

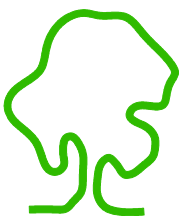
3 OAKDENE, BURSELDON



SOUTHAMPTON, SO31 8BE

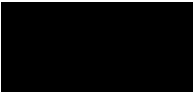
Foul and Surface Water Drainage Strategy

May 2024



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Environmental Assessment Services Ltd

REPORT DATA SHEET

Requirement	Data
Report Reference	701/BJCPlanning/3Oakdene/Drainage
Date	May 2024
Client	Tracey Buckland
Report type	Drainage Design
Purpose	Planning
Revisions	
Prepared by	Xanthe Lyford BSc (Hons)  Signed
Approved by	Eur Ing Malcolm McKemey BSc (Hons), CEng, CEnv, MICE, MCIWEM, MIEnvSc  Signed

TRACEY BUCKLAND

3 OAKDENE, WINDMILL LANE, BURSLEDON, SOUTHAMPTON, SO31 8BE

Drainage Design

May 2024

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TRACEY BUCKLAND

3 OAKDENE, WINDMILL LANE, BURSLEDON, SOUTHAMPTON, SO31 8BE

Drainage Design

May 2024

1. BACKGROUND, EXISTING SITE & PROPOSED DEVELOPMENT

- 1.1 The site as existing comprises an area of gravel/hardcore to the north of the plot with three storage containers at the far end (to be removed), the rest of the site is laid to hardstanding. A kitchen and laundry building is situated along the eastern boundary fence (to be replaced with the same style of building, on the same footprint). The existing property (3 Oakdene), a long-established mobile home which lies adjacent to the kitchen and laundry building on the eastern boundary of the site, is to remain. The site has existing access to Windmill Lane to the northwest via a tarmacked drive and parking area.
- 1.2 The site lies in Bursledon in a semi-rural, residential area. The surrounding area comprises detached properties with gardens to the north, detached mobile homes on hardstanding (in the same style as 3 Oakdene) to the west, fields for pasture to the south and southwest and the M27 motorway to the east (separated by a fence and a treeline). The site area is approximately 0.1 ha. The Ordnance Survey (OS) map reference for the site is SU 48494 11019. The site elevation is approximately +41 m OD. See Appendix A, Figure 1 for the site location.
- 1.3 It is proposed to construct a two-bedroom, single-storey mobile home (on the location of the existing storage containers) with an additional amenity building for the kitchen and laundry building to the southwest of the site. This will replace the existing kitchen and laundry building and will lie on the same footprint. See Appendix A, Figure 2 – Proposed Development.

2. GEOLOGY & HYDROGEOLOGICAL CONSIDERATIONS

- 2.1 According to the British Geological Survey, the site lies on Witterings Formation – sand, silt and clay over Sedimentary bedrock formed during the Paleogene period. The DEFRA magic site classifies the soil type as slowly permeable, seasonally wet slightly acid, rich based loamy and clayey soil.
- 2.2 The site lies on a Bedrock Secondary A Aquifer with unproductive Superficial Drift. It is within an area of medium groundwater vulnerability. The site does not lie within a groundwater source protection zone.
- 2.3 According to the Environment Agency (EA) online ‘Flood Map for Planning’, the site lies within Flood Zone 1, defined as land having a less than 0.1% probability of fluvial flooding. The site is not considered to be at risk of flooding from surface water. Flooding from groundwater and reservoirs is considered unlikely in this area. The long-term flooding projection classifies the site as

being at very low risk of flooding from rivers and the sea and at very low risk of flooding from surface water (very low risk means less than 0.1% chance of flooding each year).

3. EXISTING SITE DRAINAGE

- 3.1 The site was visited on Wednesday 22nd May 2024. Photographs of the site are provided in Appendix D.
- 3.2 The site, at the time of the visits, was mostly hardstanding with an area of gravel/hardcore at the northern end. The surface water drainage from the existing mobile home (3 Oakdene) is drained via gullies to a French Drain which appears to act as a trench soakaway and runs along the boundary fence to the southwest of the site, and from there overflows to the storm drain in the northeastern, end corner of the end of Windmill Lane. The kitchen and laundry building drains its surface water via an Eco Drain to a French Drain that runs along the boundary fence to the northeast of the site, this also appears to act as a trench soakaway.
- 3.3 The foul sewerage at the two existing buildings (3 Oakdene and the kitchen and laundry building) is connected to a main sewer, managed by Southern Water. The associated manhole (chamber number 4002) is located in the northeastern end of Windmill Lane. This appears to be in good working order. See Figure 3 in Appendix A for the Southern Water Sewer Plans.
- 3.4 A connection to the existing foul sewer and a SuDS surface water drainage scheme will be required for the proposed new house.
- 3.5 There is a general requirement that new drainage systems should be sustainable (SuDS) and that flow leaving the site should not exceed the Greenfield flow, including both surface water and sewage effluent.
- 3.6 The Greenfield runoff rate for the site has been calculated using the UK SuDS tools (See Appendix B), and the results are summarised in Table 3.1 below:

TABLE 3.1
GREENFIELD RUNOFF RATES

Return period	Flow rates (l/s)
Qbar	0.56
1 in 1 year	0.47
1 in 30 year	1.28
1 in 100 year	1.78
1 in 200 year	2.08

- 3.7 In any case, the maximum discharge permitted to leave the site from the drained area post development should not exceed Qbar (0.56 l/s). The foul sewage should also be allowed for in the permitted off-site discharge flow rate. The foul sewage from the proposed development would be 0.046 l/s (based on the

Sewers for Adoption recommendations for a single dwelling), making a total of 0.06l/s See Appendix B for Greenfield Flow Rates Data

4 SOIL PERMEABILITY

- 4.1 The site is drained by two French Drains acting as soakaway trenches. The same method (soakaway) is recommended as a drainage strategy for the proposed dwelling. The underlying soil has been confirmed as sand and gravel, with hardcore from a previous mobile home on the site. The soil appears to drain well, and the French Drains/soakaway trenches are successful in disposing of the surface water from the site. It is deemed that drainage to soakaway would be practicable for this site. Percolation testing could be carried out to confirm this if required.

5 PROPOSED SURFACE WATER DRAINAGE OPTIONS

- 5.1 The proposed development is not expected to result in an increase in the impermeable areas on site. The site is already mostly under Hardstanding. The graveled area at the northern end, where the proposed mobile home is to be located, is partly covered by three large metal storage/shipping containers (to be removed) adding to the existing impermeability of the area. It had been estimated that the surface area of the containers is 45.90 m². The surface area of the proposed mobile home is 39.27 m². At the site visit the owners were amenable to including permeable paving into the design for the hard standing areas surrounding the building, as well as some soft landscaping/lawn adjacent to the dwelling. Taking this into account, as well as the reduction in surface area by the removal of the existing storage containers, the surface runoff from the site will be decreased by the development.
- 5.2 The underlying Witterings Formation has been shown to be suitable for soakaway drainage due to the permeability of the ground, as shown by the presence and successful use of the French Drains acting as soakaway trenches running along both boundary fences. It is considered that drainage to soakaway will therefore be practicable for this development. This is considered to be the preferred Sustainable Drainage System (SuDS) solution in the SuDS hierarchy for this site.
- 5.3 An alternative to drainage to soakaway would be drainage to attenuation storage, where surface water flow exceeding Q_{bar} is stored in an attenuation pond or underground storage unit, with a flow control chamber and released through a vortex valve at a rate limited to greenfield flow (as close as practicable).
- 5.4 The proposed development will include paved areas around the new mobile home. The size of the soakaway needed has been significantly reduced by the use of permeable paving and soft landscaping in the design, as agreed at the time of the site visit. It has been calculated that a soakaway of 2.5 m x 3 m x 0.8 m deep would be suitable for this site, this is assuming a percolation rate of 1 x 10⁻⁵ m/s. See Figure 5 in Appendix A for permeable paving design.

