TECHNICAL NOTE

Job Name:	Lands at Burfield Valley and Reef Way
Job No:	49366-2001
Note No:	TN01
Date:	30/07/2020
Prepared By:	Anthony Thorpe
Subject:	**Drainage Statement & Planning comment responses for the 6 Home Development**

1. Introduction

1.1. Persimmons Homes South East have commissioned Stantec UK Limited to provide drainage advice associated with a change in land use on an individual plot adjacent Reef Way, Hailsham, East Sussex.

1.2. This note is intended to support planning application WD/2018/1271/F and respond to planning comments and requirements provided on 16.01.2020 & 17.01.2020.

1.3. This note should be read in conjunction with the following documents:

- 49366-2001-TN03

1.4. This note is deemed to supersede PBA document 43124 TN002 issued on 22/05/2018.

2. Site Proposal

2.1. The existing site is an area adjacent to Reef Way which previous developments in the area have left as soft landscaping. The current site proposal would see this land replaced by 6 new dwellings.

2.2. The following extracts shown the original and proposed layouts for the area:

Figure 2.1 - Extract from Hillreed Homes Master Access Plan and Proposed Illustrative Layout (2010)

Figure 2.2 - Extract from ECE Architecture DWG No. 6491/202

3. Planning Comments

3.1. A planning application for the site has previously been submitted with supporting drainage statements and documents. Below are comments received from East Sussex County Council (ESCC) and Wealden District Council (WDC). The current design has been developed based on these comments and responses can be seen in section 4.1 and 4.2 for ESCC and WDC respectively.

3.2. ESCC Comments received on 17/01/2020:

3.2.1. *"There have been a few planning applications seeking to make changes to the details approved under permission WD/2009/2705/MEA. Most of the changes resulted in increased impermeable area compared to that allowed for in the design of the strategic drainage system. However each drainage capacity assessment undertaken in support of the proposed changes only assessed the impact of that particular change.* ***Therefore, there is the risk that the cumulative impact of all the proposed changes will result in unacceptable flooding within the strategic network****. It is not yet clear whether this drainage system has already been adopted by Southern Water, if it is adopted the water company usually carries out the capacity assessment.*

3.2.2. *The drainage capacity assessment only considers the impact of the proposed six dwellings. It also gives an indication of the anticipated flooding in the strategic drainage network following connection of the proposed development at two manholes.* ***It is also not clear whether the surface water runoff from this plot will be attenuated****.* ***The assessment should use 40% allowance for climate change for this proposal as it is a new application*** *and is not part of the approved scheme of permission WD/2009/2705/MEA.*

3.2.3. ***The capacity assessment of the strategic drainage network in Reef Way should take into account all the additional connections and impermeable area being proposed by the various applications.*** *This should also include the capacity of the attenuation ponds to receive the additional volume. We are aware that the resulting flooding on the highway to be adopted was agreed by East Sussex Highways when considering only one of the plots. However, it could be that the resulting highway flooding when considering all the additional impermeable area would be unacceptable to the highway authority.*

3.2.4. *The application site drains surface water runoff to the Pevensey and Cuckmere Water Level Management Board drainage district, which is downstream of the application site. Therefore the applicant should apply for consent to discharge surface water runoff into the Water Level Management Board's area as required by the Board's Byelaw 3, which is the process by which the Board agrees the proposed discharge rates."*

3.3. WDC Comments received on 16/01/2020:

3.3.1. "The latter states that surface water will be discharged to a main sewer via a SUDs scheme. The Technical Note amplifies this by stating that it will discharge into the existing surface water sewer in the highway outside the site. I am unsure as to whether this has been, or is intended to be, adopted as public. The site is proposed to be drained in two parts, which will drain to the same existing surface water sewer with two different connection points. I am not aware of any agreement by Southern Water or the private owners of the existing system to these staggered (or any) connections.

3.3.2. There is no mention of any storage or hydrobraking arrangements on the two parts of the system so all discharge from these areas will be unchecked. Values for the discharge rates are given. For a 1 in 100 year event, it is noted that this will cause additional flooding elsewhere on the parts of the estate which are already constructed. Whilst this is stated to be a small increase "retained in highway or public land" rather than properties, this is wholly unacceptable as the clear aim of the national planning system is for new development not to increase the flood risk elsewhere.

3.3.3. The calculations provided have been made using a 30% climate change allowance. Reworking to the correct 40% allowance will obviously further increase the flooding and surcharging. This site and the others in the area eventually drain to a chain of attenuation ponds to the east of the application site. Sufficient room exists on the ground for these storage devices to be upsized to accommodate the water which the system cannot cope with at present. The pipe sizes and available storage need to be redesigned to accommodate all water without using the highway or public areas as a flood storage device. The whole system will need to be adequate for all the development areas feeding into it, both existing and proposed.

3.3.4. I understand that there are concerns with pollution control and would suggest that suitable devices for the area as a whole need to be provided in the vicinity of the attenuation ponds. This is of particular importance with the Pevensey Levels Ramsar site just downstream of the site.

