PS2	0.000	0.650	Type 2	95.556	94.231	1.175	432645.918	385191.863
PS5	0.000	0.450	Type 2	95.590	94.690	0.750	432652.692	385177.698
PS1	0.023	0.450	Type 2	95.556	94.229	1.177	432648.251	385187.010
S4	0.000	1.200	Type 2	95.000	93.750	1.100	432652.950	385189.433
PS10	0.002	0.450	Type 2	95.850	94.950	0.750	432631.701	385208.578
PS9	0.004	0.450	Type 2	95.850	94.789	0.911	432646.299	385215.616
PS8	0.001	0.450	Type 2	95.547	94.647	0.750	432636.000	385197.709
PS7	0.003	0.450	Type 2	95.822	94.479	1.193	432651.353	385205.065
PS6	0.000	1.200	Type 2	95.000	93.650	1.200	432656.470	385194.620
S3	0.000	1.200	Type 1B	95.000	92.950	1.250	432654.546	385193.679
S2	0.000	1.200	Type 1B	95.754	93.527	2.077	432653.399	385196.363
S1	0.000	1.200	Type 1B	95.763	92.888	2.725	432653.170	385199.266

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)
1.000	PS4	94.541	PS3	94.378	Circ	0.15mØ	16.425	100.8	0.600	0.750
1.001	PS3	94.328	PS2	94.231	Circ	0.15mØ	10.641	109.7	0.600	0.963
1.002	PS2	94.281	PS1	94.229	Circ	0.15mØ	5.384	103.4	0.600	1.125
2.000	PS5	94.690	PS1	94.229	Circ	0.15mØ	10.317	22.4	0.600	0.750
1.003	PS1	94.229	S4	93.750	Circ	0.15mØ	5.287	11.0	0.600	1.177
1.004	S4	93.750	S3	92.950	Rect	5mx0.8m	4.536	5.7	0.600	0.450
3.000	PS10	94.950	PS9	94.789	Circ	0.15mØ	16.206	100.7	0.600	0.750
3.001	PS9	94.789	PS7	94.529	Circ	0.15mØ	11.699	45.0	0.600	0.911
4.000	PS8	94.647	PS7	94.479	Circ	0.15mØ	17.024	101.3	0.600	0.750
3.002	PS7	94.479	PS6	93.650	Circ	0.15mØ	11.631	14.0	0.600	1.193
3.003	PS6	93.700	S3	93.650	Circ	0.1mØ	2.142	42.8	0.600	1.200
1.005	S3	93.600	S2	93.527	Circ	0.15mØ	2.919	40.0	0.600	1.250
1.006	S2	93.527	S1	92.888	Circ	0.15mØ	2.912	4.6	0.600	2.077