6. SURFACE WATER DRAINAGE DESIGN

6.1 Design Philosophy

- 6.1.1 The drainage strategy is for surface water to be drained to soakaway, located within the tarmacked area in front of the entrance to the site and with an extreme event overflow to the storm drain located at the northeastern corner of Windmill Lane. See Appendix D for photographs of the storm drain.

6.2 Design Storm

- 6.2.1 The surface water drainage system has been designed for the 30-year return period event plus a 40% allowance for climate change and tested for surcharge for the 1 in 100 return period event (1% Annual Exceedance Probability) plus a 45% allowance for climate change. See Appendix A, Figure 4 for the proposed drainage design and Appendix C for pipe and chamber layout.

6.3 Drainage Design Model

- 6.3.1 The soakaway has been designed to accommodate the 1 in 100-year return period storm including a 45% allowance for climate change. An appropriate soakaway size has been calculated as 2.5 m x 3 m x 0.8 m. The soakaway must be located not less than 5 m from the edge of the nearest building and 2.5 m from the nearest boundary. The soakaway is proposed to be located in the tarmacked parking area in front of the entrance to the site with an extreme event overflow to the storm drain in Windmill Lane. This location is 5 m from both buildings and 2.5 m from any boundary of the site. See Appendix C for output from the Masterdrain Design model. See Figure 4 in Appendix A for the Drainage Design.

6.4 Hydrogeological Data

- 6.4.1 Hydrological data for the site as used in the MasterDrain model is given in Appendix C.

6.5 Extreme Event

- 6.5.1 An extreme event, which overwhelmed the drainage system, would probably result in water following the existing course and flowing northwest into the storm drain located in the northeastern of the end of Windmill Lane.

7. PROPOSED FOUL DRAINAGE

- 7.1 The existing mobile home (3 Oakdene), as well as the mobile homes on the neighbouring sites (1 & 2 Oakdene) and the kitchen and laundry building, drain into the main foul water sewage system managed by Southern Water, via the existing manhole (chamber number 4002) located at the northeastern end of the Windmill Lane. See Figure 3 in Appendix A for Southern Water Sewer Plans and Appendix D for photograph of the location of the existing foul water manhole.

7.2 The foul drainage must connect to the public foul sewer if a suitable sewer is located within 30 m of the boundary. In this case there are public sewers within practicable reach and the sewage will be disposed of via the mains system.

7.3 The foul sewage design flow from the proposed development would be 0.046 l/s (based on the Sewers for Adoption recommendations for a single dwelling). See Figure 3 and Appendix C for the Southern Water Sewage Plans and levels and Appendix C for the data from the MasterDrain model.

8 OPERATION & MAINTENANCE OF THE SYSTEM

8.1 The drainage system will require minimal operational input once construction has been completed. However, it will require some regular maintenance.

8.2 Items requiring maintenance will include:

- Gullies, strip chambers and channels will need regular removal of accumulated debris.

9. SUMMARY

9.1 The existing buildings at the site (the kitchen and laundry building, and no. 3 Oakdene) presently drain well into to the French Drains that run along the site boundary fences to the northeast and northwest and act as trench soakaways. The proposed development does not appear likely to cause any elevated flood risk to neighbouring properties. The use of permeable paving for the areas of hard standing surrounding the proposed dwelling, as well as the construction of an area of soft landscaping/lawn adjacent to the dwelling, will further reduce the runoff from the site and the size of the soakaway required. Rainwater harvesting/water butts and incorporating a rain garden in the grounds of the house would further improve sustainability.

9.2 The underlying geology, being Wittering formation, sand, silt and clay over Sedimentary bedrock, exhibits varying permeability. However, the soil type at the site has proven to be sandy, gravelly with hardcore from a previous dwelling, and is working well as a French drain/trench soakaway for the two existing buildings.

9.3 The chosen SuDS option for the discharge of surface water is drainage to soakaway, located below the tarmacked parking area in front of the site entrance, allowing for the 5 m clearance from any building and 2.5 m from any boundary. An extreme event overtopping the system would likely follow the existing pattern, draining to the storm drain located in the northeastern end of Windmill Lane. A suitable sized soakaway would be 2.5 m x 3 m x 0.8 m deep, subject to percolation testing to confirm. The proposed permeable paving in the areas of hard standing, and soft landscaping/lawn, on the site has reduced the size of soakaway required. See Figure 4 in Appendix A for the Drainage Design.

9.4 Foul sewage from the proposed property is proposed to be discharged to the main sewage system managed by Southern Water via the existing manhole (chamber number 2004) in the northeastern end of Windmill Lane. See

Appendix D for photograph of the location of the existing foul water manhole and Appendix A, Figure 3 for the Southern Water Sewer Maps.

☆☆☆☆☆☆

APPENDIX A

- Figure 1: Site Location
- Figure 2: Proposed Development
- Figure 3: Southern Water Sewer Plans
- Figure 4: Suggested Drainage Plan
- Figure 5: Permeable Paving Design

