

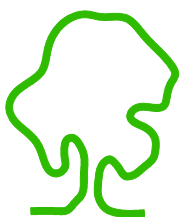
MR JULIAN BROWN



**THE GREEN, GOOSE GREEN LANE, GOOSE GREEN,
THAKENHAM, WEST SUSSEX, RH20 2LW**

Drainage Strategy

August 2026



eas ltd

Environmental Assessment Services Ltd

REPORT DATA SHEET

Requirement	Data
Report Reference	MrJulianBrown/MMEPlanning/TheGreen/DS
Date	August 2026
Client	Mr Julian Brown
Report type	Drainage Strategy
Purpose	Planning
Revisions	
Prepared by	Eur Ing Malcolm McKemey BSc (Hons), CEng, CEnv, MICE, MCIWEM, MIEnvSc Signed
Approved by	Xanthe Lyford BSc (Hons) Signed

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August 2026

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MR JULIAN BROWN

THE GREEN, GOOSE GREEN LANE, GOOSE GREEN, THAKENHAM
WEST SUSSEX, RH20 2LW

Drainage Strategy

August 2026

1. EXISTING SITE & PROPOSED DEVELOPMENT

- 1.1 The site comprises a small timber stable block, adjacent yard and access. The main site access is off Peacocks Lane. The site area is approximately 950 m². The Ordnance Survey (OS) map reference for the site is TQ 1155 1827. The site elevation is approximately +25 m OD. See Appendix A, Figure 1: Site Location Plan and Figure 2: Site Layout.
- 1.2 According to the British Geological Survey (available online), the site lies on Cretaceous Weald Clay (Mudstone). Weald Clay is classified as unproductive strata. The site does not lie within a groundwater source protection zone. Ponds and lakes to the north of the site suggest that the underlying soil has very low permeability. There is a significant watercourse (ditch) immediately to the north of the site.
- 1.3 It is proposed to convert the stable block to a two-bedroom residence.

2. FLOOD RISK ASSESSMENT

- 2.1 According to the EA online Flood Map for Planning, the site lies within Flood Zone 1 (low risk of flooding from fluvial sources). It is also shown to be at very low risk of surface water (pluvial) flooding, although the ponds to the north are shown to be at high risk.
- 2.2 Risks of groundwater flooding or flooding from reservoirs are not considered significant at this location. There are no public sewers nearby and sewer flooding risk is minimal.
- 2.3 As the site is less than 1 ha in area and lies within Flood Zone 1, there is no requirement for a flood risk assessment under the National Planning Policy Framework (NPPF) and associated guidance documents.
- 2.4 In this case, it is required by Horsham District Council that all runoff for the 1 in 100 year return period flood event, plus allowance for climate change, will be managed on site, and that that discharge from the proposed development will be restricted to the Greenfield run-off rate, as near as is practicable.

3. GREENFIELD RUN-OFF RATES

- 3.1 The Greenfield runoff rate for the site has been estimated using the UK Sustainable Drainage (UKSUDS) Greenfield Runoff Estimation Tool. The runoff rates are given for scenarios up to (and including) the 1 in 200 year storm event, as summarised in Table 3.1 below and provided in Appendix D.

TABLE 3.1
GREENFIELD RUNOFF RATES

Return period	Flow rates (l/s)
1 in 1 year	0.7
1 in 12year	0.7
1 in 10 year	1.3
1 in 30 year	1.8
1 in 100 year	2.5
1 in 200 year	2.9

- 3.2 The maximum discharge permitted to leave the whole site post development should not exceed 0.7 l/s, including the foul sewage effluent. However, the lowest practicable flow achievable with a vortex valve flow control device is 2 l/s, and the smallest diameter orifice without a high risk of blocking is 50 mm, and the drainage has been designed for this maximum flow rate.

4 EXISTING DRAINAGE

- 4.1 The site was visited on 15 July 2026 in order to examine the existing drainage, identify watercourses and take ground levels. See Appendix B: Site Photographs.
- 4.2 Formal surface water drainage on the site as existing comprises roof guttering with downpipes discharging to adjacent ground. The concrete paved area in front of the stables has a slight fall to the northeast and drains into the adjacent grass.
- 4.3 There is presently no foul sewerage on site.

5. PROPOSED DRAINAGE

- 5.1 The proposed residential redevelopment does not appear likely to increase the impermeable area of the site compared to its existing use. If permeable paving is used for all access and parking areas, the impermeable area will be reduced post redevelopment. Any soft landscaping will still discharge informally as Greenfield (as existing) and only the controlled drainage from the impermeable areas (the roof) will be subject to SuDS measures
- 5.2 The sustainable drainage (SuDS) hierarchy is as follows (preferred at the top):

- a. Re-use of rainwater (no discharge from site). Options in this case would be collecting rainwater from the roof for garden irrigation, or, possibly, toilet flushing.
 - b. Disposal of rainwater to soakaway (no discharge from site).
 - c. Disposal of rainwater to attenuation storage, with outflow limited to a maximum of Greenfield flow, discharging to a watercourse.
 - d. Disposal of rainwater to attenuation storage, with outflow limited to a maximum of Greenfield flow, discharging to a surface water sewer.
 - e. Disposal of rainwater to attenuation storage, with outflow limited to a maximum of Greenfield flow, discharging to a combined sewer.
- 5.3 Disposal to soakaway requires a suitably permeable soil in which to discharge the surface water. In this case, the underlying geology is Weald Clay (mudstone). This stratum has very low permeability, is almost never suitable for soakaways and the local impermeability is demonstrated by the conglomeration of lakes and ponds immediately to the north of the site.
- 5.4 In view of the above, attenuation storage with outflow limited to a maximum of 2 l/s to the large ditch adjacent to the northern edge of the site has been adopted as the surface water drainage strategy. See Figure 3 for surface water drainage layout.
- 5.5 Attenuation storage could be provided in the form of ponds, swales, a detention basin or an underground geocellular/modular system wrapped in a geomembrane. Due to the volume which is required, the area available and the slope of the site, ponds, swales or a detention basin are not thought to be practicable. Due to the slope of the site, it is considered most practicable that the underground geocellular/modular system is as shallow as practicable with a minimum cover of 250 mm. The geomembrane could be permeable to take advantage of any small amount of infiltration available.
- 5.6 The attenuation storage has been sized to store up to the 1 in 100 year storm plus a 45% climate change allowance. This gives a required volume of 4 m³. This can be provided in a 4 m x 3 m x 0.4m deep subsurface crate (AquaCell Core or similar) wrapped in a geomembrane (Terram 1000 or similar) with a 50 mm sand surround.
- 5.7 Flow control will be by vortex valve or 50 mm diameter orifice plate.
- 5.8 A suitable location for the geocellular/modular system would be under the access road or adjacent to it See Figure 3. This would allow for the outlet pipe from the storage system and flow control chamber to discharge into the drainage ditch along the northern site boundary.

- 5.9 It will be necessary to obtain an ordinary watercourse land discharge consent from MDSC for the proposed outfall.
- 5.10 Additional SUDS options would include the use of permeable paving in the driveway and any patio areas. Permeable paving will permit surface water to infiltrate into the underlying structure, delay discharge and reduce peak flows following a rainfall event. It is recommended that the permeable paving be underlain by a shallow drainage blanket.
- 5.11 Rainwater harvesting could also be practiced. Rainwater could be used for irrigation purposes within the garden, via water butts connected to roof downpipes.
- 5.12 It may be possible to incorporate a green roof into the proposed design. Green roofs reduce the volume and rate of runoff and can be low maintenance, generally requiring bi-annual maintenance visits.
- 5.13 If an extreme storm event overwhelmed the surface water drainage system at the site and/or if the drainage system were to fail, ground levels would indicate that surface water would discharge into the drainage ditch lying along the northern site boundary, as per the present situation.

6. SURFACE WATER DRAINAGE DESIGN

- 6.1 The surface water drainage system has been designed for the 30-year return period event with 10% urban creep, plus a 35% allowance for climate change and tested for surcharge for the 1 in 100-year 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 E for pipe and chamber layout and sizing of the attenuation storage from the MasterDrain model.
- 6.2 Hydrological data based on FEH22 rainfall data for the site and applied to the MasterDrain model is given in Appendix E.
- 6.3 The proposed drainage arrangement is shown in Figure 4. Chamber details, pipe sizes and levels are given in Appendix E and summarised in Table 6.1 below:

TABLE 6.1
SURFACE WATER DRAINAGE

Ref.	Dia (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe dia in (mm)	Pipe dia out (mm)
SW1	450	20.00	19.50	-	100
SW2	450	20.00	19.43	100	150
SW3	450	19.99	19.49	-	100
SW4	600	20.05	19.30	100 + 150	150
SW5	600	19.80	19.14	150	150
Atten	-	19.80	19.12	150	225
SW6	1200	19.70	19.10	225	100
Outfall	-	-	19.00	100	100

7. FOUL SEWERAGE

- 7.1 There was no existing foul sewerage at the site. No public foul sewers are located on Peacocks Lane or in the vicinity of the site, see Appendix C: Southern Water Sewer Plans. Foul sewerage for the proposed development will comprises a package sewage treatment plant providing an effluent suitable for discharge to the adjacent drainage ditch. The outlet pipe should be located downstream (to the east) of the surface water outfall.
- 7.2 The proposed sewage treatment system (as installed) will require no permit from the Environment Agency (EA), provided that it adheres to the EA's General Binding Rules for a discharge to a watercourse. The General Binding Rules relevant to this type of site and discharge to a watercourse are provided in Appendix E.
- 7.3 New discharges are not allowed to a ditch or a surface water that does not contain flowing water throughout the whole year. That is unless there is a drought or an unusually long period of dry weather. New discharges to watercourses that seasonally dry up are not allowed under the general binding rules, nor are discharges to enclosed lakes or ponds.
- 7.4 The foul sewerage has been designed using the MasterDrain (Foul) network drainage model and is shown on Figure 4 plus summarised in Table 7.1 below:

TABLE 7.1
FOUL SEWERAGE

Ref.	Dia (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe dia in (mm)	Pipe dia out (mm)
F1	450	20.00	19.50	-	100
F2	450	20.00	19.40	100	100
F3	600	20.00	19.34	100	100
F4	600	20.00	19.27	100	100
F5	600	19.80	18.91	100	100
STW	2400	19.80	18.89	100	100
Outfall	-	-	18.87	100	100

8. OPERATION AND MAINTENANCE

- 8.1 The drainage system will generally require minimal operational input once construction has been completed. However, it will require some regular maintenance. The maintenance of the drainage systems will be the responsibility of the owners of the residence.
- 8.2 The chambers, gullies, gutters and channels will require regular removal of any silt or other debris. Maintenance should be carried out at the time of year after most leaf fall has occurred.
- 8.3 In accordance with the CIRIA SuDS Manual (C753) the pollution hazard level for the development is considered to be very low for the residential roofs and low for a property driveway with permeable paving. For the roofs, it is advised to remove gross solids and sediments to satisfy requirements. For the driveways the simple index approach to determine pollution control measures should be applied. As such the proposed permeable pavement is considered an adequate control measure.
- 8.4 The sewage treatment plant will require maintenance by a specialist. Annual removal of sludge, general cleaning and checks on mechanical/electrical items will be required.

9. CONCLUSIONS

- 9.1 The site comprises a small timber stable block, adjacent yard and access. The main site access is off Peacocks Lane. The underlying geology is Cretaceous Weald Clay (mudstone).
- 9.2 Planning permission has been sought for the conversion of the existing stables to a residence. A condition of planning is that a surface water and foul sewerage drainage strategy should be prepared for the proposed change of use.