Outfall Details

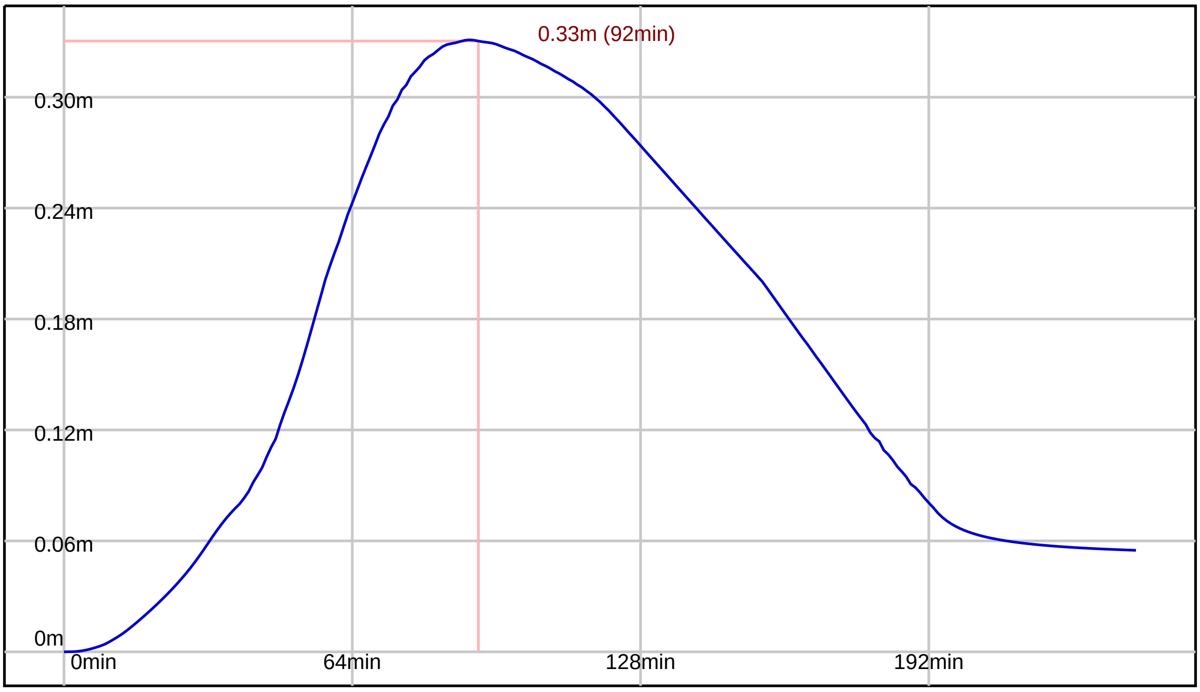
Outfall Manhole S1 : Free Discharge

Flow Control Details

Tank Structure at Manhole S3

Tank Invert (m)	Tank Height (m)	Void Ratio (%)	Area (m2)	Effective Area (m2) Area x Void Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
92.950	0.800	95.00	30.007	28.506	22.805	0.00000000	0.00000000	2.00

Tank at S3 (100Yr+40% 120Min Winter)

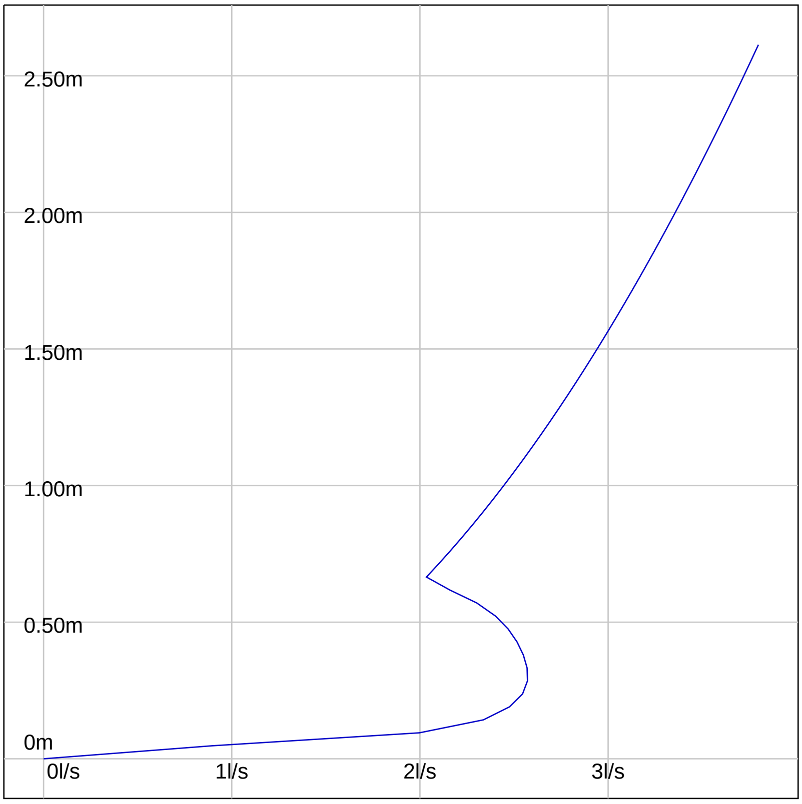


Controls within Manhole S2

Hydro-Brake® Optimum Control at Manhole S2

Model Ref	Design Depth (m)	Design Flow (l/s)	Depth Above Invert (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SFP-0073-3500-2200-3500	2.200	3.500	0.000	0.304	2.573	0.652	2.016