Figure 1: Site Location

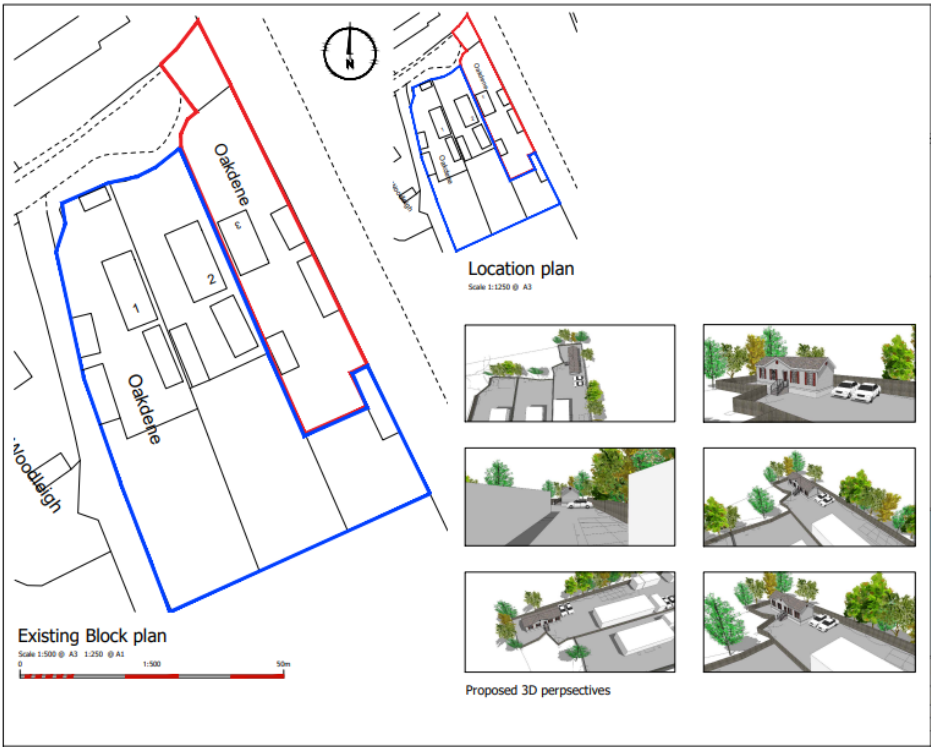
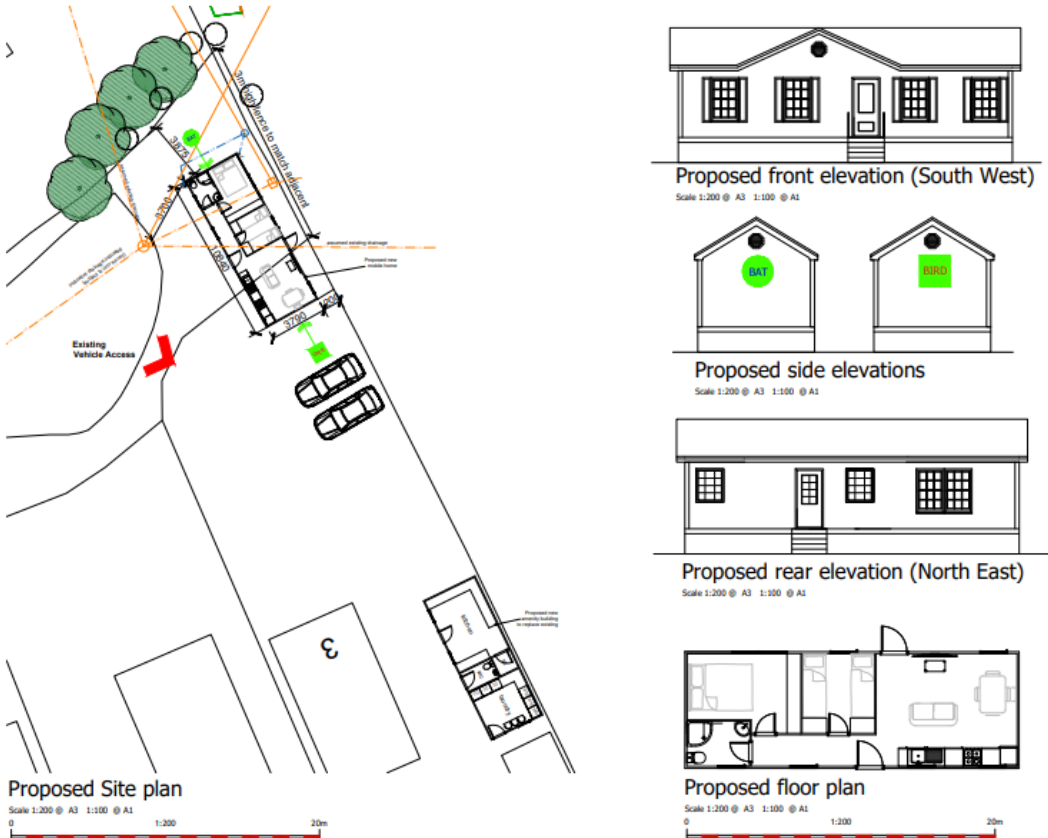
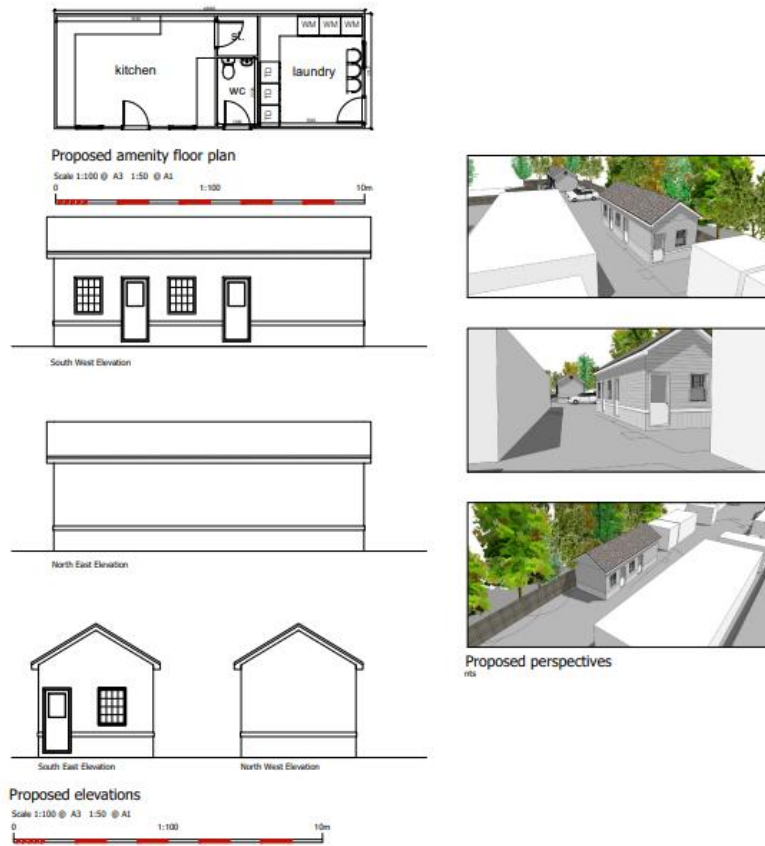


Figure 2: Proposed Development





(c) Crown copyright and database rights 2024 Ordnance Survey 100031673 Date: 23/05/24 Scale: 1:1250 Map Centre: 448489,111003 Data updated: 12/04/24 Our Ref: 1477334 - 1 Wastewater Plan A4

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies are not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

- Pipe Quality Score - Combined Gravity Sewer - Combined Gravity Sewer with Trunk Effluent - Combined Canal - Foul Outfall - Watercourse / Wash or Siphon	- Controlled Water Course of Trunk Effluent - Surface Water Drainage - Surface Water Outfall - Surface Water Inlet	- Continued Pumping Station - Surface Water Pumping Station - Flow Reversal Station - Water Treatment Works - Sewer Overflow - Washing Line Discharge Area	- Pipe Material - Bonded Asbestos Cement - Unknown (UNK) - Other Materials - Other Materials - Other Materials - Other Materials
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malcolm@eastdl.co.uk

13 Oakdene

[illegible][illegible]