- 9.3 It is required that all runoff for the 1 in 100 year flood event, plus allowance for climate change, will be managed on site, and that that discharge from the proposed development will be restricted to Greenfield run-off rate.
- 9.4 According to the EA online Flood Map for Planning, the site lies within Flood Zone 1 (low risk of flooding from fluvial sources). It is also shown to be at very low risk of surface water (pluvial) flooding, although the ponds to the north are shown to be at high risk. Risks of groundwater flooding or flooding from reservoirs are not considered significant at this location. There are no public sewers nearby and sewer flooding risk is minimal.
- 9.5 It is considered that the proposed development will not result in an increase in the impermeable area of the site compared with the existing. Particularly as permeable paving has been proposed for the parking area and driveway. This will not increase the peak flow following a rainfall event, and will not increase the flood risk elsewhere.
- 9.6 The preferred sustainable (SUDS) surface water drainage solution for the site would be drainage to soakaway, however, the underlying geology comprises Weald Clay (mudstone). The Weald Clay has minimal permeability and this is illustrated at this location by the ponds immediately to the north of the site. Percolation testing was not deemed worthwhile at this site.
- 9.7 The alternative to soakaway drainage would be attenuation storage with discharge limited to Greenfield flow (as near as practicable). The maximum flow rate would be 2 l/s. This would require a discharge point, of which the most practical option would be to the substantial drainage ditch located along the site's northern boundary. This ditch has the required onward continuity.
- 9.8 The most feasible attenuation storage option for the proposed site layout would be a geocellular/modular system, wrapped in a geomembrane. This can be provided in a 4 m x 3 m x 0.4m deep subsurface crate (AquaCell Core or similar) wrapped in a geomembrane (Terram 1000 or similar) with a 50 mm sand surround.
- 9.9 Where drainage to a ditch is required, it will be necessary to obtain an ordinary watercourse land discharge consent from Horsham District Council.
- 9.10 Additional SUDS measures to be incorporated into the development include permeable paving beneath driveway and parking area, rainwater harvesting for garden irrigation purposes, via the provision of water butts.
- 9.11 There is no existing foul sewerage on the site and there are no public sewers in Peacocks Lane, or anywhere else in proximity to the site.. The foul sewerage drainage scheme for the dwelling will comprise a package sewage treatment plant with discharge of treated effluent into the northern boundary ditch downstream of the proposed surface water discharge. No permit should be required from the EA as the installation should comply with the General Binding Rules.

10. RECOMMENDATIONS

- 10.1 It is recommended that it should be confirmed that there is a year-round flow in the drainage ditch on the northern site boundary.

☆ ☆ ☆ ☆ ☆ ☆ ☆

APPENDIX A

Figures

- | | |
|-----------|---------------------------|
| Figure 1: | Site Location |
| Figure 2: | Site as Existing |
| Figure 3: | Proposed Development |
| Figure 4: | Suggested Drainage Design |



Reproduced from the Ordnance Survey 1:25000 map with permission. Licence No. 100005508

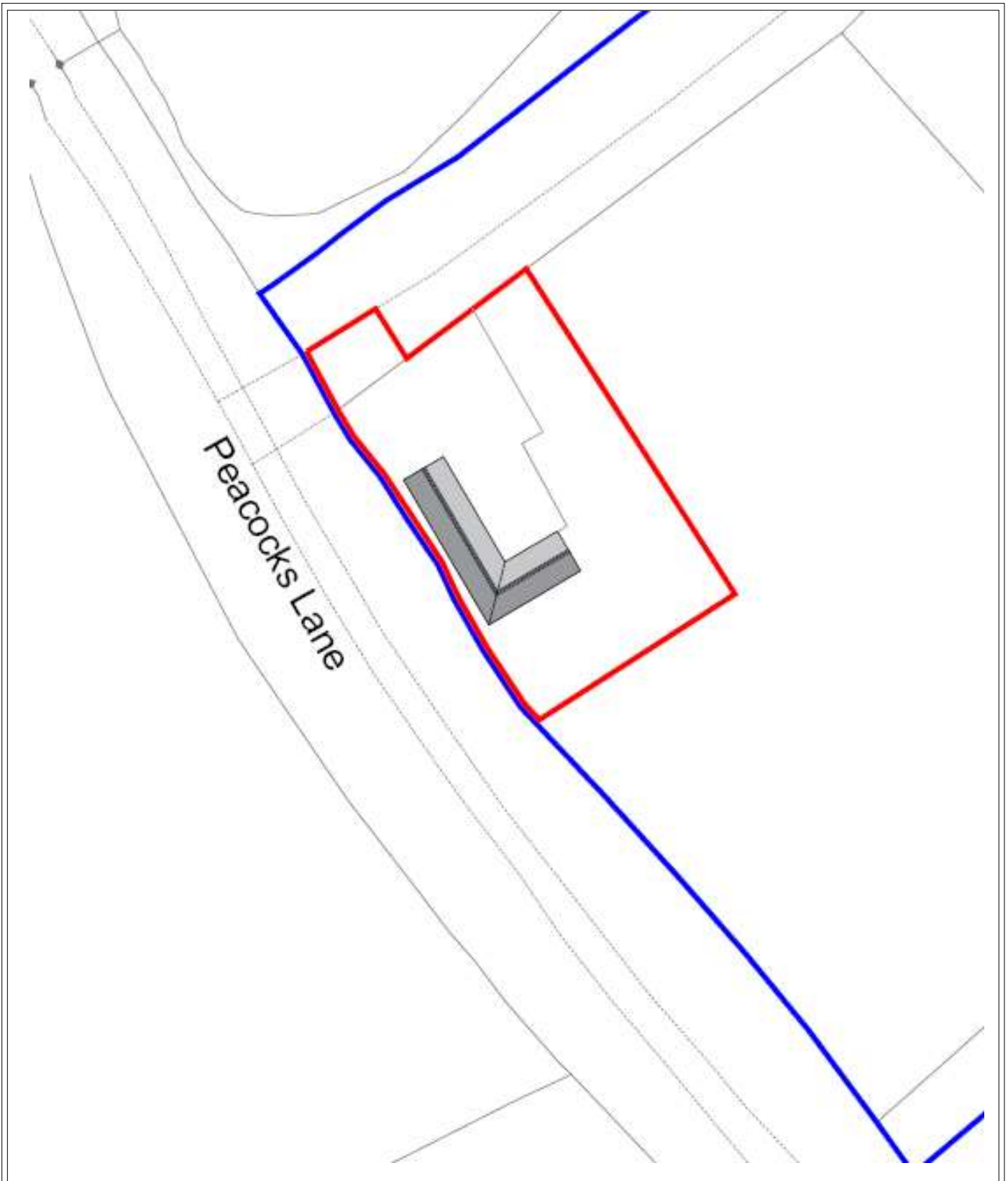
Scale as shown



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Figure 1: Site Location

August 2026



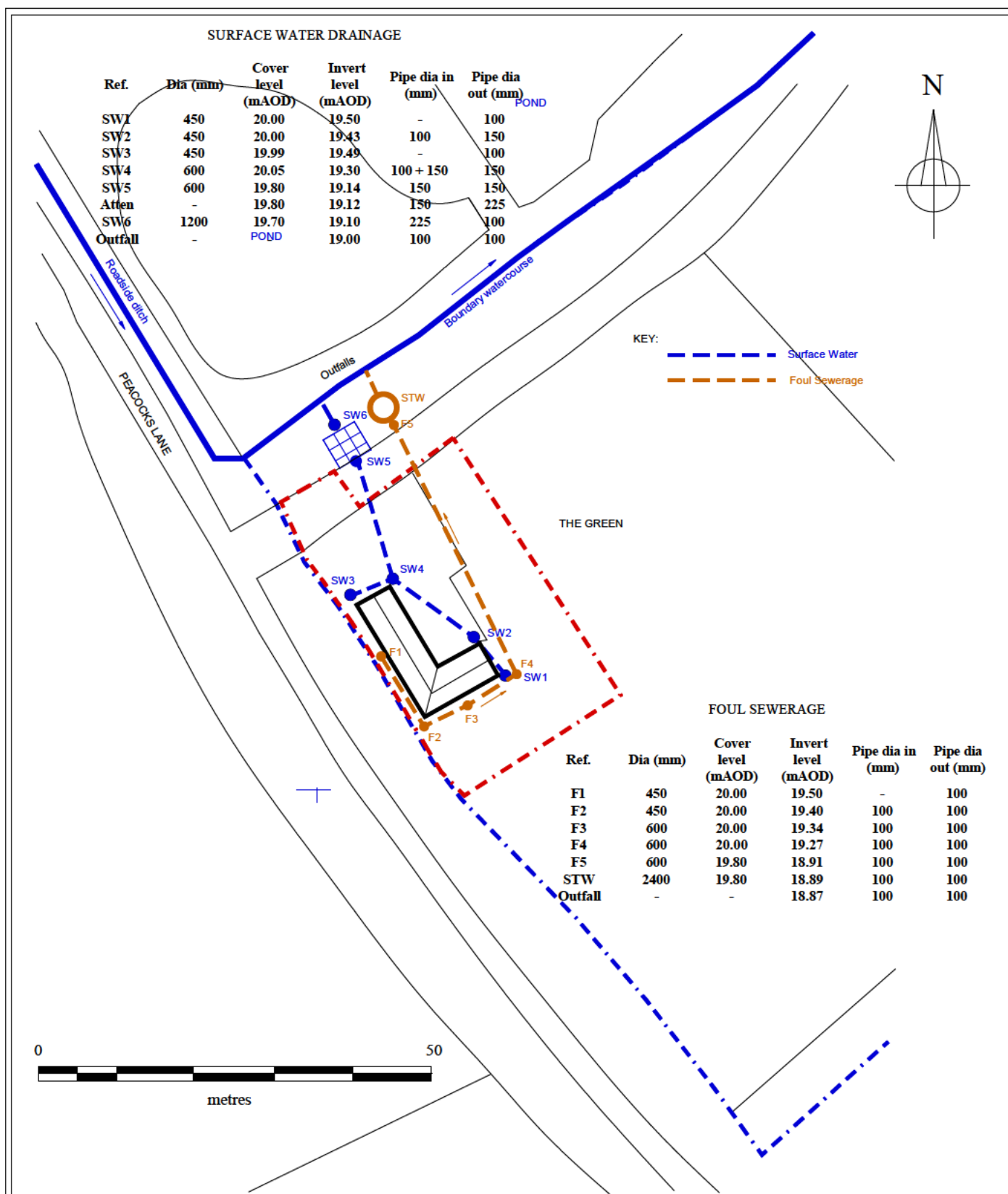
Scale as shown



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Figure 2: Site as Existing

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Figure 4: Proposed Drainage Arrangement

August 2026

APPENDIX B

Site Photographs



Photo 1: The Site. Stables and concrete Apron



Photo 2: Large drainage ditch on northern boundary



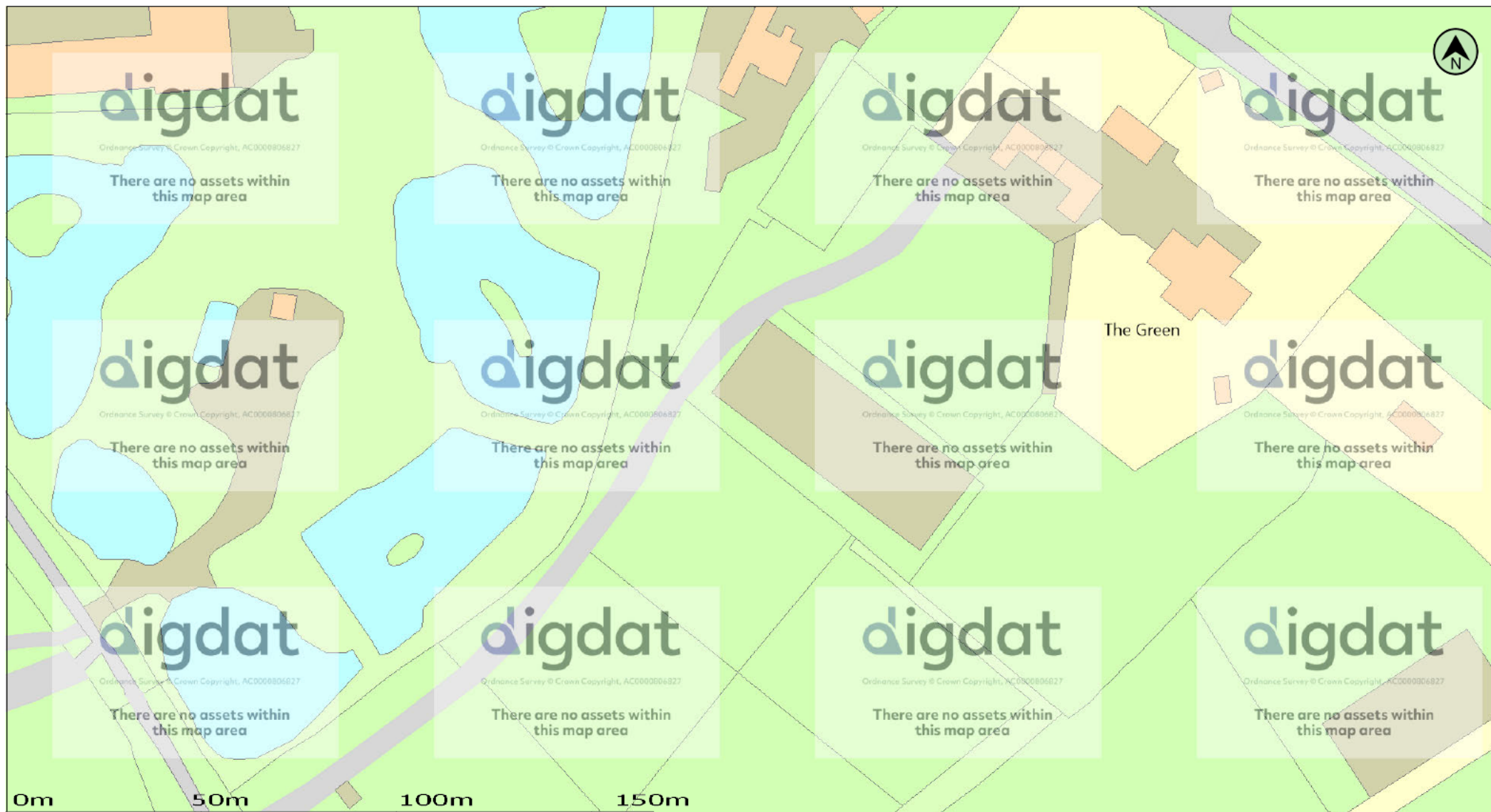
Photo 3: Junction where roadside drainage ditch joins boundary ditch.