Hydro-Brake® Optimum Control at S2



Simulation Settings

FSR: M5-60=19.00, R=0.36, Locale=England and Wales

Summer (Cv: 0.75), Winter (Cv: 0.84)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (1, +0%), (2, +0%), (5, +0%), (10, +0%), (30, +0%), (100, +0%), (100, +40%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Winter	33.575	0.00	0.00	10Yr 360Min Summer	6.319	0.00	0.00
1Yr 15Min Summer	33.575	0.00	0.00	10Yr 360Min Winter	6.319	0.00	0.00
1Yr 30Min Winter	21.657	0.00	0.00	10Yr 480Min Summer	5.113	0.00	0.00
1Yr 30Min Summer	21.657	0.00	0.00	10Yr 480Min Winter	5.113	0.00	0.00
1Yr 60Min Summer	13.523	0.00	0.00	10Yr 600Min Summer	4.336	0.00	0.00
1Yr 60Min Winter	13.523	0.00	0.00	10Yr 600Min Winter	4.336	0.00	0.00
1Yr 120Min Summer	8.320	0.00	0.00	10Yr 720Min Summer	3.789	0.00	0.00
1Yr 120Min Winter	8.320	0.00	0.00	10Yr 720Min Winter	3.789	0.00	0.00
1Yr 180Min Winter	6.253	0.00	0.00	10Yr 960Min Summer	3.061	0.00	0.00
1Yr 180Min Summer	6.253	0.00	0.00	10Yr 960Min Winter	3.061	0.00	0.00
1Yr 240Min Summer	5.110	0.00	0.00	10Yr 1440Min Summer	2.265	0.00	0.00
1Yr 240Min Winter	5.110	0.00	0.00	10Yr 1440Min Winter	2.265	0.00	0.00
1Yr 360Min Winter	3.844	0.00	0.00	30Yr 15Min Summer	69.495	0.00	0.00
1Yr 360Min Summer	3.844	0.00	0.00	30Yr 15Min Winter	69.495	0.00	0.00
1Yr 480Min Summer	3.136	0.00	0.00	30Yr 30Min Summer	46.054	0.00	0.00
1Yr 480Min Winter	3.136	0.00	0.00	30Yr 30Min Winter	46.054	0.00	0.00
1Yr 600Min Summer	2.679	0.00	0.00	30Yr 60Min Summer	29.238	0.00	0.00
1Yr 600Min Winter	2.679	0.00	0.00	30Yr 60Min Winter	29.238	0.00	0.00
1Yr 720Min Winter	2.354	0.00	0.00	30Yr 120Min Summer	18.026	0.00	0.00
1Yr 720Min Summer	2.354	0.00	0.00	30Yr 120Min Winter	18.026	0.00	0.00
1Yr 960Min Summer	1.921	0.00	0.00	30Yr 180Min Summer	13.436	0.00	0.00
1Yr 960Min Winter	1.921	0.00	0.00	30Yr 180Min Winter	13.436	0.00	0.00
1Yr 1440Min Winter	1.442	0.00	0.00	30Yr 240Min Summer	10.855	0.00	0.00
1Yr 1440Min Summer	1.442	0.00	0.00	30Yr 240Min Winter	10.855	0.00	0.00
2Yr 15Min Summer	38.941	0.00	0.00	30Yr 360Min Summer	8.011	0.00	0.00
2Yr 15Min Winter	38.941	0.00	0.00	30Yr 360Min Winter	8.011	0.00	0.00
2Yr 30Min Summer	25.257	0.00	0.00	30Yr 480Min Summer	6.455	0.00	0.00
2Yr 30Min Winter	25.257	0.00	0.00	30Yr 480Min Winter	6.455	0.00	0.00
2Yr 60Min Summer	15.824	0.00	0.00	30Yr 600Min Summer	5.457	0.00	0.00
2Yr 60Min Winter	15.824	0.00	0.00	30Yr 600Min Winter	5.457	0.00	0.00
2Yr 120Min Summer	9.740	0.00	0.00	30Yr 720Min Summer	4.755	0.00	0.00
2Yr 120Min Winter	9.740	0.00	0.00	30Yr 720Min Winter	4.755	0.00	0.00
2Yr 180Min Summer	7.308	0.00	0.00	30Yr 960Min Summer	3.823	0.00	0.00
2Yr 180Min Winter	7.308	0.00	0.00	30Yr 960Min Winter	3.823	0.00	0.00
2Yr 240Min Summer	5.958	0.00	0.00	30Yr 1440Min Summer	2.809	0.00	0.00
2Yr 240Min Winter	5.958	0.00	0.00	30Yr 1440Min Winter	2.809	0.00	0.00
2Yr 360Min Summer	4.464	0.00	0.00	100Yr 15Min Summer	89.906	0.00	0.00
2Yr 360Min Winter	4.464	0.00	0.00	100Yr 15Min Winter	89.906	0.00	0.00
2Yr 480Min Summer	3.634	0.00	0.00	100Yr 30Min Summer	60.154	0.00	0.00
2Yr 480Min Winter	3.634	0.00	0.00	100Yr 30Min Winter	60.154	0.00	0.00
2Yr 600Min Winter	3.097	0.00	0.00	100Yr 60Min Summer	38.413	0.00	0.00
2Yr 600Min Summer	3.097	0.00	0.00	100Yr 60Min Winter	38.413	0.00	0.00
2Yr 720Min Summer	2.717	0.00	0.00	100Yr 120Min Summer	23.700	0.00	0.00
2Yr 720Min Winter	2.717	0.00	0.00	100Yr 120Min Winter	23.700	0.00	0.00
2Yr 960Min Summer	2.210	0.00	0.00	100Yr 180Min Summer	17.613	0.00	0.00
2Yr 960Min Winter	2.210	0.00	0.00	100Yr 180Min Winter	17.613	0.00	0.00
2Yr 1440Min Summer	1.652	0.00	0.00	100Yr 240Min Summer	14.172	0.00	0.00
2Yr 1440Min Winter	1.652	0.00	0.00	100Yr 240Min Winter	14.172	0.00	0.00
5Yr 15Min Summer	47.372	0.00	0.00	100Yr 360Min Summer	10.389	0.00	0.00
5Yr 15Min Winter	47.372	0.00	0.00	100Yr 360Min Winter	10.389	0.00	0.00
5Yr 30Min Summer	30.949	0.00	0.00	100Yr 480Min Summer	8.335	0.00	0.00
5Yr 30Min Winter	30.949	0.00	0.00	100Yr 480Min Winter	8.335	0.00	0.00
5Yr 60Min Summer	19.477	0.00	0.00	100Yr 600Min Summer	7.020	0.00	0.00
5Yr 60Min Winter	19.477	0.00	0.00	100Yr 600Min Winter	7.020	0.00	0.00
5Yr 120Min Winter	11.995	0.00	0.00	100Yr 720Min Summer	6.098	0.00	0.00