3 Oakdene

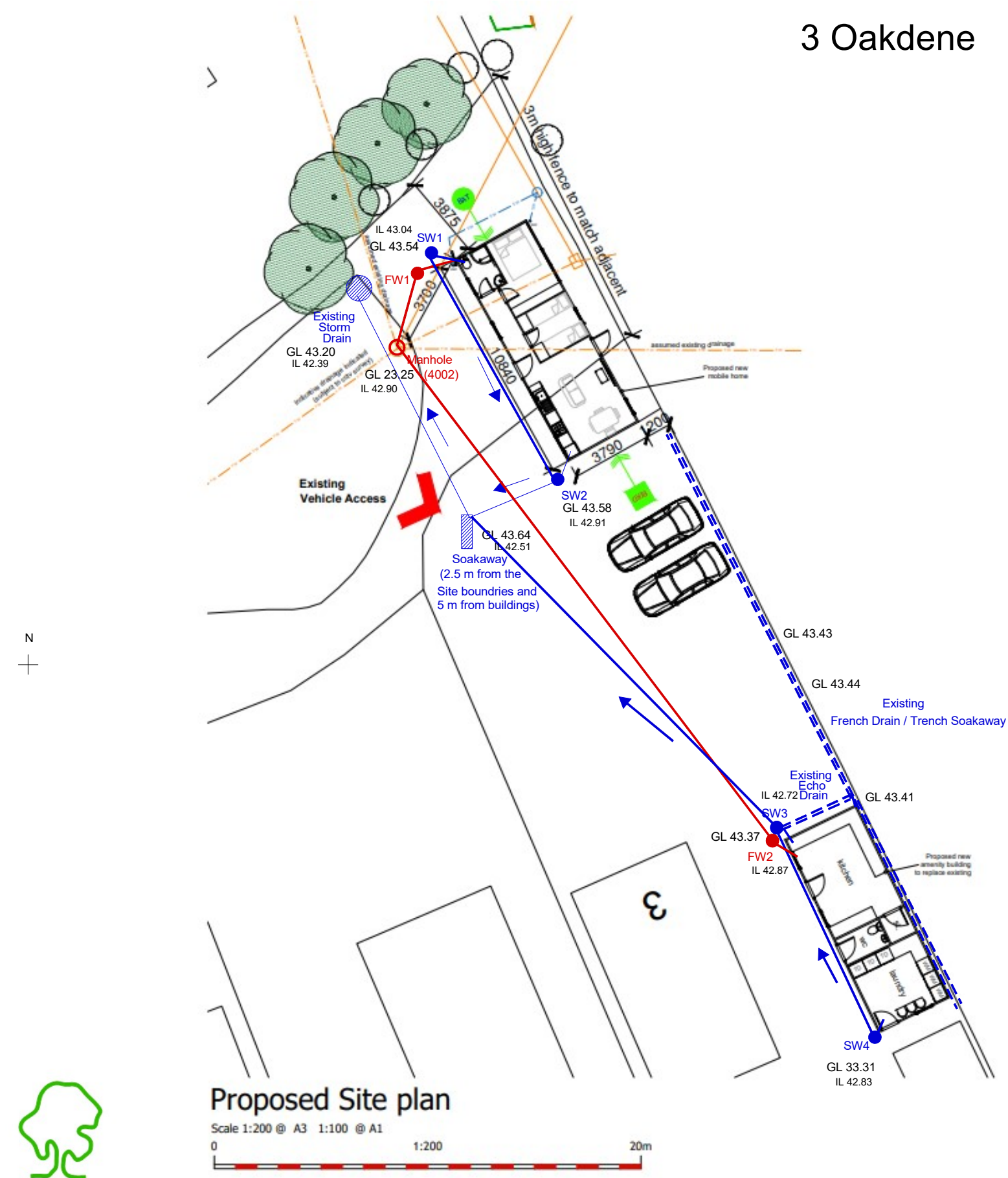
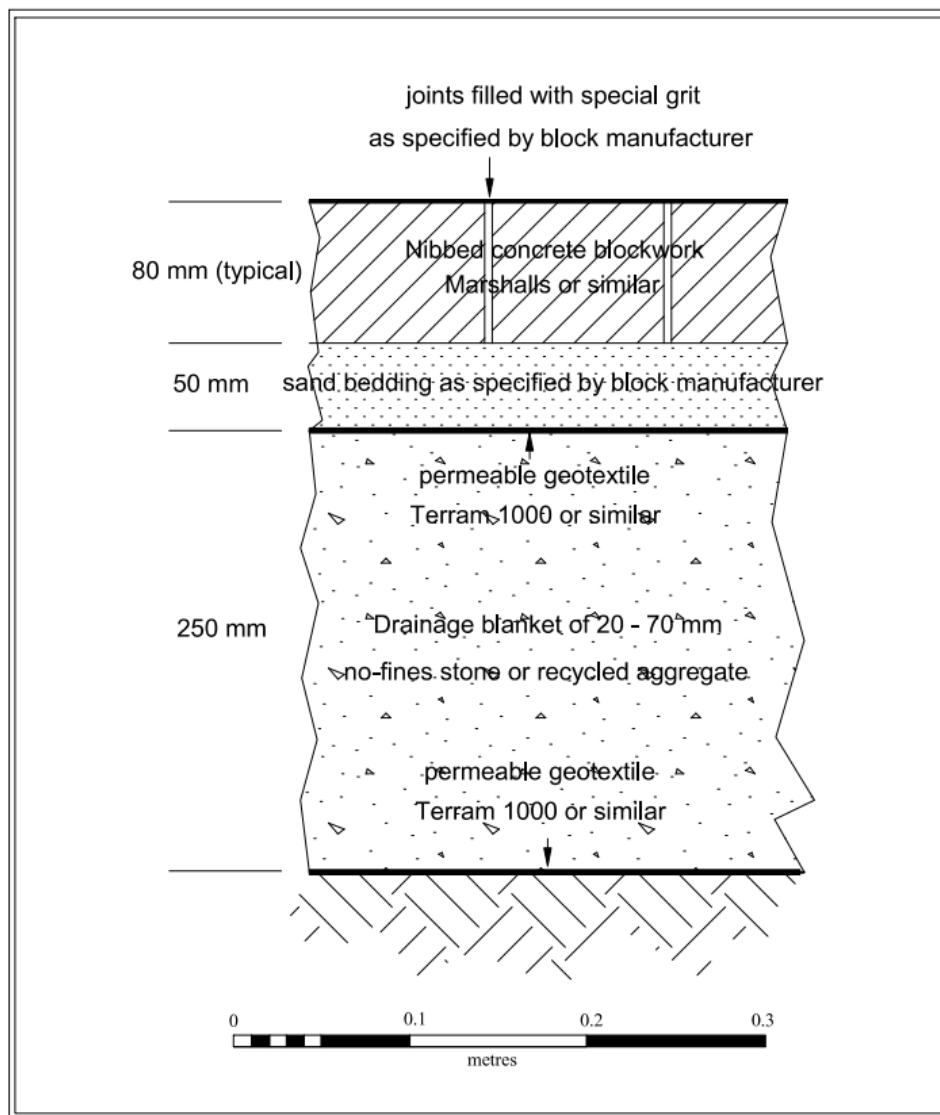


Figure 4 : Drainage Design

Figure 5: Permeable Paving Design



APPENDIX B

HR WALLINGFORD GREENFIELD FLOW

Calculated by:	Xanthe Lyford
Site name:	3 Oakdene
Site location:	Burseldon, Southampton

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:	50.89666° N
Longitude:	1.31212° W
Reference:	666598303
Date:	May 22 2024 10:55

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	0.1
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Methodology

Q _{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

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

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

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates $< 5.0 \text{ l/s}$?

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.

Hydrological characteristics

	Default	Edited
SAAR (mm):	791	791
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is $\text{SPR/SPRHOST} \leq 0.3$?

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

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):	0.56	0.56
1 in 1 year (l/s):	0.47	0.47
1 in 30 years (l/s):	1.28	1.28
1 in 100 year (l/s):	1.78	1.78
1 in 200 years (l/s):	2.08	2.08

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.

APPENDIX C:

OUTPUT FROM DRAINAGE DESIGN SOFTWARE AND
UNDERGROUND ATTENUATION STORAGE CALCULATIONS



MasterDrain
SW

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Job No. 701		
Sheet no. 1		
Date 28/05/24		
By XL	Checked	Reviewed

Project 3 Oakdene, Bruseldon
Title Surcharge calcs (Sized at 10 yrs storm) for BURSELDON.SW CCF = 45%

Free flowing outlet
Return period = 100 yrs
Climate change factor = 45

PEAK hydrograph values printed
Storm duration = 15 mins
No offline storage

Mean rain intens. 137.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 537.04 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²) x FACTOR	STATUS
1	I	1.01 SW4	5.9	1.1	100	450	42.83	42.85	43.33	0.19	0.02	0.00	0.000	17	OK
2	I	1.02 SW3	12.2	2.2	100	450	42.72	42.74	43.37	0.18	0.02	0.00	0.000	34	OK
3	B	2.01 SW1	6.1	1.2	100	450	43.04	43.07	43.54	0.20	0.03	0.00	0.000	19	OK
4	B	2.02 SW2	17.6	2.5	100	450	42.91	42.93	43.58	0.14	0.02	0.00	0.000	38	OK
5	I	1.04 Soakaway	-1.8	4.7	100	900	42.15	42.33	43.64	-2.59	0.18	6.51	0.000	72	Surch.