3.3.5. No comments on maintenance are provided.

3.3.6. For the reasons given above I would object to this proposed surface water scheme.

3.3.7. Provision of foul sewage drainage is a matter for Southern Water to comment on."

4. Comment Responses

4.1. Responses to ESSC Comments:

4.1.1. Technical note 49366-2001-TN03 should be read in conjunction with this document. The technical note covers the combined effect that the multiple land use changes across the development will have on the existing sewer. It highlights that there is an overall reduction in flood volumes experienced within the existing sewer network during a 1 in 100 year +40% climate change event. The existing sewer has not yet been adopted by Southern Water but is in the process of being offered for adoption.

4.1.2. Section 5 of this document shows the re-design of the surface water drainage networks. The re-design assesses the impact of 1 in 100 +40% climate change events in line with current government guidance.

4.1.3. Section 5 of this document shows the volume of flooding expected within the highways as a direct result of the land use changes highlighted in section 2. The flood volume within the highways is maintained at or below existing levels. For the combined effect of multiple land use changes, refer to Technical note 49366-2001-TN03.

4.1.4. The Pevensey and Cuckmere Water Level Management Board has not yet been consulted. It is intended that the management board will be contacted.

4.2. Responses to WDC Comments:

4.2.1. The existing sewer that the development proposes to connect to is not yet adopted by Southern Water but is in the process of being offered for adoption. The current owner of the sewer is therefore the contractor (Persimmons Homes). It is therefore assumed that connections onto the sewer are accepted by the sewer owner and changes will be written into future adoption agreements with Southern Water. A re-design of the development network has reduced the development to a single connection point (refer to Section 5 for details).

4.2.2. As part of the development redesign (Section 5), a flow control has been added to the development discharge point. The re-design has assessed the impact of the development to the wider highways network and determined that there is no increase in flood risk if attenuation is provided.

4.2.3. The development redesign has assessed flood volumes up to the 1 in 100-year + 40% climate change event in line with current government guidance. An assessment of the overall impact from the multiple land use changes on the existing surface water network has been undertaken (see Technical Note 49366-2001-TN03). It has determined that there is an overall decrease in flood volume from that of the existing approved network (under planning application WD/2009/2705/MEA). As a result, the only additional attenuation facilities introduced are plot specific.

4.2.4. The potential resultant pollution from the development has been mitigated in line with the Ciria document C753 The SuDS Manual (an industry recognised document). The development utilises catchpits and trapped gullies to mitigate the 5mm first flush pollutants and connects into an established attenuation pond. Refer to section 5 for specific details.

5. Surface Water Re-design

5.1. Existing Surface Water

5.1.1. The development is not currently served by any existing drainage network (private or adopted), however the adjacent road and turning head contain surface water drains. It is intended that both these drains will be offered for adoption.

5.1.2. The extract below, from PBA drawing 24336/003/010 Rev D, shows the main surface water network running down reef way as a 225mm dia. pipe and the pipe within the turning head as a 150mm dia. pipe

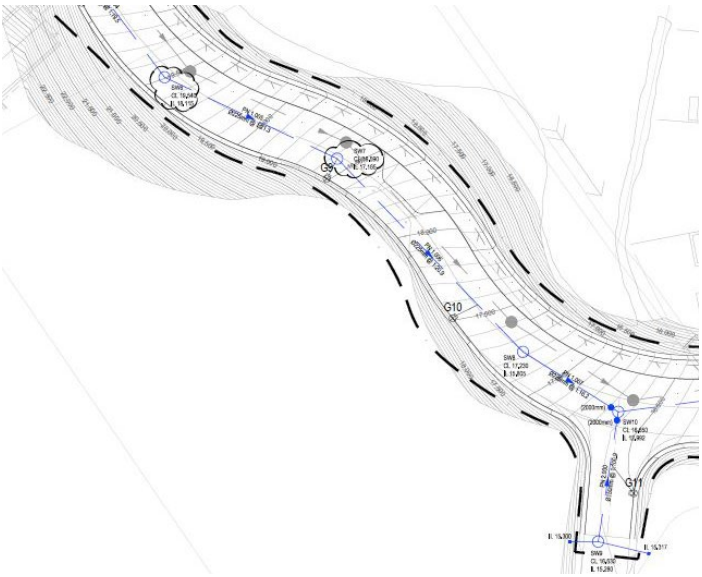

Figure 5.1 - Extract from PBA Drawing 24336/003/010 Rev D

5.2. Proposed Design Parameters

5.2.1. Rainfall data: Flood Studies Report

- R = 0.356
- M5-60 = 20.3mm

5.2.2. Storm Return Period

- 1 in 1-year - No surcharging (except where flow controls exist)
- 1 in 30-year (Worst case storm) – No flooding
- 1 in 100-year +40% (Worst case event) – No internal flooding of buildings, no increase in flooding off-site

5.2.3. PIMP coefficient – 100% runoff assumed from impermeable surfaces

5.2.4. Catchment Area – 0.28ha Total, 0.13ha considered impermeable

5.3. Proposed Surface Water

5.3.1. The proposed site consists of 0.28ha. 0.12ha are considered impermeable and 0.16ha are considered permeable. It is assumed that the 0.12ha shall drain into the surface water sewer, while the 0.16ha shall drain to ground (as per existing conditions). A small consideration for land creep has been given to the catchment area (4% based on Table 3 of KCC's Drainage and Planning Policy). The total drainable catchment area is therefore 0.13ha (refer to Stantec drawing 49366-2001-502 for catchment areas).