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
5Yr 120Min Summer	11.995	0.00	0.00	100Yr 720Min Winter	6.098	0.00	0.00
5Yr 180Min Summer	8.980	0.00	0.00	100Yr 960Min Summer	4.878	0.00	0.00
5Yr 180Min Winter	8.980	0.00	0.00	100Yr 960Min Winter	4.878	0.00	0.00
5Yr 240Min Summer	7.299	0.00	0.00	100Yr 1440Min Summer	3.556	0.00	0.00
5Yr 240Min Winter	7.299	0.00	0.00	100Yr 1440Min Winter	3.556	0.00	0.00
5Yr 360Min Summer	5.441	0.00	0.00	100Yr+40% 15Min Summer	125.869	0.00	0.00
5Yr 360Min Winter	5.441	0.00	0.00	100Yr+40% 15Min Winter	125.869	0.00	0.00
5Yr 480Min Summer	4.414	0.00	0.00	100Yr+40% 30Min Summer	84.215	0.00	0.22
5Yr 480Min Winter	4.414	0.00	0.00	100Yr+40% 30Min Winter	84.215	0.00	0.20
5Yr 600Min Summer	3.751	0.00	0.00	100Yr+40% 60Min Summer	53.779	0.00	0.18
5Yr 600Min Winter	3.751	0.00	0.00	100Yr+40% 60Min Winter	53.779	0.00	0.18
5Yr 720Min Summer	3.283	0.00	0.00	100Yr+40% 120Min Summer	33.180	0.00	0.00
5Yr 720Min Winter	3.283	0.00	0.00	100Yr+40% 120Min Winter	33.180	0.00	0.00
5Yr 960Min Summer	2.661	0.00	0.00	100Yr+40% 180Min Summer	24.659	0.00	0.00
5Yr 960Min Winter	2.661	0.00	0.00	100Yr+40% 180Min Winter	24.659	0.00	0.00
5Yr 1440Min Summer	1.977	0.00	0.00	100Yr+40% 240Min Summer	19.841	0.00	0.00
5Yr 1440Min Winter	1.977	0.00	0.00	100Yr+40% 240Min Winter	19.841	0.00	0.00
10Yr 15Min Summer	54.942	0.00	0.00	100Yr+40% 360Min Summer	14.545	0.00	0.00
10Yr 15Min Winter	54.942	0.00	0.00	100Yr+40% 360Min Winter	14.545	0.00	0.00
10Yr 30Min Summer	36.094	0.00	0.00	100Yr+40% 480Min Summer	11.669	0.00	0.00
10Yr 30Min Winter	36.094	0.00	0.00	100Yr+40% 480Min Winter	11.669	0.00	0.00
10Yr 60Min Summer	22.792	0.00	0.00	100Yr+40% 600Min Summer	9.828	0.00	0.00
10Yr 60Min Winter	22.792	0.00	0.00	100Yr+40% 600Min Winter	9.828	0.00	0.00
10Yr 120Min Summer	14.042	0.00	0.00	100Yr+40% 720Min Summer	8.537	0.00	0.00
10Yr 120Min Winter	14.042	0.00	0.00	100Yr+40% 720Min Winter	8.537	0.00	0.00
10Yr 180Min Summer	10.494	0.00	0.00	100Yr+40% 960Min Summer	6.830	0.00	0.00
10Yr 180Min Winter	10.494	0.00	0.00	100Yr+40% 960Min Winter	6.830	0.00	0.00
10Yr 240Min Summer	8.510	0.00	0.00	100Yr+40% 1440Min Winter	4.978	0.00	0.00
10Yr 240Min Winter	8.510	0.00	0.00	100Yr+40% 1440Min Summer	4.978	0.00	0.00