Photo 4: Site entrance off Peacocks Lane.

APPENDIX C

Southern Water Sewer Plans



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Date: 15/07/26

Scale: 1:1250

Map Centre: 511678,118383

Data updated: 19/06/26

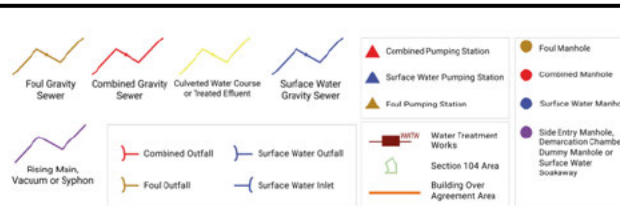
Our Ref: 2170640 - 1

Wastewater Plan A4
Powered by digdat

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 2026 Ordnance Survey AC0000808122. 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 is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



malcolm@easitd.co.uk
The Green



APPENDIX D

UK Sustainable Drainage (UKSUDS) Calculations (Greenfield Runoff Rate and Required Storage Volumes)

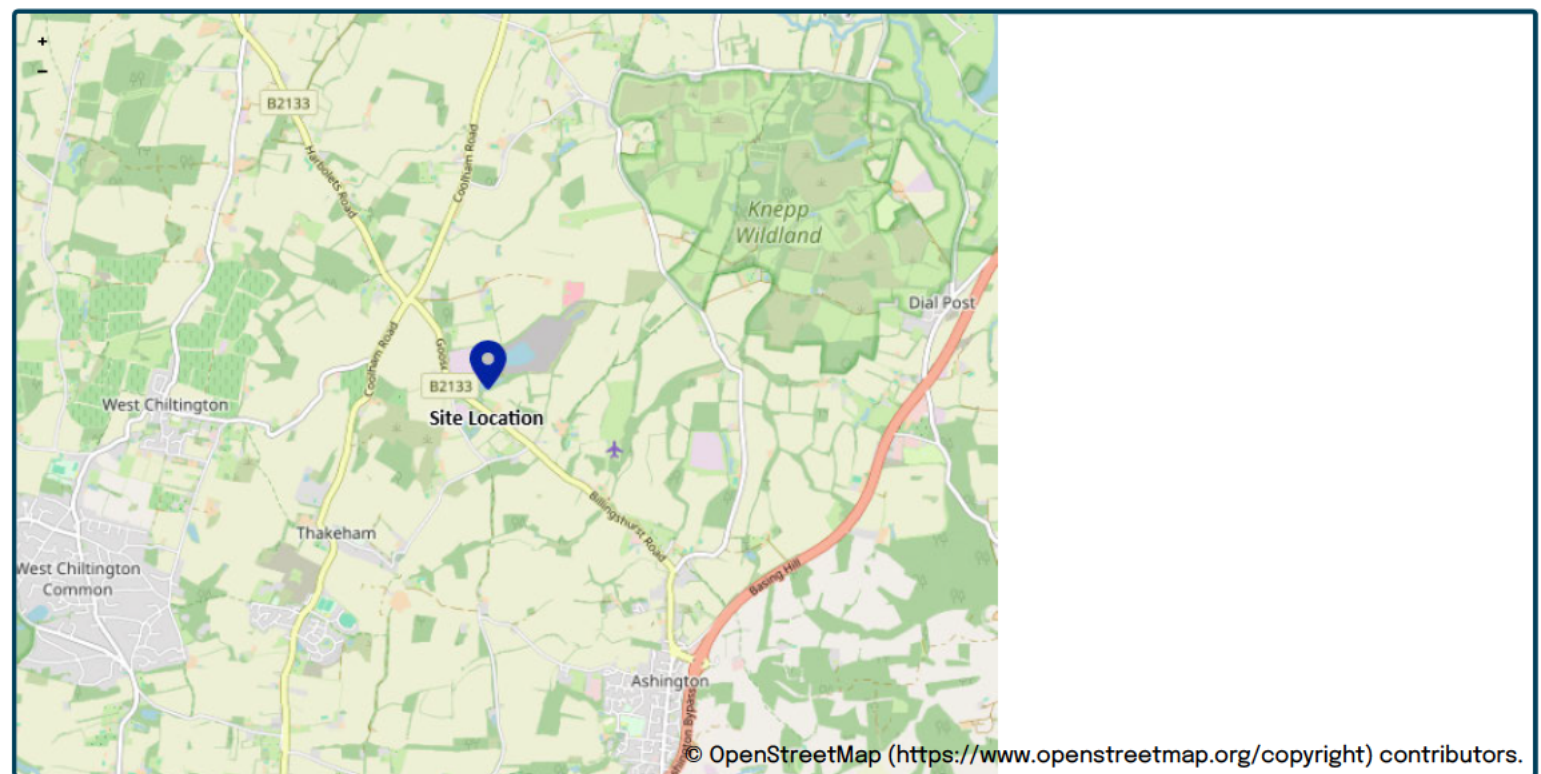
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	05/08/2026
Calculated by	Malcolm McKemey
Reference	923 The Green
Model version	2.2.3

Location

Site name	The Green
Site location	Goose Green



Site easting (British National Grid)	511706
Site northing (British National Grid)	118532

Site details

Total site area (ha)	0.1	ha
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Greenfield runoff

Method

Method	FEH statistical (2025)
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FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	920	mm
BFIHOST19scaled	0.388	
QMed-QBar conversion	1.136	1.136
QMed (l/s)	0.7	l/s
QBar (FEH statistical 2025) (l/s)	0.8	l/s

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	7	7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	0.7
Flow rate 2 year (l/s)	0.7
Flow rate 10 years (l/s)	1.3
Flow rate 30 years (l/s)	1.8
Flow rate 100 years (l/s)	2.5
Flow rate 200 years (l/s)	2.9

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://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 uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX E

Output from the Drainage Network Model



MasterDrain
SW

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Job No. 923			
Sheet no. 1			
Date 17/07/26			
By MDM	Checked	Reviewed	

Project The Green, Goose Green			
Title Hydrograph storage analysis (Winter profile) for Goose Green			

Data:-

FEH Hydrology:-

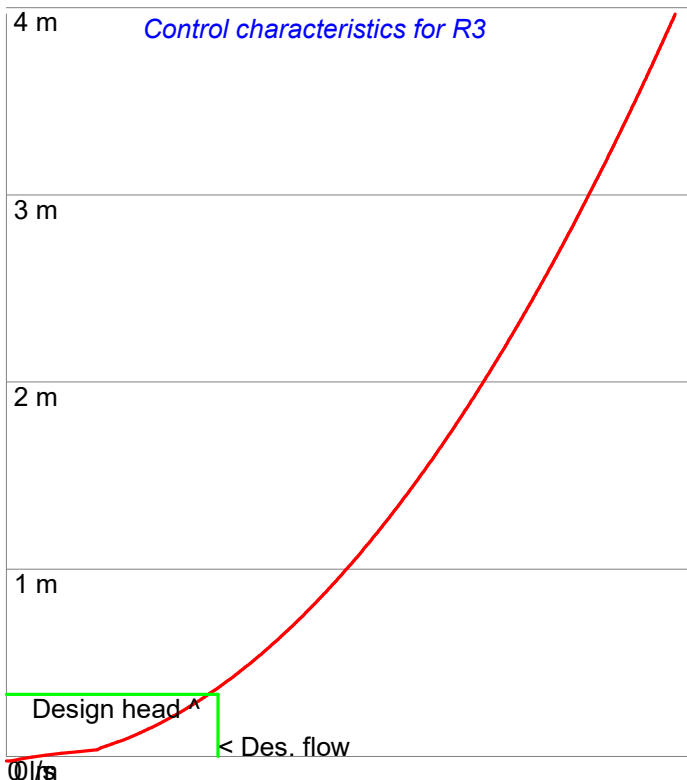
Location = Goose Green Grid reference = TQ1118
 c = -0.0280 d1 = 0.3900 d2 = 0.3130
 d3 = 0.3350 e = 0.3150 f = 2.4660
 Return period = 100 Climate change = 30%

Percentage runoff = 95.0% (manual setting)

Imperv. area = 111 m² Pervious area = 0 m²
 Total area = 111 m² Equiv area = 105 m² (Tot. area x % runoff).
 Total runoff = 5.7 m³ Discharge rate = 2.000 l/s

Design Head = 0.4m Peak flow = 2.00 l/s
 Control device = R3 Orifice diam = 49.7 mm
 Max. calc. depth = 0.4 m Available depth = 0.0 m³
 Mean discharge = 1.44 l/s

Available system storage = 0.00 m³ under a system plane at the design head level.
 Offline storage = 0.0 m³
 Total storage = 4.0 m³ Peak input flow = 7.97 l/s



Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.01	0.05	2.01	4.48
0.05	0.52	2.05	4.53
0.10	1.00	2.10	4.58
0.15	1.22	2.15	4.64
0.20	1.41	2.20	4.69
0.25	1.58	2.25	4.74
0.30	1.73	2.30	4.80
0.35	1.87	2.35	4.85
0.40	2.00	2.40	4.90
0.45	2.12	2.45	4.95
0.50	2.24	2.50	5.00
0.55	2.35	2.55	5.05
0.60	2.45	2.60	5.10
0.65	2.55	2.65	5.15
0.70	2.65	2.70	5.20
0.75	2.74	2.75	5.24
0.80	2.83	2.80	5.29
0.85	2.92	2.85	5.34
0.90	3.00	2.90	5.39
0.95	3.08	2.95	5.43
1.00	3.16	3.00	5.48
1.05	3.24	3.05	5.52
1.10	3.32	3.10	5.57
1.15	3.39	3.15	5.61
1.20	3.46	3.20	5.66
1.25	3.54	3.25	5.70
1.30	3.61	3.30	5.74
1.35	3.67	3.35	5.79
1.40	3.74	3.40	5.83
1.45	3.81	3.45	5.87
1.50	3.87	3.50	5.92
1.55	3.94	3.55	5.96
1.60	4.00	3.60	6.00
1.65	4.06	3.65	6.04
1.70	4.12	3.70	6.08
1.75	4.18	3.75	6.12
1.80	4.24	3.80	6.16
1.85	4.30	3.85	6.20
1.90	4.36	3.90	6.24
1.95	4.42	3.95	6.28
2.00	4.47	4.00	6.32