MasterDrain
SW

Environmental Assessment Services Ltd

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Job No. 701		
Sheet no. 2		
Date 28/05/24		
By XL	Checked	Reviewed

Project **3 Oakdene, Bruseldon**

Title **Surcharge calcs (Sized at 10 yrs storm) for BURSELDON.SW CCF = 45%**

Notes

Printout headings

- | | | |
|---|---|--|
| 1) Entry no - position in file | 2) Section no - pipe identifier | 3) Manhole ref - Manhole identifier |
| 4) Pipe cap - full bore capacity of that pipe | 5) Rate of flow - calculated flow rate (l/s) ± = flow restrictor. | 6) Pipe diam - outlet pipe diameter (mm) |
| 7) Chamber diam - chamber diam. at base of MH | 8) Invert level - invert level of manhole | 9) Water level - calculated peak water level. |
| 10) Grnd level - ground / cover level | 11) Surch. fract - calc.flow/pipe capacity | 12) Surch. depth - surcharge level above soffit |
| 13) Overflow - surcharged flow rate (l/s) | 14) Flooded vol - volume of water above cover | 15) Upstrm Vol - upstream pipe vol to previous manhole(s) |
| 16) Status - OK - outlet not surcharged | 17) Status - Surcharged - outlet surcharged | 18) Status - Warning - water level within 299mm of cover level |
| 19) Status - Flooded - cover over-topped | 20) § against diameter indicates throttle pipe used. | |

Title box

Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 1) Ret. period - that used to calculate profile | 2) Duration - length of storm (mins) | 3) Profile - either Winter (75%) or Summer (50%) |
|---|--------------------------------------|--|



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Job No. 701		
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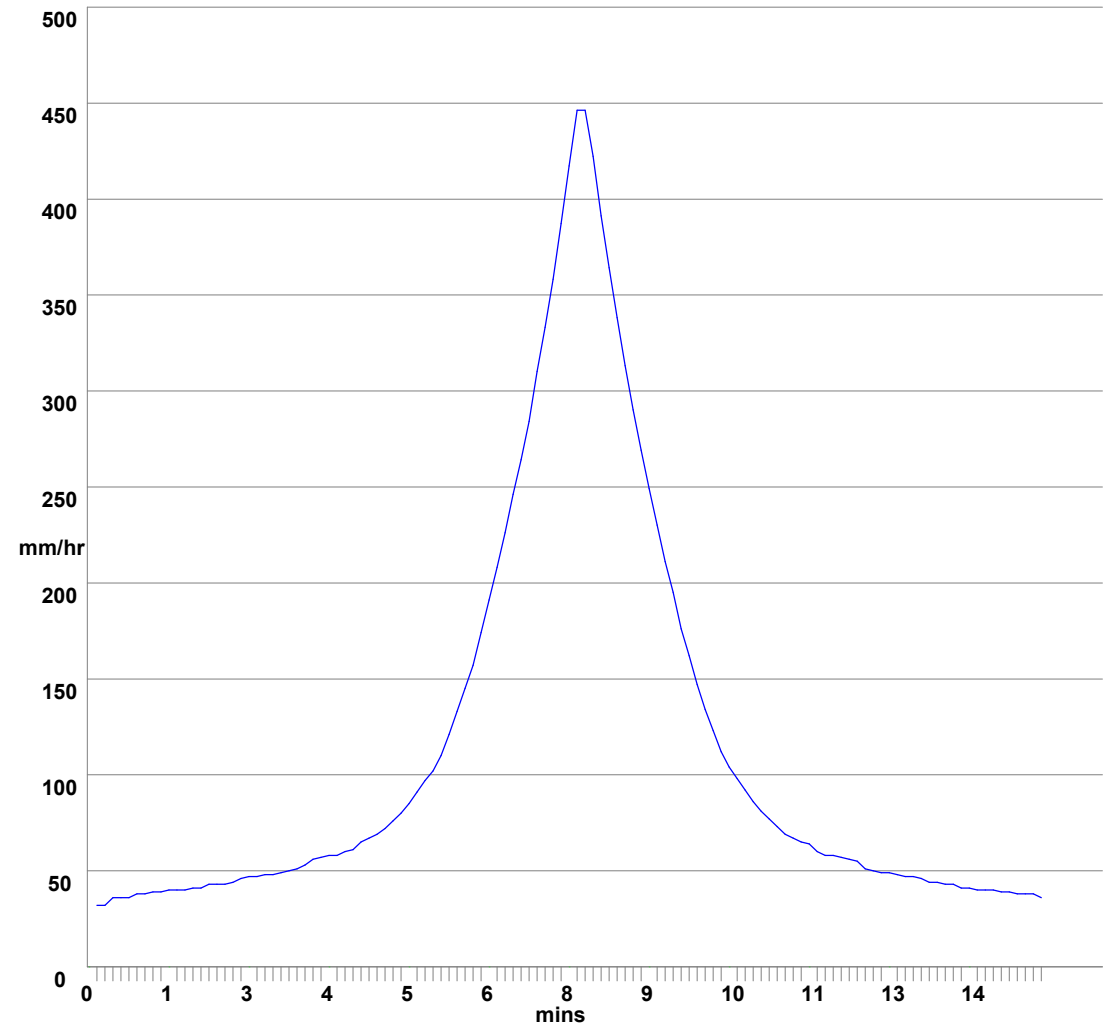
MasterDrain
SW

Project 3 Oakdene, Bruseldon
Title Surcharge calcs (Sized at 10 yrs storm) for BURSELDON.SW CCF = 45%

Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:08	31.86	5:08	91.04	10:08	97.87
0:15	31.86	5:15	96.73	10:15	92.18
0:22	36.42	5:22	102.42	10:22	86.49
0:30	36.42	5:30	110.39	10:30	80.80
0:38	36.42	5:38	120.63	10:38	77.38
0:45	37.55	5:45	133.15	10:45	72.83
0:52	37.55	5:52	144.53	10:52	69.42
1:00	38.69	6:00	157.04	11:00	67.14
1:08	38.69	6:08	174.11	11:08	64.87
1:15	39.83	6:15	191.18	11:15	63.73
1:22	39.83	6:22	208.25	11:22	60.31
1:30	39.83	6:30	226.46	11:30	58.04
1:38	40.97	6:38	245.81	11:38	58.04
1:45	40.97	6:45	264.02	11:45	56.90
1:52	43.24	6:52	284.50	11:52	55.76
2:00	43.24	7:00	309.54	12:00	54.62
2:08	43.24	7:08	333.43	12:08	51.21
2:15	44.38	7:15	358.47	12:15	50.07
2:22	45.52	7:22	386.92	12:22	48.93
2:30	46.66	7:30	416.51	12:30	48.93
2:38	46.66	7:38	446.10	12:38	47.80
2:45	47.80	7:45	446.10	12:45	46.66
2:52	47.80	7:52	422.20	12:52	46.66
3:00	48.93	8:00	391.47	13:00	45.52
3:08	50.07	8:08	364.16	13:08	44.38
3:15	51.21	8:15	337.99	13:15	44.38
3:22	53.49	8:22	312.95	13:22	43.24
3:30	55.76	8:30	290.19	13:30	43.24
3:38	56.90	8:38	268.57	13:38	40.97
3:45	58.04	8:45	249.22	13:45	40.97
3:52	58.04	8:52	229.88	13:52	39.83
4:00	60.31	9:00	210.53	14:00	39.83
4:08	61.45	9:08	194.60	14:08	39.83
4:15	64.87	9:15	176.39	14:15	38.69
4:22	67.14	9:22	161.60	14:22	38.69
4:30	69.42	9:30	146.80	14:30	37.55
4:38	71.69	9:38	134.28	14:38	37.55
4:45	76.25	9:45	122.90	14:45	37.55
4:52	79.66	9:52	111.52	14:52	36.42
5:00	85.35	10:00	103.56	15:00	36.42