Simulation Results

Return Period Yrs: 1.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
PS4	15 min Winter	8	94.569	0.028	1.436		OK
PS3	15 min Winter	8	94.364	0.036	2.151		OK
PS2	15 min Winter	9	94.316	0.085	2.101		OK
PS5	-	0	94.690	0.000	0.000		OK
PS1	15 min Winter	8	94.269	0.040	5.593		OK
S4	15 min Winter	8	93.753	0.003	5.559		OK
PS10	15 min Winter	8	94.963	0.013	0.285		OK
PS9	15 min Winter	8	94.807	0.018	0.844		OK
PS8	15 min Winter	9	94.657	0.010	0.168		OK
PS7	15 min Winter	9	94.496	0.017	1.373		OK
PS6	15 min Winter	9	93.726	0.076	1.383		OK
S3	60 min Winter	41	93.632	0.082	1.955		OK
S2	60 min Winter	44	93.643	0.116	2.150		OK
S1	60 min Winter	43	92.904	0.016	2.031		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	PS4	PS3	0.028	0.602	1.403	0.079	OK
1.001	15 min Winter	8	PS3	PS2	0.060	0.435	2.126	0.126	OK
1.002	15 min Winter	9	PS2	PS1	0.037	0.619	2.122	0.122	OK
2.000	15 min Winter	8	PS5	PS1	0.020	0.000	0.000	0.000	OK
1.003	15 min Winter	8	PS1	S4	0.021	3.597	5.559	0.103	OK
1.004	60 min Winter	41	S4	S3	0.041	0.039	2.897	0.000	OK
3.000	15 min Winter	8	PS10	PS9	0.015	0.285	0.275	0.016	OK
3.001	15 min Winter	9	PS9	PS7	0.018	0.684	0.821	0.031	OK
4.000	15 min Winter	9	PS8	PS7	0.014	0.208	0.172	0.010	OK
3.002	15 min Winter	9	PS7	PS6	0.047	0.704	1.383	0.029	OK
3.003	15 min Winter	9	PS6	S3	0.026	0.851	1.391	0.150	OK
1.005	60 min Winter	44	S3	S2	0.073	0.649	2.631	0.093	OK
1.006	60 min Winter	43	S2	S1	0.016	2.003	2.031	0.024	OK