Calculation data provided by Crown Water Ltd, SL5 7NT



MasterDrain
SW

Environmental Assessment Services Ltd

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Job No. 923		
Sheet no. 2		
Date 17/07/26		
By MDM	Checked	Reviewed

Project The Green, Goose Green	
Title Hydrograph storage analysis (Winter profile) for Goose Green	

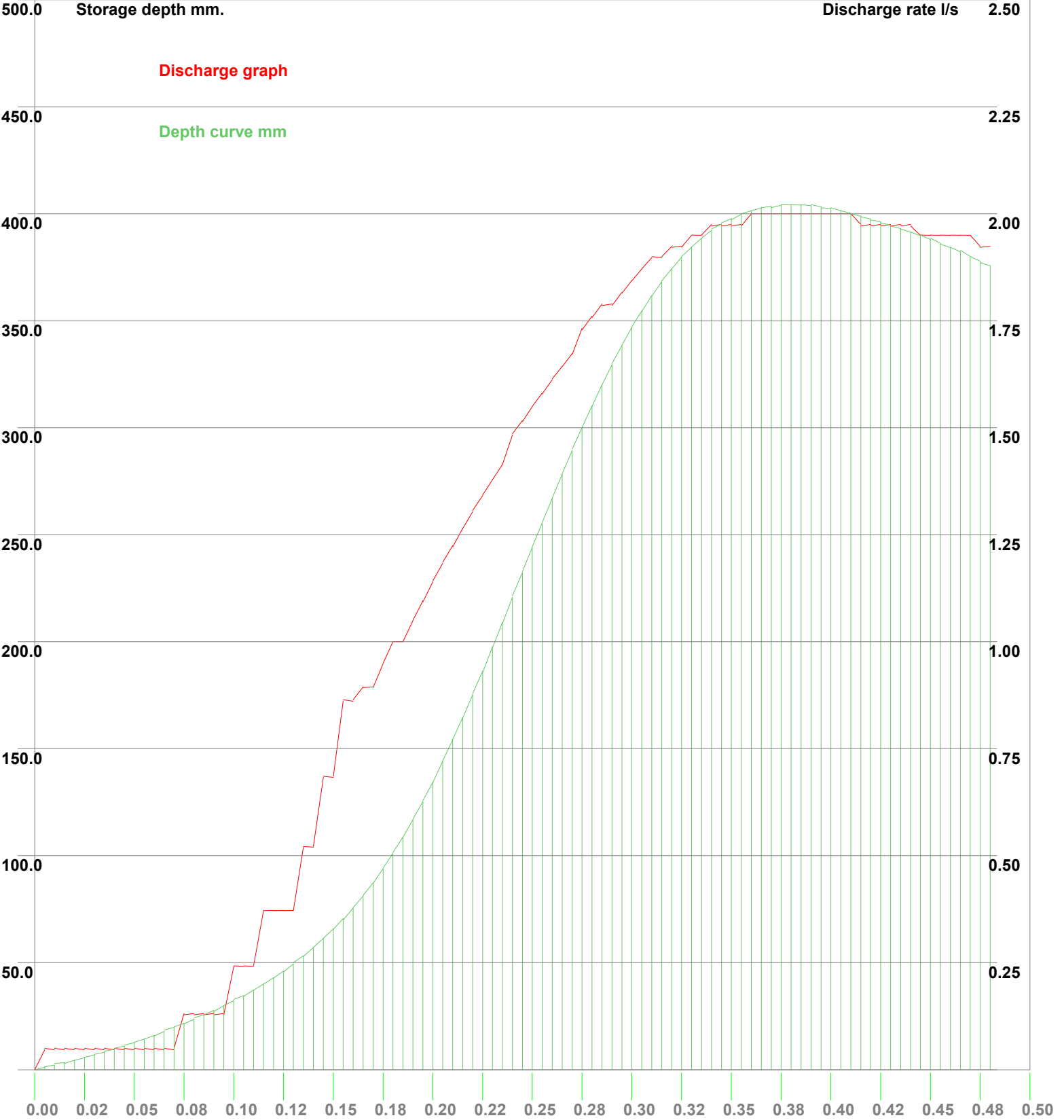
Storage curves for a .5 hours storm.

Storage depth mm.

Discharge rate l/s 2.50

Discharge graph

Depth curve mm





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				Sheet no. 3
				Date 17/07/26
Project The Green, Goose Green	By MDM	Checked	Reviewed	
Title Hydrograph storage analysis (Winter profile) for Goose Green				

MasterDrain
SW

Incremental rainfall figures.

Storm Mins	Storage Depth mm	Control Flow l/s	Storm Mins	Storage Depth mm	Control Flow l/s
0.3	1.1	0.05	15.3	255.5	1.58
0.6	2.2	0.05	15.6	267.0	1.61
0.9	3.3	0.05	15.9	278.3	1.64
1.2	4.5	0.05	16.2	289.3	1.67
1.5	5.6	0.05	16.5	300.0	1.73
1.8	6.9	0.05	16.8	310.3	1.76
2.1	8.2	0.05	17.1	320.1	1.79
2.4	9.6	0.05	17.4	329.4	1.79
2.7	11.0	0.05	17.7	338.4	1.82
3.0	12.6	0.05	18.0	346.8	1.84
3.3	14.3	0.05	18.3	354.6	1.87
3.6	16.1	0.05	18.6	361.7	1.90
3.9	17.9	0.05	18.9	368.2	1.90
4.2	19.7	0.05	19.2	374.2	1.92
4.5	21.7	0.13	19.5	379.6	1.92
4.8	23.7	0.13	19.8	384.4	1.95
5.1	25.7	0.13	20.1	388.6	1.95
5.4	27.7	0.13	20.4	392.3	1.97
5.7	29.9	0.13	20.7	395.2	1.97
6.0	32.2	0.24	21.0	397.7	1.97
6.3	34.6	0.24	21.3	399.8	1.97
6.6	37.2	0.24	21.6	401.4	2.00
6.9	40.1	0.37	21.9	402.7	2.00
7.2	42.9	0.37	22.2	403.5	2.00
7.5	46.1	0.37	22.5	403.9	2.00
7.8	49.5	0.37	22.8	404.1	2.00
8.1	53.2	0.52	23.1	404.1	2.00
8.4	57.1	0.52	23.4	403.8	2.00
8.7	61.4	0.68	23.7	403.2	2.00
9.0	65.8	0.68	24.0	402.4	2.00
9.3	70.6	0.86	24.3	401.4	2.00
9.6	75.5	0.86	24.6	400.2	2.00
9.9	81.2	0.89	24.9	398.9	1.97
10.2	87.3	0.89	25.2	397.6	1.97
10.5	93.9	0.95	25.5	396.2	1.97
10.8	101.0	1.00	25.8	394.7	1.97
11.1	108.6	1.00	26.1	393.1	1.97
11.4	116.8	1.05	26.4	391.4	1.97
11.7	125.4	1.10	26.7	389.7	1.95
12.0	134.5	1.14	27.0	388.0	1.95
12.3	144.2	1.18	27.3	386.2	1.95
12.6	154.2	1.22	27.6	384.2	1.95
12.9	164.6	1.26	27.9	382.2	1.95
13.2	175.2	1.30	28.2	380.0	1.95
13.5	186.3	1.34	28.5	377.9	1.92
13.8	197.6	1.38	28.8	375.7	1.92
14.1	209.1	1.41	29.1	373.4	1.92
14.4	220.8	1.48	29.4	371.1	1.92
14.7	232.4	1.52	29.7	368.8	1.90
15.0	244.0	1.55	30.0	366.6	1.90

Using the Get Max button causes the program to step through a series of storm durations until a maximum volume is obtained.

Each duration is sampled 600 times and the results recorded. The storm durations (hrs) are:-

0.25, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 42, 48, 54, 60, 66, 72, 84, 96, 120, 150, 175, 200, 250, 300, 375, 500, 750, 1000, 1250, 1500, 1570, 2000, 2500, 3000, 3500, 4000

It should be noted that the six hour storm frequently requested rarely demonstrates the worst case for storage.



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Job No.	923		
Sheet no.	4		
Date	17/07/26		
By	MDM	Checked	Reviewed

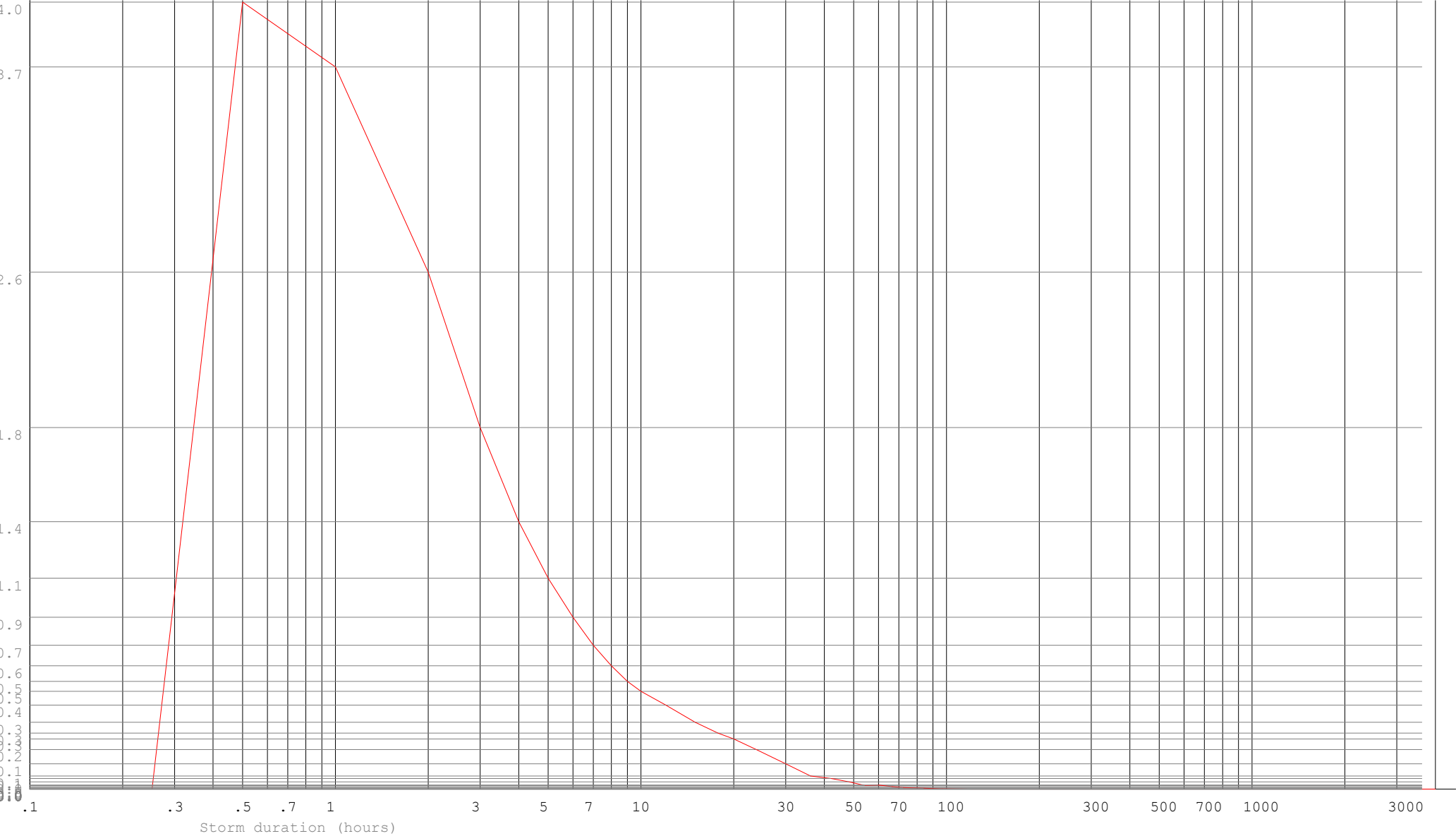
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The Green, Goose Green

Hydrograph storage analysis (Winter profile) for Goose Green

Sequential storage volume at specific storm durations.