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 15 mins Profile - summer





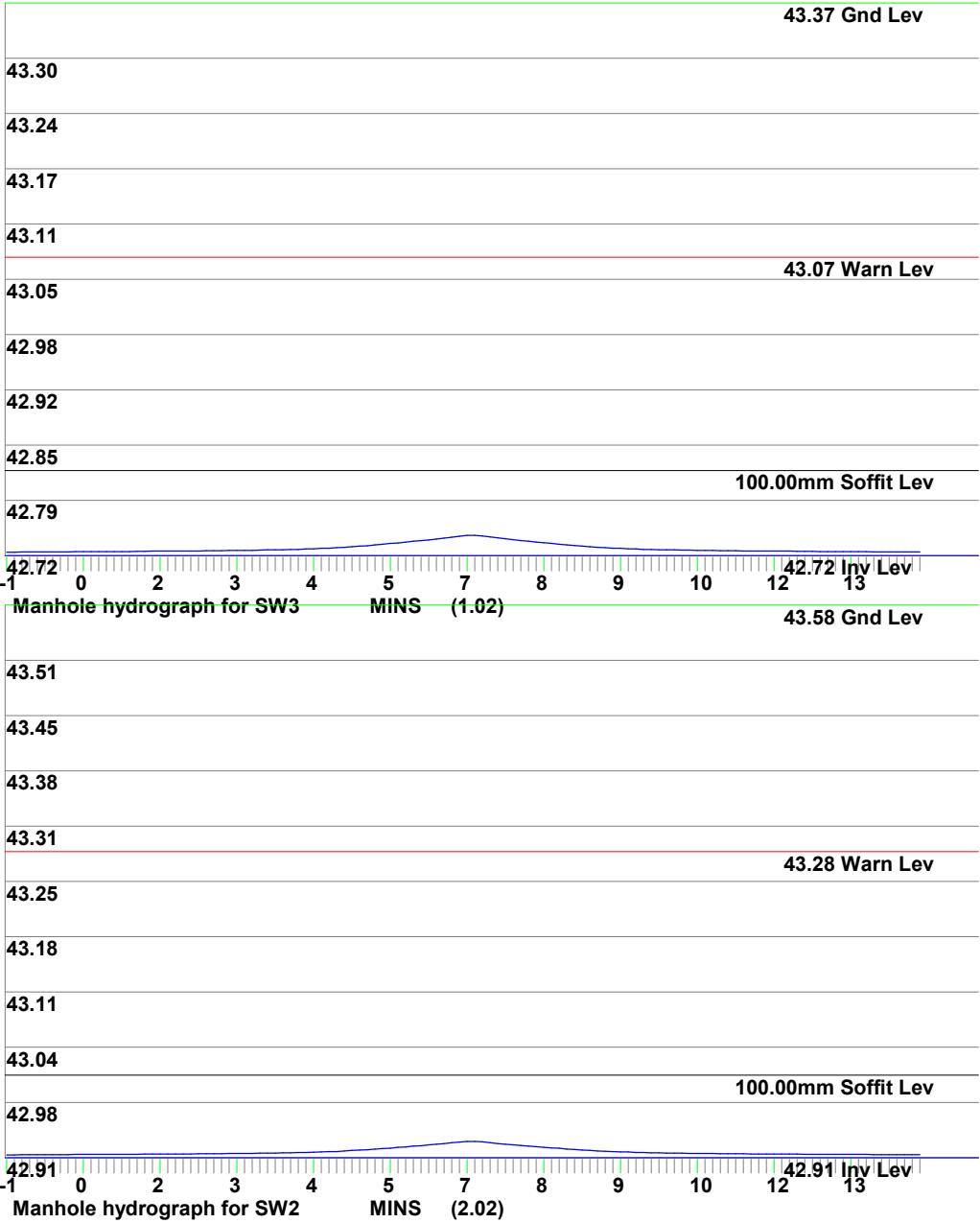
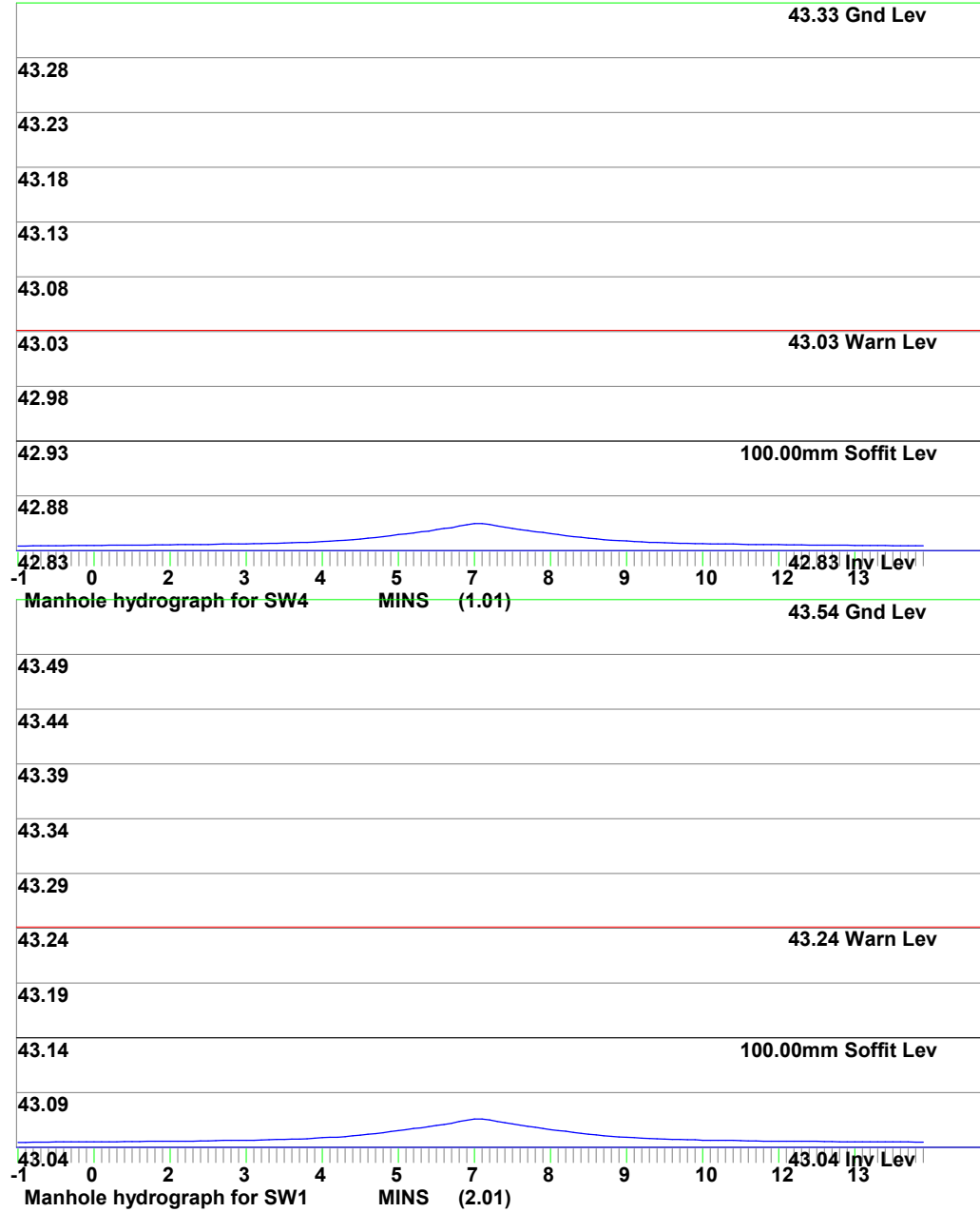
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SW