Return Period Yrs: 2.0
Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
PS4	15 min Winter	8	94.572	0.031	1.666		OK
PS3	15 min Winter	8	94.366	0.038	2.497		OK
PS2	15 min Winter	9	94.319	0.088	2.435		OK
PS5	-	0	94.690	0.000	0.000		OK
PS1	15 min Winter	8	94.272	0.043	6.495		OK
S4	15 min Winter	8	93.753	0.003	6.458		OK
PS10	15 min Winter	8	94.964	0.014	0.330		OK
PS9	15 min Winter	8	94.808	0.019	0.979		OK
PS8	15 min Winter	9	94.658	0.011	0.195		OK
PS7	15 min Winter	9	94.498	0.019	1.592		OK
PS6	15 min Winter	9	93.728	0.078	1.603		OK
S3	60 min Winter	42	93.643	0.093	2.024		OK
S2	60 min Winter	43	93.669	0.142	3.994		OK
S1	60 min Winter	43	92.904	0.016	2.149		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	PS4	PS3	0.031	0.629	1.629	0.092	OK
1.001	15 min Winter	8	PS3	PS2	0.063	0.444	2.471	0.146	OK
1.002	15 min Winter	9	PS2	PS1	0.040	0.648	2.463	0.141	OK
2.000	15 min Winter	8	PS5	PS1	0.021	0.000	0.000	0.000	OK
1.003	15 min Winter	8	PS1	S4	0.023	3.746	6.458	0.120	OK
1.004	60 min Winter	42	S4	S3	0.047	0.043	3.391	0.000	OK
3.000	15 min Winter	8	PS10	PS9	0.017	0.297	0.320	0.018	OK
3.001	15 min Winter	8	PS9	PS7	0.019	0.714	0.953	0.036	OK
4.000	15 min Winter	9	PS8	PS7	0.015	0.218	0.200	0.011	OK
3.002	15 min Winter	9	PS7	PS6	0.048	0.727	1.603	0.034	OK
3.003	15 min Winter	9	PS6	S3	0.028	0.889	1.616	0.174	OK
1.005	60 min Winter	43	S3	S2	0.092	0.652	5.104	0.181	OK
1.006	60 min Winter	43	S2	S1	0.016	2.031	2.149	0.026	OK

Return Period Yrs: 5.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
PS4	15 min Winter	8	94.575	0.034	2.027		OK
PS3	15 min Winter	8	94.371	0.043	3.041		OK
PS2	15 min Winter	8	94.323	0.092	3.012		OK
PS5	-	0	94.690	0.000	0.000		OK
PS1	15 min Winter	8	94.276	0.047	7.913		OK
S4	15 min Winter	8	93.754	0.004	7.873		OK
PS10	15 min Winter	8	94.965	0.015	0.402		OK
PS9	15 min Winter	8	94.810	0.021	1.193		OK
PS8	15 min Winter	8	94.659	0.012	0.254		OK
PS7	15 min Winter	8	94.500	0.021	1.978		OK
PS6	15 min Winter	9	93.731	0.081	1.951		OK
S3	60 min Winter	43	93.664	0.114	2.194		OK
S2	60 min Winter	39	93.701	0.174	2.542		Surcharged
S1	60 min Winter	47	92.905	0.017	2.359		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	PS4	PS3	0.034	0.666	1.985	0.112	OK
1.001	15 min Winter	8	PS3	PS2	0.067	0.443	3.012	0.178	OK
1.002	15 min Winter	9	PS2	PS1	0.045	0.685	2.992	0.172	OK
2.000	15 min Winter	8	PS5	PS1	0.024	0.000	0.000	0.000	OK
1.003	15 min Winter	8	PS1	S4	0.025	3.953	7.873	0.146	OK
1.004	60 min Winter	43	S4	S3	0.058	0.044	4.174	0.000	OK
3.000	15 min Winter	8	PS10	PS9	0.018	0.316	0.391	0.022	OK
3.001	15 min Winter	8	PS9	PS7	0.021	0.758	1.164	0.044	OK
4.000	15 min Winter	8	PS8	PS7	0.016	0.231	0.244	0.014	OK
3.002	15 min Winter	9	PS7	PS6	0.051	0.751	1.955	0.041	OK
3.003	15 min Winter	9	PS6	S3	0.031	0.940	1.969	0.213	OK
1.005	60 min Winter	48	S3	S2	0.106	0.691	8.795	0.312	OK
1.006	60 min Winter	47	S2	S1	0.017	2.094	2.359	0.028	OK