m³



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		Sheet no. 1		
		Date 07/08/26 16:45		
Project The Green, Goose Green		By MDM	Checked	Reviewed
Title Manhole printout for GOOSE GREEN.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
SW1	24.15	14.44	circ	450	N/A	0.50		0.08	100	19.625	19.500	N/A	19.450	20.000	SW2
SW2	19.90	19.38	circ	450	N/A	0.57		0.09	150	19.605	19.430	N/A	19.380	20.000	SW4
SW3	4.08	24.53	circ	450	N/A	0.50		0.08	100	19.615	19.490	N/A	19.440	19.990	SW4
SW4	9.58	26.95	circ	600	N/A	0.75		0.21	150	19.475	19.300	N/A	19.250	20.050	SW5
SW5	4.97	41.87	circ	600	N/A	0.66		0.19	150	19.315	19.140	N/A	19.090	19.800	Atten
Atten	3.86	43.65	circ	3600	N/A	0.68		6.92	225	19.370	19.120	N/A	19.070	19.800	SW6
SW6	2.23	46.4	circ	1200	N/A	0.60		0.68	225	19.350	19.100	N/A	19.050	19.700	Outfall

All manholes to be as per 'Sewers for Adoption'

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Sheet no.
2

Date
07/08/26 16:45

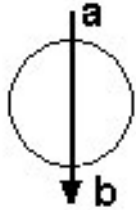
Project
The Green, Goose Green

Title
Manhole printout for GOOSE GREEN.SW

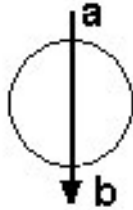
By
MDM

Checked

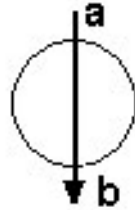
Reviewed



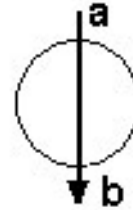
MH = SW1
a=head
b = 100



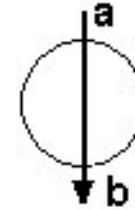
MH = SW2
a= 100
b = 150



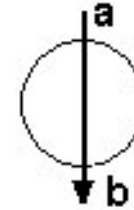
MH = SW3
a=head
b = 100



MH = SW4
a= 150
b = 150
c = 100
d = 100



MH = SW5
a= 150
b = 150



MH = Atten
a= 150
b = 225

MH = SW6
a= 225
b = 225

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Project The Green, Goose Green	By MDM		Checked	Reviewed
Title Manhole printout for GOOSE GREEN.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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Job No. 923		
Sheet no. 1		
Date 07/08/26		
By MDM	Checked	Reviewed

Project The Green, Goose Green	Title Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.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. 294.00 mm/hr
Storm profile = Summer
Using FEH data

Peak rain intens. 1152.48 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 m³	DRAINED AREA (m²) :x FACTOR	STATUS	
1	I	1.01	SW1	6.3	2.7	100	450	19.50	19.55	20.00	0.43	0.05	0.00	0.000	19	OK
2	I	1.02	SW2	17.9	5.3	150	450	19.43	19.48	20.00	0.30	0.05	0.00	0.000	38	OK
3	B	2.01	SW3	10.7	6.2	100	450	19.49	19.55	19.99	0.58	0.06	0.00	0.000	44	OK
4	I	1.03	SW4	17.9	14.8	150	600	19.30	19.42	20.05	0.83	0.12	0.00	0.000	105	OK
5	I	1.04	SW5	17.3	14.8	150	600	19.14	19.26	19.80	0.86	0.12	0.00	0.000	105	OK
6	I	1.05	Atten	40.9	14.8	225	3600	19.12	19.21	19.80	0.36	0.09	0.00	0.000	105	OK
7	I	1.06	SW6†	49.9	14.8	225	1200	19.10	19.18	19.70	0.30	0.08	0.00	0.000	105	OK



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Date 07/08/26		
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Project	The Green, Goose Green
Title	Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.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%) |
|---|--------------------------------------|--|

Flow restrictors

Manhole reference - SW6

Restrictor flowrate - 2 l/s



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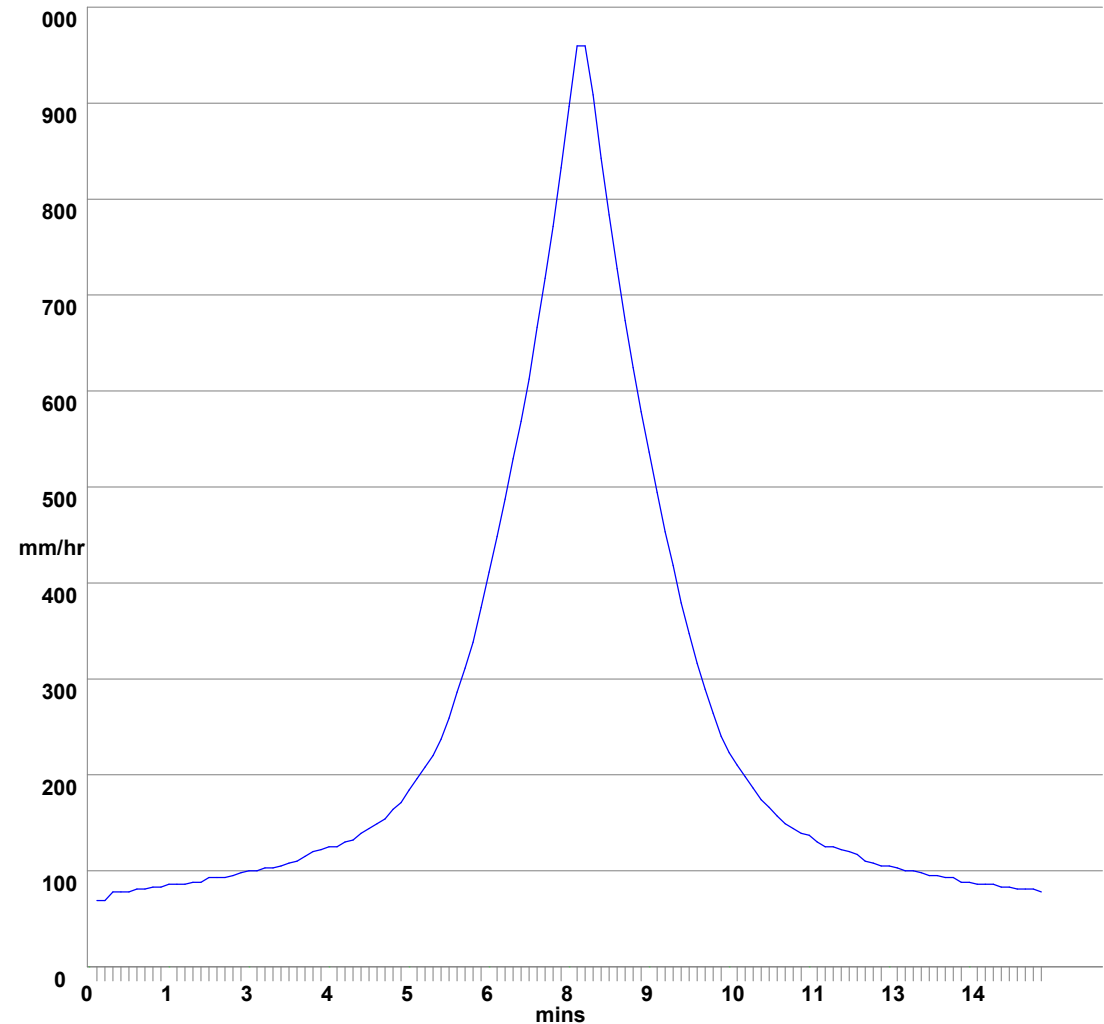
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SW

Project The Green, Goose Green	Title Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.SW CCF = 45%

Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:08	68.52	5:08	195.76	10:08	210.45
0:15	68.52	5:15	208.00	10:15	198.21
0:22	78.31	5:22	220.23	10:22	185.98
0:30	78.31	5:30	237.36	10:30	173.74
0:38	78.31	5:38	259.39	10:38	166.40
0:45	80.75	5:45	286.30	10:45	156.61
0:52	80.75	5:52	310.78	10:52	149.27
1:00	83.20	6:00	337.69	11:00	144.38
1:08	83.20	6:08	374.40	11:08	139.48
1:15	85.65	6:15	411.10	11:15	137.03
1:22	85.65	6:22	447.81	11:22	129.69
1:30	85.65	6:30	486.96	11:30	124.80
1:38	88.09	6:38	528.56	11:38	124.80
1:45	88.09	6:45	567.72	11:45	122.35
1:52	92.99	6:52	611.76	11:52	119.91
2:00	92.99	7:00	665.60	12:00	117.46
2:08	92.99	7:08	716.99	12:08	110.12
2:15	95.43	7:15	770.82	12:15	107.67
2:22	97.88	7:22	832.00	12:22	105.22
2:30	100.33	7:30	895.62	12:30	105.22
2:38	100.33	7:38	959.24	12:38	102.78
2:45	102.78	7:45	959.24	12:45	100.33
2:52	102.78	7:52	907.86	12:52	100.33
3:00	105.22	8:00	841.78	13:00	97.88
3:08	107.67	8:08	783.06	13:08	95.43
3:15	110.12	8:15	726.77	13:15	95.43
3:22	115.01	8:22	672.94	13:22	92.99
3:30	119.91	8:30	624.00	13:30	92.99
3:38	122.35	8:38	577.50	13:38	88.09
3:45	124.80	8:45	535.90	13:45	88.09
3:52	124.80	8:52	494.30	13:52	85.65
4:00	129.69	9:00	452.70	14:00	85.65
4:08	132.14	9:08	418.45	14:08	85.65
4:15	139.48	9:15	379.29	14:15	83.20
4:22	144.38	9:22	347.48	14:22	83.20
4:30	149.27	9:30	315.67	14:30	80.75
4:38	154.16	9:38	288.75	14:38	80.75
4:45	163.95	9:45	264.28	14:45	80.75
4:52	171.29	9:52	239.81	14:52	78.31
5:00	183.53	10:00	222.68	15:00	78.31