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Project 3 Oakdene, Bruseldon	Title Surcharge calcs (Sized at 10 yrs storm) for BURSELDON.SW CCF = 45%





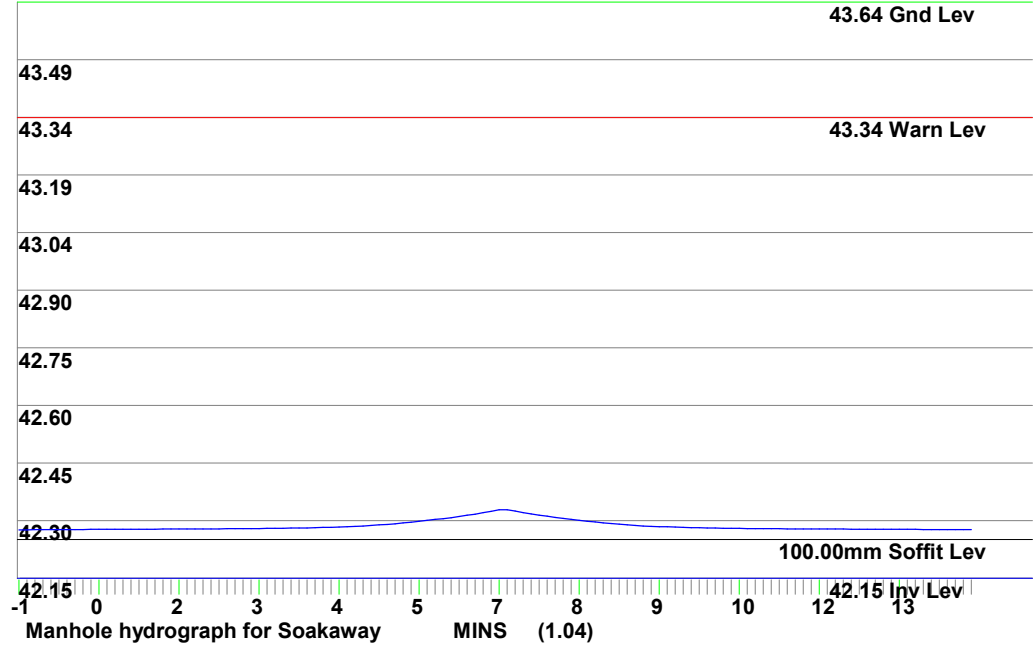
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Project 3 Oakdene, Bruseldon	By XL	Checked	Reviewed
Title Surcharge calcs (Sized at 10 yrs storm) for BURSELDON.SW CCF = 45%			





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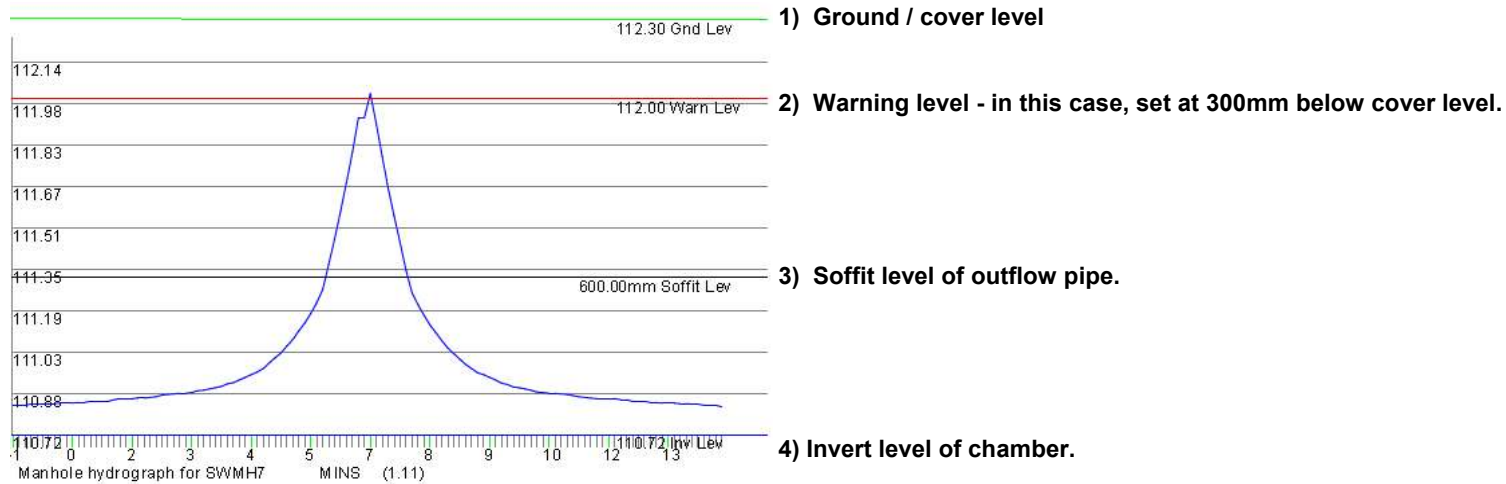
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Project
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Title
Surcharge calcs (Sized at 10 yrs storm) for BURSELDON.SW CCF = 45%



Notes

- Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
- Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
- The top of the graph clips the warning level and would be marked thus on the printout.
- In many cases the invert of the offline storage is required to enter at the channel soffit level, meaning that the pipe will still surcharge but flooding risk reduced.
- The diagram above is a general one and is not part of the current calculation.



MasterDrain
SW 16.54

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Project **3 Oakdene Burseldon**

Title **Filled pit soakaway calculations for Burseldon**

Data:-

Location hydrological data (FSR):-

Location	= Burseldon	Grid reference	= SU1048
M5-60 (mm)	= 20.0	r	= 0.35
Soil index	= 0.45	SAAR (mm/yr)	= 850
WRAP	= 4	Area	= England and Wales

Soil classification for WRAP type 4

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Design data:-

Safety factor = 2.0 - Minor inconvenience (SF=2)
Fill porosity = 0.95 - Plastic cells (porosity = 0.95)

Equivalent porosity (n1) = 0.95

Pit dimensions= 2.5 x 3.0 metres

Area drained = 76 m²

Infiltration coefficient = 0.036 m/hr
Effective inf.coeff (q) = 0.018

Return period = 100 yrs

Climate change factor = 30%

Calculations :-

Filled Excavation:-

Perimeter of pit = (2 x Excavation Width)+(2 x Excavation Length)
Area of base = Excavation Width x Excavation Length
Infiltration area = (Area of base)+(Perimeter of pit x Hmax)
Temporary constant 'a'
= (Area of base / perimeter)-((AreaDrained x Rainfall depth /1000)/((Perimeter/Inf. coeff))
Temporary constant 'b' = (Perimeter/Inf. coeff) / (Area of base x porosity)
Hmax = a*((EXP(-1 x b x Duration of storm))-1)

Note: The Hmax calculation is iterated to a maximum value of Hmax.

Note: Duration of storm in hours, Rainfall depth in mm/hr x Climate Change factor.