Return Period Yrs: 10.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
PS4	15 min Winter	8	94.577	0.036	2.351		OK
PS3	15 min Winter	8	94.374	0.046	3.530		OK
PS2	15 min Winter	8	94.326	0.095	3.499		OK
PS5	-	0	94.690	0.000	0.000		OK
PS1	15 min Winter	8	94.280	0.051	9.187		OK
S4	15 min Winter	8	93.754	0.004	9.143		OK
PS10	15 min Winter	8	94.966	0.016	0.465		OK
PS9	15 min Winter	8	94.812	0.023	1.385		OK
PS8	15 min Winter	8	94.660	0.013	0.294		OK
PS7	15 min Winter	8	94.501	0.022	2.299		OK
PS6	15 min Winter	9	93.734	0.084	2.261		OK
S3	60 min Winter	43	93.685	0.135	5.436		OK
S2	60 min Winter	46	93.721	0.194	5.003		Surcharged
S1	60 min Winter	45	92.905	0.017	2.420		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	PS4	PS3	0.036	0.696	2.306	0.131	OK
1.001	15 min Winter	8	PS3	PS2	0.071	0.434	3.499	0.207	OK
1.002	15 min Winter	9	PS2	PS1	0.048	0.715	3.466	0.199	OK
2.000	15 min Winter	8	PS5	PS1	0.026	0.000	0.000	0.000	OK
1.003	15 min Winter	8	PS1	S4	0.027	4.117	9.143	0.170	OK
1.004	60 min Winter	43	S4	S3	0.068	0.047	4.885	0.000	OK
3.000	15 min Winter	8	PS10	PS9	0.020	0.331	0.454	0.026	OK
3.001	15 min Winter	8	PS9	PS7	0.023	0.792	1.354	0.051	OK
4.000	15 min Winter	8	PS8	PS7	0.018	0.242	0.284	0.016	OK
3.002	15 min Winter	9	PS7	PS6	0.053	0.749	2.275	0.048	OK
3.003	15 min Winter	9	PS6	S3	0.034	0.980	2.285	0.247	OK
1.005	60 min Winter	44	S3	S2	0.117	0.707	10.274	0.365	OK
1.006	60 min Winter	45	S2	S1	0.017	2.110	2.420	0.029	OK

Return Period Yrs: 30.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
PS4	15 min Winter	8	94.582	0.041	2.974		OK
PS3	15 min Winter	8	94.380	0.052	4.470		OK
PS2	15 min Winter	8	94.333	0.102	4.435		OK
PS5	-	0	94.690	0.000	0.000		OK
PS1	15 min Winter	8	94.287	0.058	11.637		OK
S4	15 min Winter	8	93.754	0.004	11.585		OK
PS10	15 min Winter	8	94.968	0.018	0.588		OK
PS9	15 min Winter	8	94.815	0.026	1.753		OK
PS8	15 min Winter	8	94.662	0.015	0.372		OK
PS7	15 min Winter	8	94.504	0.025	2.915		OK
PS6	15 min Winter	9	93.738	0.088	2.858		OK
S3	60 min Winter	44	93.728	0.178	3.486		OK
S2	60 min Winter	47	93.728	0.201	2.521		Surcharged
S1	60 min Winter	38	92.905	0.017	2.460		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	PS4	PS3	0.041	0.744	2.920	0.165	OK
1.001	15 min Winter	8	PS3	PS2	0.077	0.486	4.435	0.262	OK
1.002	15 min Winter	8	PS2	PS1	0.055	0.765	4.387	0.252	OK
2.000	15 min Winter	8	PS5	PS1	0.029	0.000	0.000	0.000	OK
1.003	15 min Winter	8	PS1	S4	0.031	4.380	11.585	0.215	OK
1.004	60 min Winter	44	S4	S3	0.090	0.059	6.268	0.000	OK
3.000	15 min Winter	8	PS10	PS9	0.022	0.355	0.577	0.033	OK
3.001	15 min Winter	8	PS9	PS7	0.026	0.850	1.717	0.065	OK
4.000	15 min Winter	8	PS8	PS7	0.020	0.260	0.361	0.021	OK
3.002	15 min Winter	9	PS7	PS6	0.057	0.761	2.887	0.060	OK
3.003	60 min Winter	45	PS6	S3	0.055	0.883	1.580	0.171	OK
1.005	60 min Winter	44	S3	S2	0.139	0.717	9.671	0.343	OK
1.006	60 min Winter	38	S2	S1	0.018	2.123	2.460	0.029	OK