Hydrograph profile derived from data in the Flood Studies Report

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





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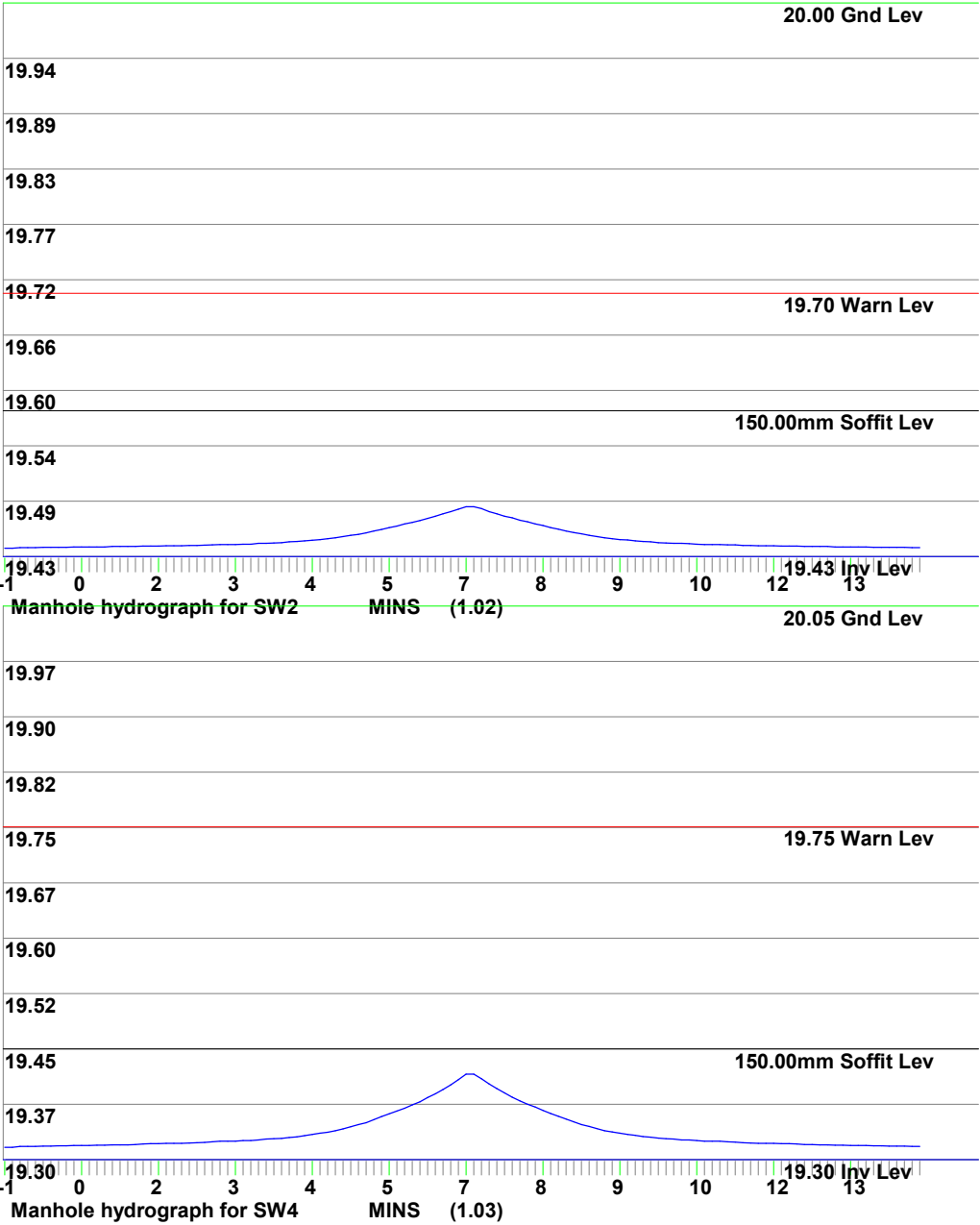
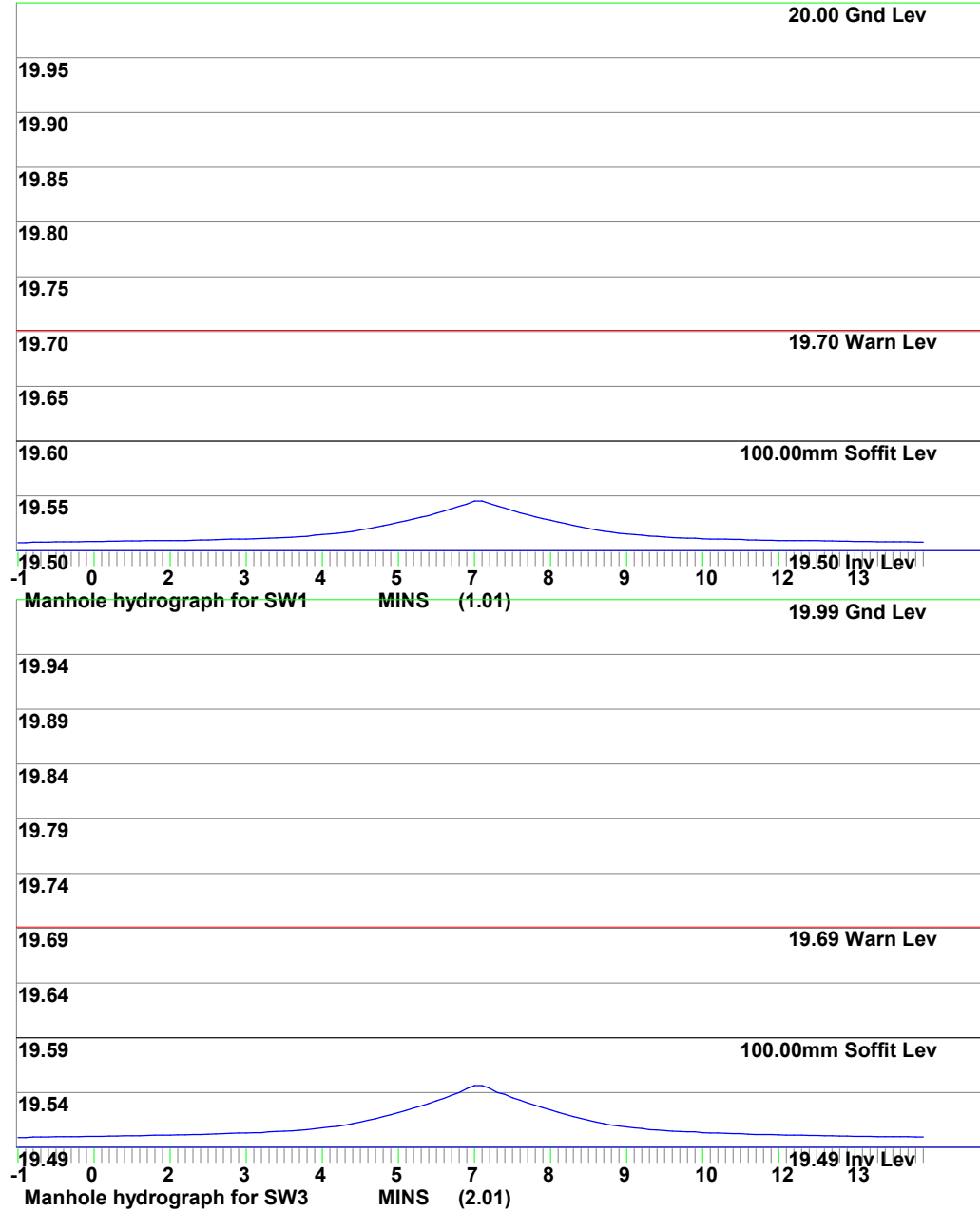
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Title Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.SW CCF = 45%			





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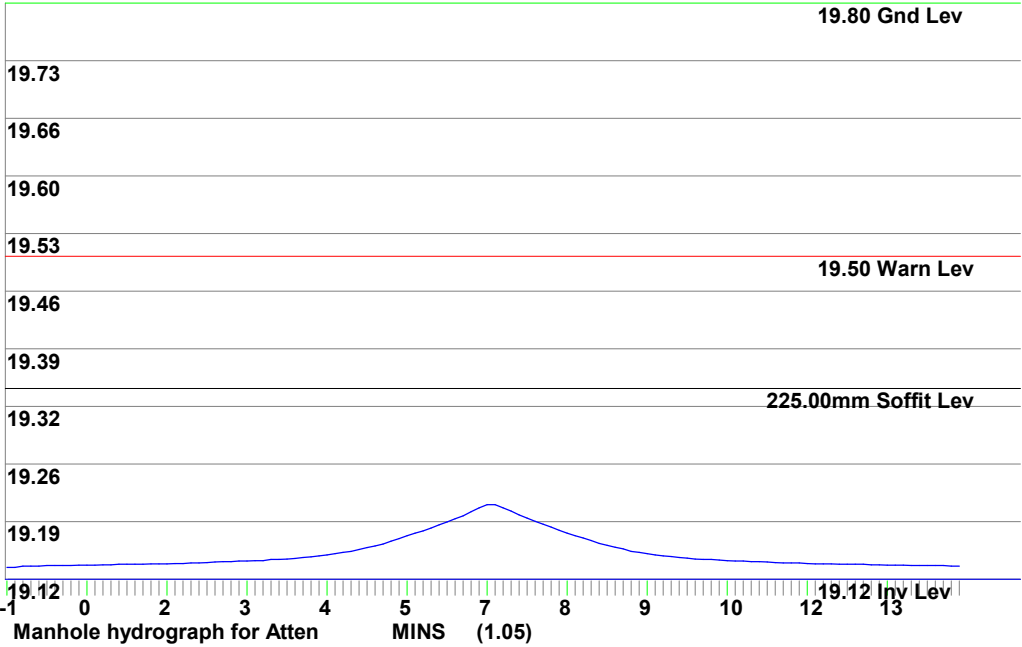
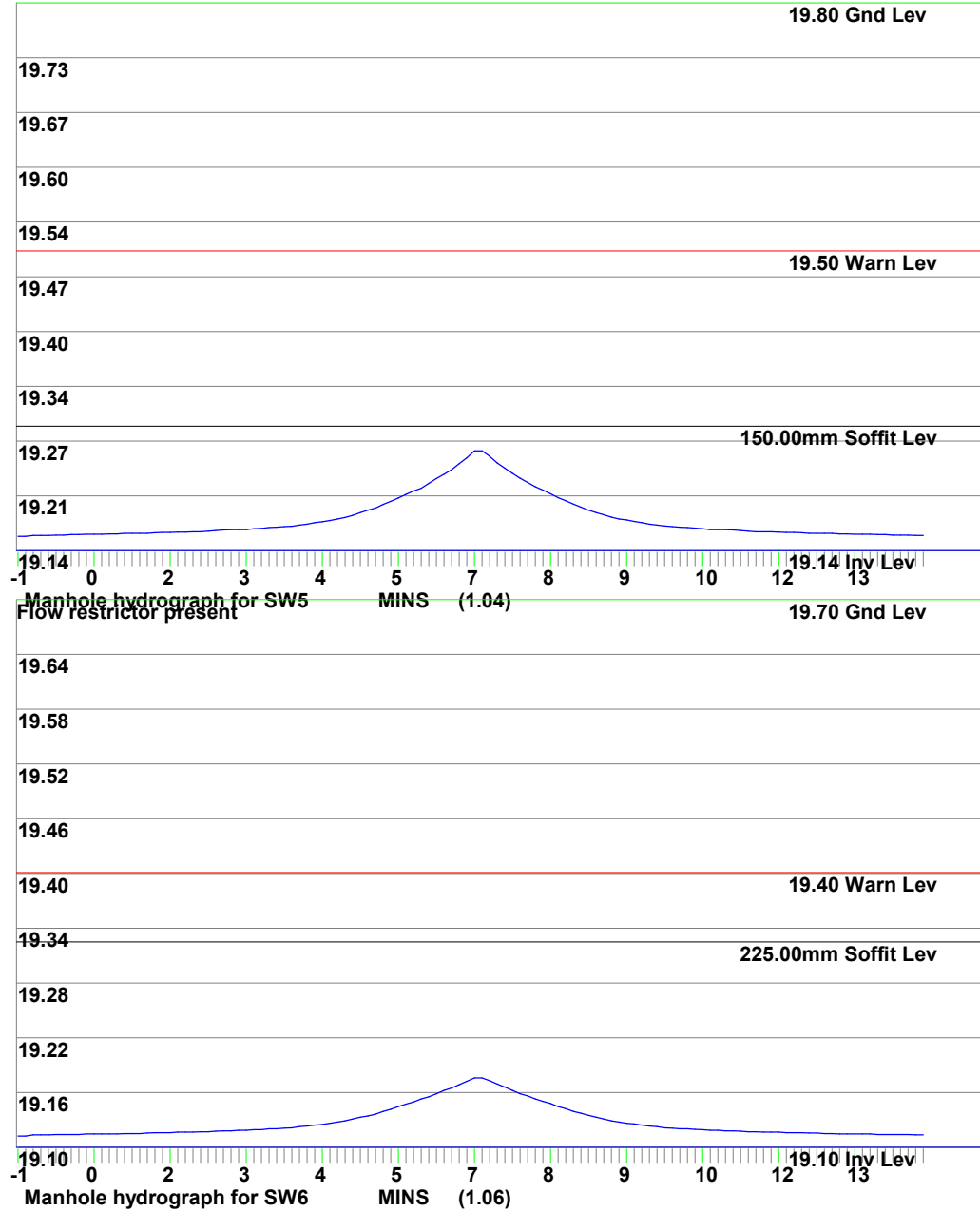
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Project

Title **Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.SW CCF = 45%**

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

PEAK hydrograph values printed
Storm duration = 60 mins
No offline storage

Mean rain intens. 105.00 mm/hr
Storm profile = Summer
Using FEH data

Peak rain intens. 411.60 mm/hr
Sample period = 30.0 secs.