Results :-

Emptying time to 50% volume = 10:51 (hr:min)

hMax (Depth) = 0.74 metres

Time to maximum = 0:08 hr:min

Rainfall at maximum = 11.86mm/hr

Width (m) = 2.5

Length (m) = 3.0

Total Infiltration area = 15.7m² (base area + sidewall area).

Total available volume = 5.28m³

N.B. The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.
Formulae and methods from CIRIA 156.



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Project 3 Oakdene Burseldon		By XL	Checked	Reviewed
Title Worst case soakaway times to empty.				

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				Sheet no. 1		
				Date 28/05/24 12:43		
Project 3 Oakdene, Burseldon				By XL	Checked	Reviewed
Title Manhole printout for BURSELDON.SW						

Manhole ref.	X ref	Y ref	Form	Cham diam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Exit Diam	Exit Crown	Exit Invert	Chamb const	Slab level	Cover Level	Dwnstr MH
SW4	43.12	15.7	circ	450	N/A	0.50		0.08	100	42.955	42.830	N/A	42.780	43.330	SW3
SW3	34.87	7.6	circ	450	N/A	0.65		0.10	100	42.845	42.720	N/A	42.670	43.370	Soakaway
SW1	18.77	19.77	circ	450	N/A	0.50		0.08	100	43.165	43.040	N/A	42.990	43.540	SW2
SW2	24.7	8.5	circ	450	N/A	0.67		0.11	100	43.035	42.910	N/A	42.860	43.580	Soakaway
Soakaway	20.48	6.19	circ	900	N/A	1.49		0.95	100	42.275	42.150	N/A	42.100	43.640	orm Drain

All manholes to be as per 'Sewers for Adoption'

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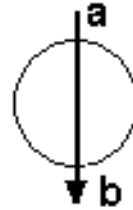
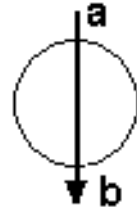
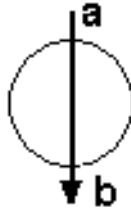
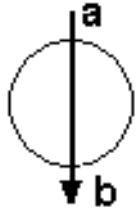
Project
3 Oakdene, Burseldon

Title
Manhole printout for BURSELDON.SW

By
XL

Checked

Reviewed



MH = SW4
a=head
b = 100

MH = SW3
a= 100
b = 100

MH = SW1
a=head
b = 100

MH = SW2
a= 100
b = 100

MH = Soakaway
a=head
b = 100
c = 100

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				Sheet no. 3		
				Date 28/05/24 12:43		
Project 3 Oakdene, Burseldon				By XL	Checked	Reviewed
Title Manhole printout for BURSELDON.SW						

These explanatory notes should be read in conjunction with the Manhole printout

- 1) Manhole ref - the reference for the manhole in question
- 2) Form - either circular or rectangular
- 3) Chamber diam or length - diameter of chamber if circular, or length if rectangular - in metres
- 4) Rectangular width - if form is rectangular, this gives the width of the chamber
- 5) Chamber height - height of chamber from invert
- 6) Shaft height - height of access shaft if applicable, from top of chamber to ground level
- 7) Manhole volume - cubic capacity of manhole chamber
- 8) Exit diameter - diameter of pipe leaving this manhole
- 9) Exit crown - crown level of pipe leaving this manhole
- 10) Exit invert - invert level of pipe leaving this manhole
- 11) Chamb const - manhole construction :-
 - N/A - not specified
 - Conc - concrete rings
 - Poly - polypropylene rings surrounded by selected fill
 - Poly/conc - polypropylene rings surrounded by concrete
 - Brick - brick built with waterproof render
 - In situ - concrete cast in situ
- 12) Slab level - surface level of base slab (if no sump, this is placed at 50mm below exit invert to allow levels manipulation).
- 13) Manhole diameters of 9999 have exceeded the sizes available in SfA
- 14) Manhole diameters may have to be modified due to the number of branches



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Foul 11.5

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Project 3 Oakdene, Burdeldon				By XL	Checked	Reviewed
Title Manhole printout for 3 OAKDENE.FL						

Manhole ref.	Form	Cham diam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Ent. Diam	Ent. Crown	Ent. Invert	Exit Diam	Exit Crown	Exit Invert	Chamb const	Cover Level	Dwnstr MH
FW2	circ	450	N/A	0.50		0.08	Head	----	----	100	42.995	42.870	N/A	43.370ain	Sewer
FW1	circ	450	N/A	0.50		0.08	Head	----	----	100	43.165	43.040	N/A	43.540ain	Sewer

All manholes to be as per 'Sewers for Adoption'

Levels calculated for level inverts



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Project 3 Oakdene, Burdeldon	
Title Manhole printout for 3 OAKDENE.FL	

These explanatory notes should be read in conjunction with the Manhole printout

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- 7) Manhole volume - cubic capacity of manhole chamber
- 8) Exit diameter - diameter of pipe leaving this manhole
- 9) Exit crown - crown level of pipe leaving this manhole
- 10) Exit invert - invert level of pipe leaving this manhole
- 11) Manhole diameters of 9999 have exceeded the sizes available in Sfa
- 12) Manhole diameters may have to be modified due to the number of branches

APPENDIX D

PHOTOGRAPHS

Showing proposed location of dwelling and storage containers.



Showing northeast boundary, junction between tarmac and gravel and proposed location of dwelling.



Showing north boundary fence with Windmill Lane.



Onsite soft landscaping in front of fence.



Existing kitchen, laundry building (to be replaced with the same).



Existing residence 3 Oakdene (to remain).



Manhole covering cable terminus.



Location of foul manhole in Windmill Lane.



Location of storm drain in Windmill Lane.



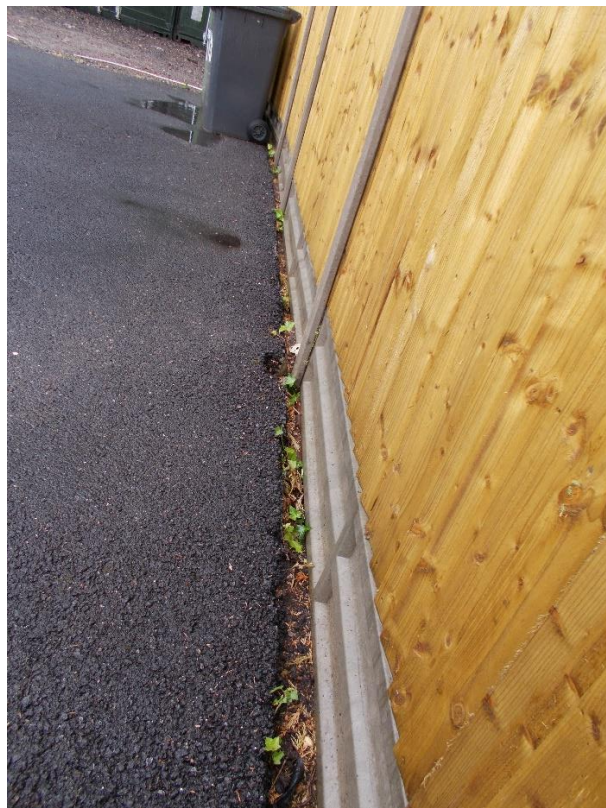
Existing Eco Drain to the north of the kitchen, laundry building.

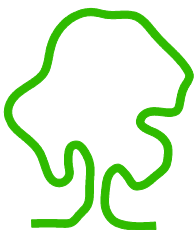


Surface water drainage from kitchen, laundry building.



French Drain currently acting as trench soakaway to the northeast of the site.





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