Return Period Yrs: 100.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
PS4	15 min Winter	8	94.588	0.047	3.848		OK
PS3	15 min Winter	8	94.388	0.060	5.788		OK
PS2	15 min Winter	8	94.341	0.110	5.747		OK
PS5	-	0	94.690	0.000	0.000		OK
PS1	15 min Winter	8	94.295	0.066	15.071		OK
S4	60 min Winter	46	93.785	0.035	2.589		OK
PS10	15 min Winter	8	94.971	0.021	0.761		OK
PS9	15 min Winter	8	94.818	0.029	2.271		OK
PS8	15 min Winter	8	94.664	0.017	0.481		OK
PS7	15 min Winter	8	94.507	0.028	3.781		OK
PS6	60 min Winter	46	93.785	0.135	0.602		OK
S3	60 min Winter	47	93.785	0.235	0.642		Surcharged
S2	60 min Winter	47	93.784	0.257	2.591		Surcharged
S1	60 min Winter	48	92.906	0.018	2.546		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	PS4	PS3	0.047	0.801	3.784	0.214	OK
1.001	15 min Winter	8	PS3	PS2	0.085	0.558	5.747	0.340	OK
1.002	15 min Winter	8	PS2	PS1	0.063	0.822	5.692	0.327	OK
2.000	15 min Winter	8	PS5	PS1	0.033	0.000	0.000	0.000	OK
1.003	15 min Winter	8	PS1	S4	0.036	4.675	15.009	0.279	OK
1.004	60 min Winter	46	S4	S3	0.135	0.066	8.237	0.000	Surcharged
3.000	15 min Winter	8	PS10	PS9	0.025	0.383	0.748	0.042	OK
3.001	15 min Winter	8	PS9	PS7	0.029	0.917	2.230	0.084	OK
4.000	15 min Winter	8	PS8	PS7	0.023	0.281	0.470	0.027	OK
3.002	60 min Winter	43	PS7	PS6	0.074	0.656	2.080	0.044	OK
3.003	60 min Winter	46	PS6	S3	0.093	0.942	2.820	0.304	OK
1.005	120 min Winter	69	S3	S2	0.150	0.695	10.370	0.368	Surcharged
1.006	60 min Winter	48	S2	S1	0.018	2.146	2.546	0.030	OK

Return Period Yrs: 100.0

Climate Change %: 40

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
PS4	15 min Winter	8	94.597	0.056	5.387		OK
PS3	15 min Winter	8	94.400	0.072	8.110		OK
PS2	15 min Winter	8	94.354	0.123	8.058		OK
PS5	-	0	94.690	0.000	0.000		OK
PS1	15 min Winter	8	94.308	0.079	21.124		OK
S4	120 min Winter	92	93.881	0.131	1.841		OK
PS10	15 min Winter	8	94.975	0.025	1.066		OK
PS9	15 min Winter	8	94.824	0.035	3.183		OK
PS8	15 min Winter	8	94.667	0.020	0.673		OK
PS7	15 min Winter	8	94.513	0.034	5.308		OK
PS6	120 min Winter	90	93.881	0.231	0.535		Surcharged
S3	120 min Winter	90	93.881	0.331	2.641		Surcharged
S2	120 min Winter	90	93.880	0.353	2.572		Surcharged
S1	60 min Summer	46	92.906	0.018	2.571		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	PS4	PS3	0.056	0.880	5.305	0.300	OK
1.001	15 min Winter	8	PS3	PS2	0.098	0.663	8.058	0.476	OK
1.002	15 min Winter	8	PS2	PS1	0.076	0.901	7.991	0.458	OK
2.000	15 min Winter	8	PS5	PS1	0.040	0.000	0.000	0.000	OK
1.003	120 min Winter	87	PS1	S4	0.076	3.845	7.356	0.137	OK
1.004	120 min Winter	92	S4	S3	0.231	0.059	14.558	0.000	Surcharged
3.000	15 min Winter	8	PS10	PS9	0.030	0.424	1.051	0.059	OK
3.001	15 min Winter	8	PS9	PS7	0.035	1.013	3.132	0.118	OK
4.000	15 min Winter	8	PS8	PS7	0.027	0.311	0.661	0.038	OK
3.002	30 min Winter	19	PS7	PS6	0.088	0.746	4.310	0.090	OK
3.003	30 min Winter	20	PS6	S3	0.100	1.127	4.198	0.453	Surcharged
1.005	360 min Winter	199	S3	S2	0.150	0.710	10.343	0.367	Surcharged
1.006	60 min Summer	46	S2	S1	0.018	2.153	2.571	0.031	OK