Entry	SECT.:	MANHOLE :	PIPE :	RATE :	PIPE :	CHAMBER :	INVERT:	WATER :	GRND :	SURCHARGE :		EXCESS :	FLOODED :	DRAINED :	STATUS	
No.	No. :	REF :	CAPACITY :	FLOW :	SIZE :	:DIAM/LxW :	LEVEL :	LEVEL :	LEVEL :	:	:	FLOW :	VOL :	:AREA (m ²) :		
:	:	:	l/s :	l/s :	mm :	mm :	m :	m :	m :	fract.	Depth :	l/s :	m ³ :	:x FACTOR :		
1	I	1.01	SW1	6.3	1.0	100	450	19.50	19.52	20.00	0.16	0.02	0.00	0.000	19	OK
2	I	1.02	SW2	17.9	1.9	150	450	19.43	19.45	20.00	0.11	0.02	0.00	0.000	38	OK
3	B	2.01	SW3	10.7	2.2	100	450	19.49	19.52	19.99	0.21	0.03	0.00	0.000	44	OK
4	I	1.03	SW4	17.9	5.3	150	600	19.30	19.35	20.05	0.30	0.05	0.00	0.000	105	OK
5	I	1.04	SW5	17.3	5.3	150	600	19.14	19.19	19.80	0.31	0.05	0.00	0.000	105	OK
6	I	1.05	Atten	40.9	5.3	225	3600	19.12	19.16	19.80	0.13	0.04	0.00	0.000	105	OK
7	I	1.06	SW6†	49.9	5.3	225	1200	19.10	19.14	19.70	0.11	0.04	0.00	0.000	105	OK



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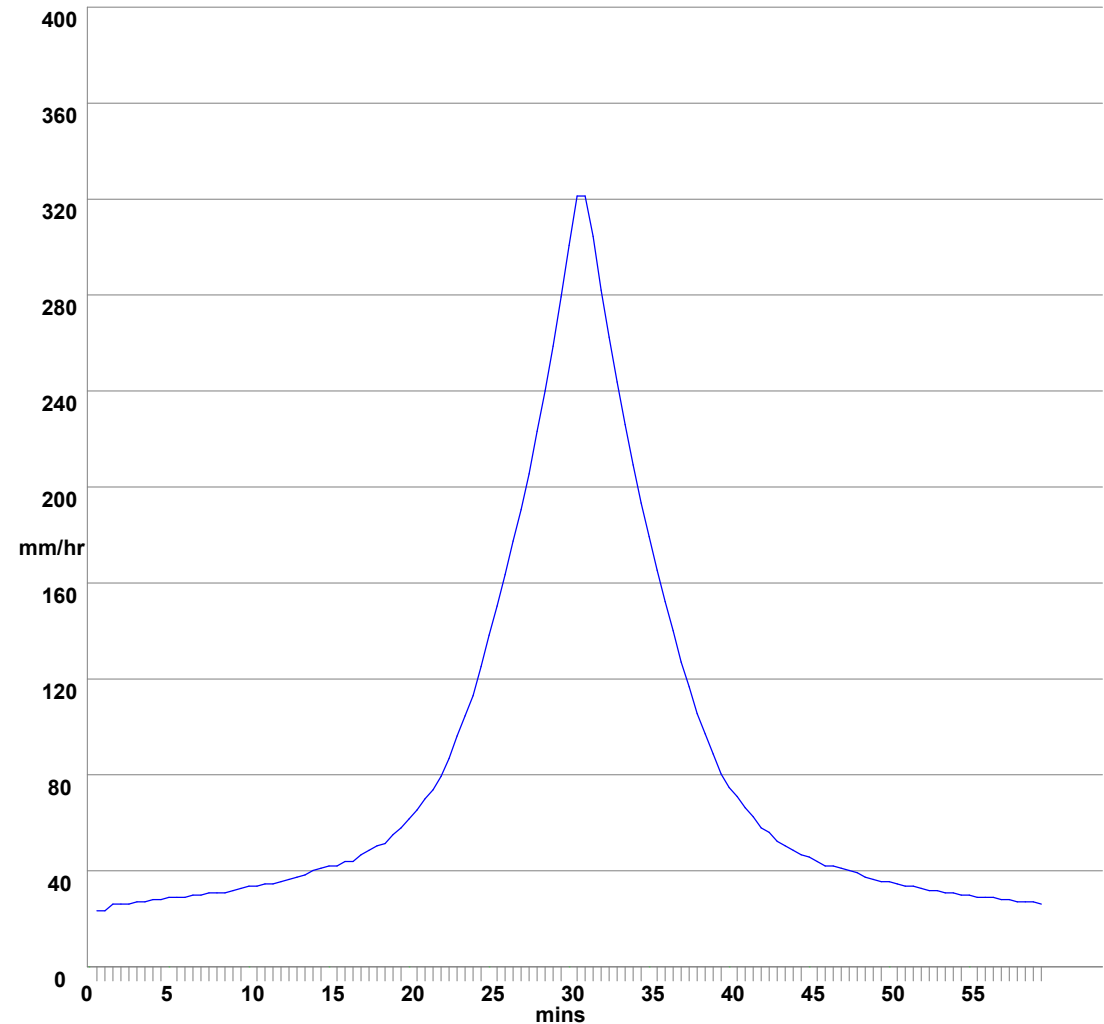
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Sheet no. 3		
Date 07/08/26		
By MDM	Checked	Reviewed

Project	
Title	Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.SW CCF = 45%

Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:30	24.60	20:30	70.30	40:30	75.57
1:00	24.60	21:00	74.69	41:00	71.17
1:30	28.12	21:30	79.08	41:30	66.78
2:00	28.12	22:00	85.23	42:00	62.39
2:30	28.12	22:30	93.14	42:30	59.75
3:00	29.00	23:00	102.81	43:00	56.24
3:30	29.00	23:30	111.59	43:30	53.60
4:00	29.88	24:00	121.26	44:00	51.84
4:30	29.88	24:30	134.44	44:30	50.09
5:00	30.75	25:00	147.62	45:00	49.21
5:30	30.75	25:30	160.80	45:30	46.57
6:00	30.75	26:00	174.86	46:00	44.81
6:30	31.63	26:30	189.80	46:30	44.81
7:00	31.63	27:00	203.86	47:00	43.93
7:30	33.39	27:30	219.67	47:30	43.06
8:00	33.39	28:00	239.01	48:00	42.18
8:30	33.39	28:30	257.46	48:30	39.54
9:00	34.27	29:00	276.79	49:00	38.66
9:30	35.15	29:30	298.76	49:30	37.78
10:00	36.03	30:00	321.60	50:00	37.78
10:30	36.03	30:30	344.45	50:30	36.91
11:00	36.91	31:00	344.45	51:00	36.03
11:30	36.91	31:30	326.00	51:30	36.03
12:00	37.78	32:00	302.27	52:00	35.15
12:30	38.66	32:30	281.18	52:30	34.27
13:00	39.54	33:00	260.97	53:00	34.27
13:30	41.30	33:30	241.64	53:30	33.39
14:00	43.06	34:00	224.07	54:00	33.39
14:30	43.93	34:30	207.37	54:30	31.63
15:00	44.81	35:00	192.43	55:00	31.63
15:30	44.81	35:30	177.50	55:30	30.75
16:00	46.57	36:00	162.56	56:00	30.75
16:30	47.45	36:30	150.26	56:30	30.75
17:00	50.09	37:00	136.20	57:00	29.88
17:30	51.84	37:30	124.77	57:30	29.88
18:00	53.60	38:00	113.35	58:00	29.00
18:30	55.36	38:30	103.69	58:30	29.00
19:00	58.87	39:00	94.90	59:00	29.00
19:30	61.51	39:30	86.11	59:30	28.12
20:00	65.90	40:00	79.96	60:00	28.12

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 60 mins Profile - summer





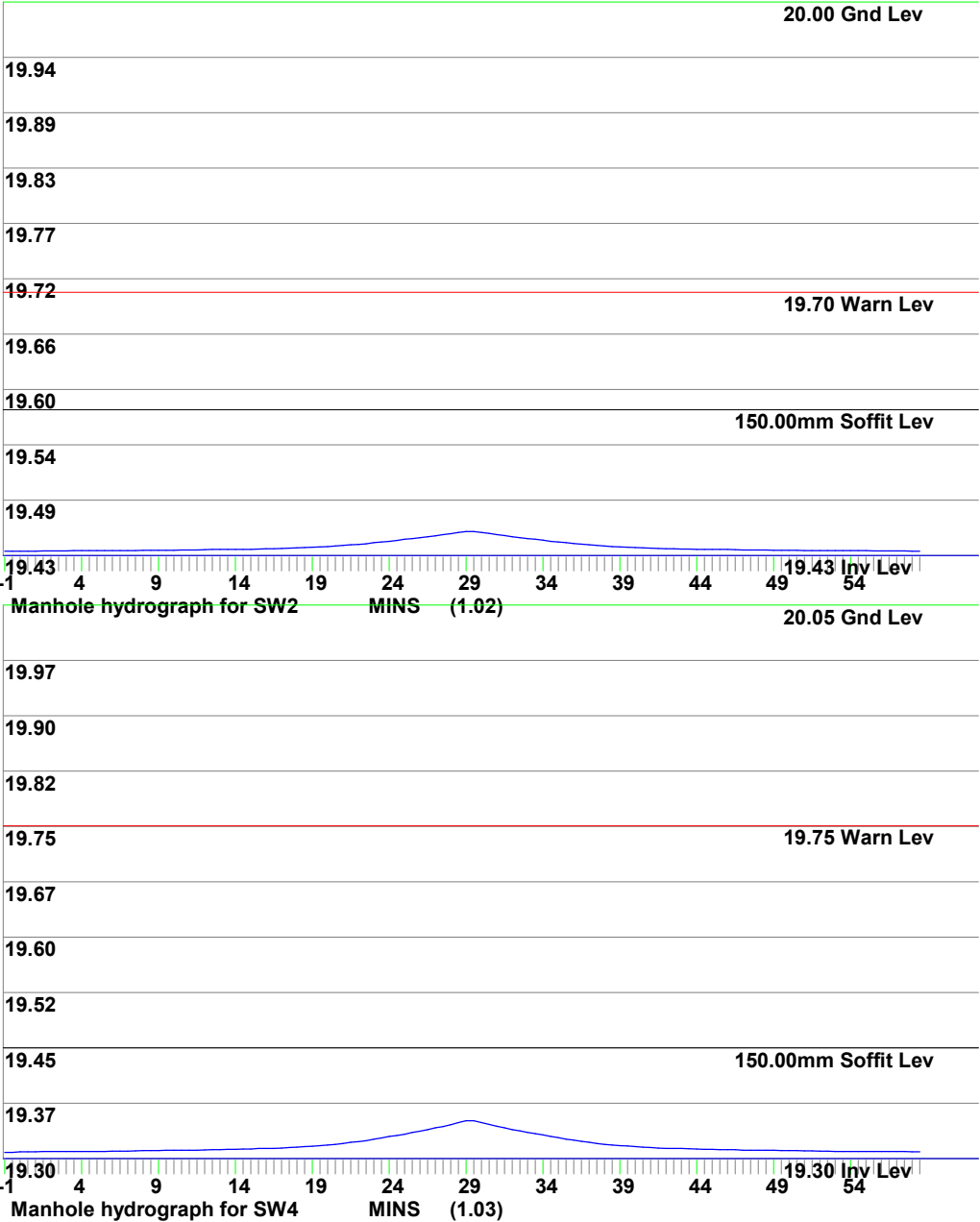
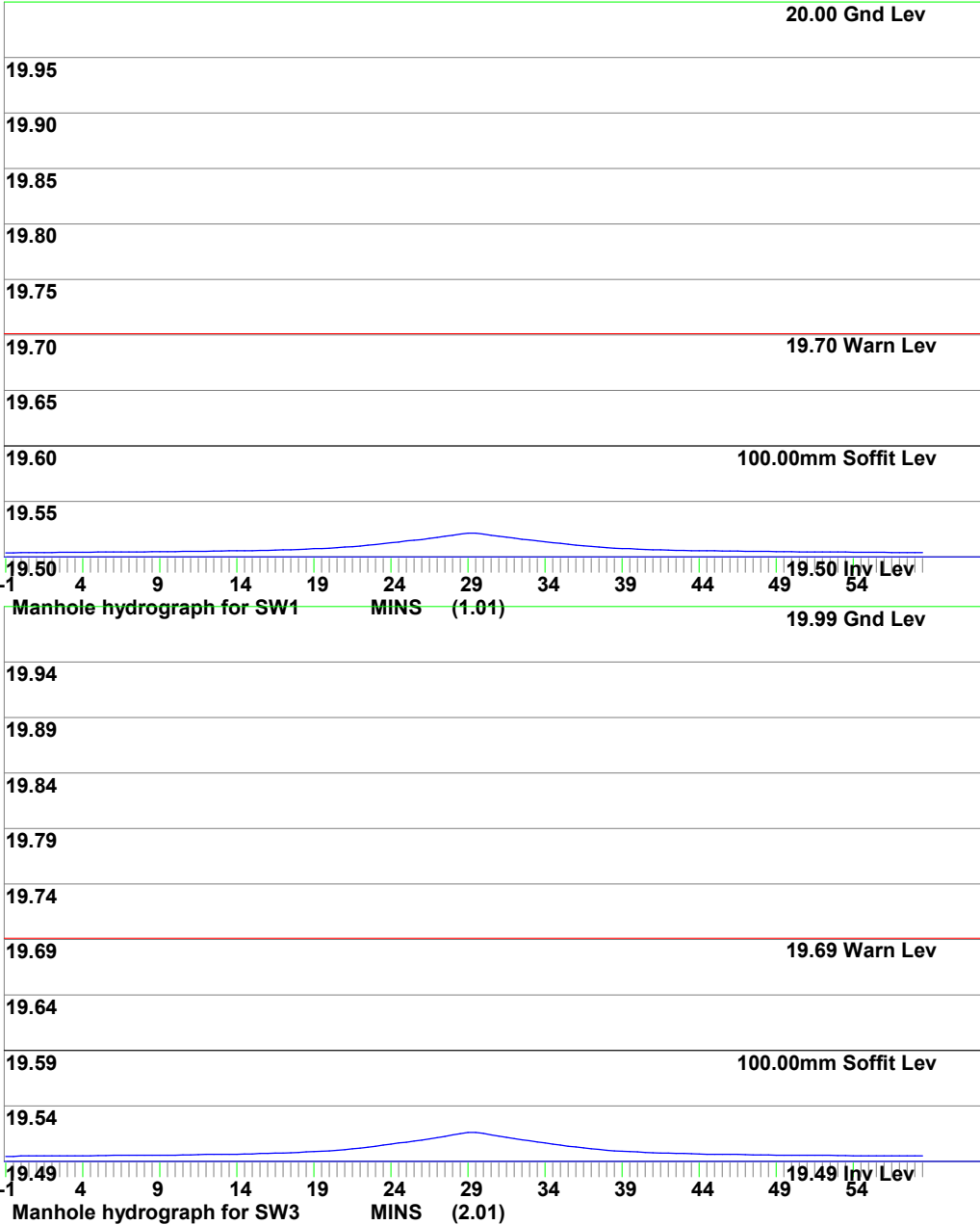
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Date 07/08/26		
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Project
Title Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.SW CCF = 45%





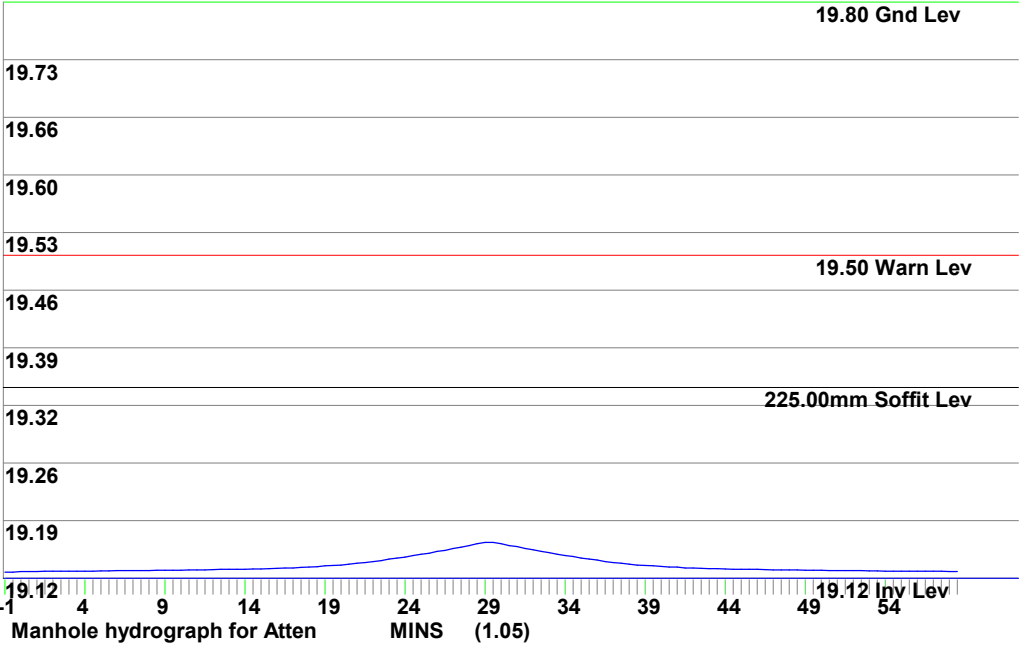
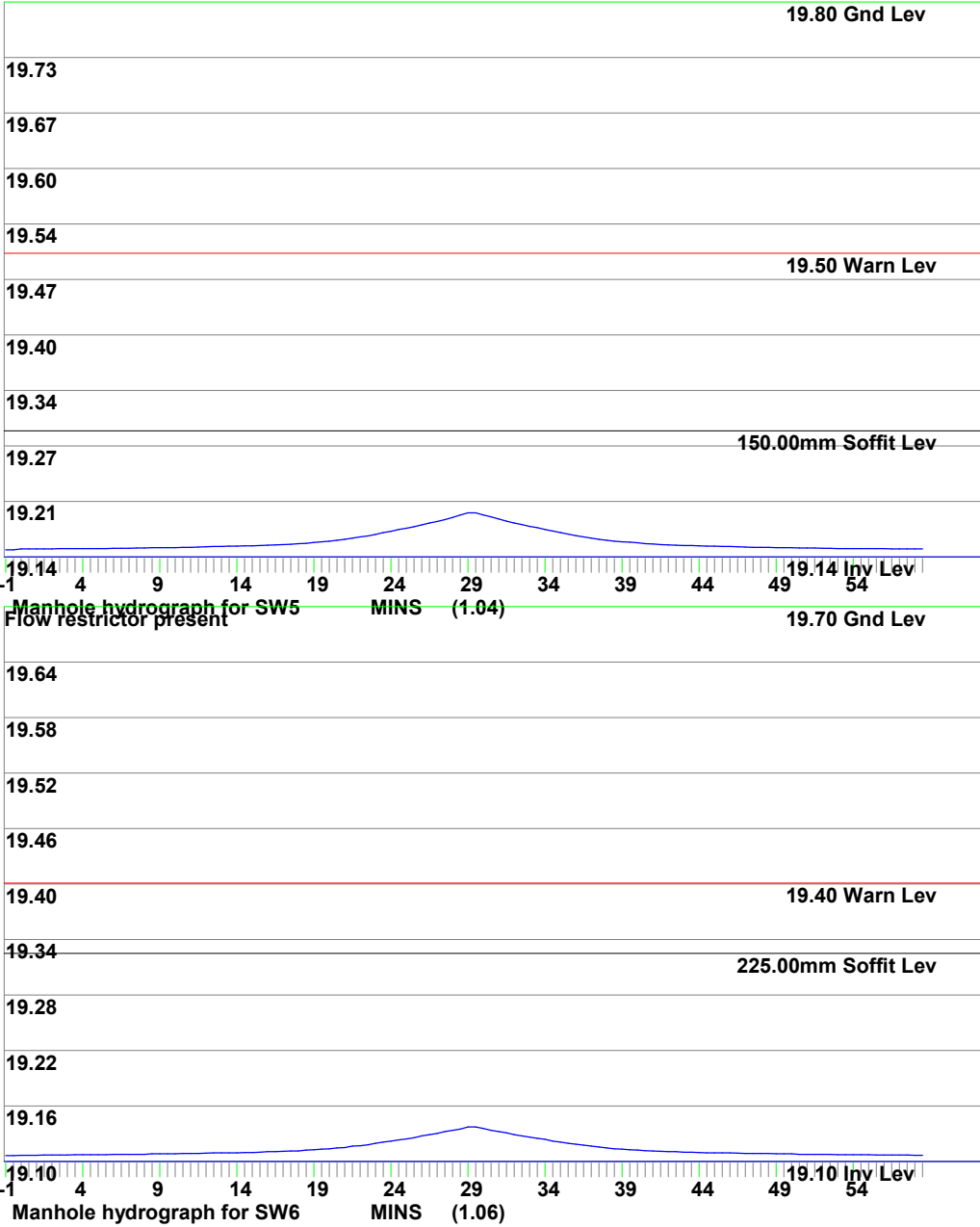
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Project
Title Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.SW CCF = 45%





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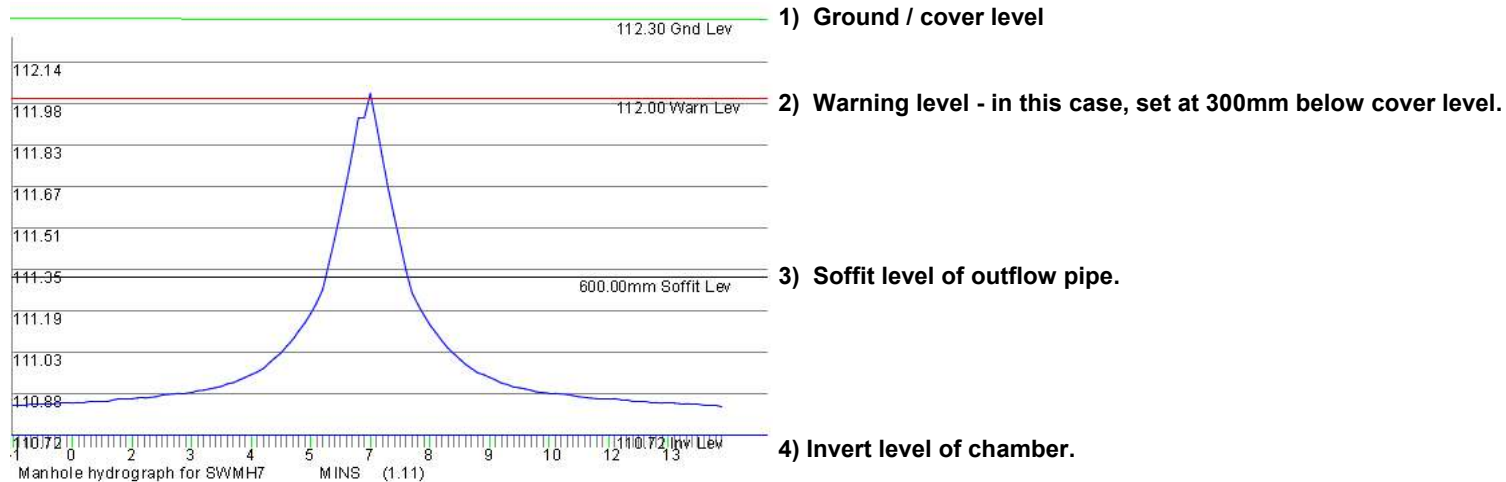
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Title **Surcharge calcs (Sized at 30 yrs storm) for GOOSE GREEN.SW CCF = 45%**



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.



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Project The Green, Goose Green	By MDM	Checked	Reviewed
Title Manhole printout for GOOSE GREEN.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
F1	circ	450	N/A	0.50		0.08	Head	----	----	100	19.625	19.500	N/A	20.000	F2
F2	circ	450	N/A	0.60		0.10	100	0.000	0.000	100	19.525	19.400	N/A	20.000	F3
F3	circ	600	N/A	0.66		0.19	100	0.000	0.000	100	19.465	19.340	N/A	20.000	F4
F4	circ	600	N/A	0.73		0.21	100	0.000	0.000	100	19.395	19.270	N/A	20.000	F5
F5	circ	600	N/A	0.89		0.25	100	0.000	0.000	100	19.035	18.910	N/A	19.800	STW
STW	circ	2400	N/A	0.81		3.66	100	0.000	0.000	100	19.115	18.990	N/A	19.800	Outfall

All manholes to be as per 'Sewers for Adoption'

Levels calculated for level inverts



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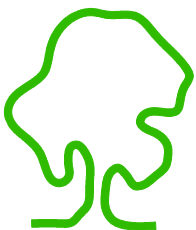
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Project The Green, Goose Green	By MDM	Checked	Reviewed
Title Manhole printout for GOOSE GREEN.FL			

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) 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



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