5.3.2. Since the proposed site has not been considered as part of the wider drainage network, it is expected that the additional area will result in flooding during extreme storm events if not restricted and attenuated.

Table 5.1 shows the modelled flood volumes for the network during a 1 in 100+40% storm pre-development and post development assuming no flow control is used.

Manhole Ref	***Flooded volume during Worst Case 1 in 100-year +40% Storm Event, m³***		
	Pre-Development	*Post-Development*	*Change in Volume*
S2	0.662	0.662	0.000
S3	5.389	5.389	0.000
S4	4.781	4.781	0.000
S5	0.553	0.552	-0.001
S12	1.109	1.109	0.000
S14	6.340	7.076	0.736
S21	6.362	8.858	2.496
S26	18.500	18.606	0.106
S30	11.345	11.490	0.145
S31	7.761	7.914	0.153
S36	0.125	0.125	0.000
S37	8.605	8.604	-0.001
S49	5.122	5.128	0.006
S57	6.499	7.139	0.640
S58	2.988	4.265	1.277
S59	22.800	27.080	4.280
S76	29.337	30.712	1.375
S89	4.855	4.855	0.000
Total	*143.133*	*154.345*	*11.212*

5.3.3. As table 5.1 shows, the introduction of the 6 homes will cause the overall network to flood by an additional 11.212m³. This is a very small volume of water spread across several locations on the site. Since the development falls under a new planning application it is considered a new site the site should not cause additional flooding outside of it. Thus, a flow control with attenuation is required.

5.3.4. A nominal flow of 5 l/s has been taken as a maximum flow for all storm events. This is achieved using a hydrobrake.

5.3.5. An additional manhole chamber has been introduced within Reef Way. This will act as an outfall location and will restrict flows that arise from the footway running along the plots.

5.3.6. Preliminary attenuation assessments (See Appendix C) have determined that approximately 45 m³ attenuation will be required to ensure there is no flooding during the 1 in 100+40%. This volume has been achieved using attenuation crates, oversized pipes, and oversized manholes.

5.3.7. The proposed design is shown on Stantec drawing 49366-2001-501

Table 5.2 shows the perceived flood volumes for the network during a 1 in 100+40% storm event pre-development and post development (with and without a flow control)

Manhole Ref	*Flooded volume during Worst Case 1 in 100-year +40% Storm Event, m^3*		
	Pre-Development	*Post-Development*	*Change in Volume*
S2	0.662	0.662	0.000
S3	5.389	5.389	0.000
S4	4.781	4.781	0.000
S5	0.553	0.552	-0.001
S12	1.109	1.109	0.000
S14	6.340	6.340	0.000
S21	6.362	5.543	-0.819
S26	18.500	18.458	-0.042
S30	11.345	11.296	-0.049
S31	7.761	7.712	-0049
S36	0.125	0.125	0.000
S37	8.605	8.604	-0.001
S49	5.122	5.117	-0.005
S57	6.499	6.140	-0.359
S58	2.988	2.813	-0.175
S59	22.800	22.239	-0.561
S76	29.337	29.105	-0.232
S89	4.855	4.855	0.000
Total	*143.133*	140.840	-2.293

5.3.8. As table 5.2 shows, if the site discharge rate is restricted to 5.0 l/s and attenuated during extreme storm events, the overall site flooded volume will reduce from the existing conditions (reduction of 2.293m^3) and not increase flood risk downstream.

5.3.9. The overall effect the proposed development has on the existing drainage strategy is positive.

5.4. Pollution Considerations

5.4.1. Government guidance (pollution prevention for businesses) suggests that car parks larger than 800m^2 may need an oil separator or an alternative method of water treatment (such as sustainable drainage (SuDS)) to protect against hydrocarbons. The site has a single outfall discharging private driveways less than 800m^2 in total area. Thus, the site does not require the specific pollution control under government guidance.

5.4.2. It is generally good practise to assess the pollution impact from a site. Since a large SuDS pond is situated downstream of the site, it would be appropriate to consider this as an existing pollution treatment feature. As the entire network has been required for analysis, it should then be acceptable that this can act also as pollution control.

5.4.3. The surface water run-off catchment area is 0.13ha and consists of roof area and private driveways. The SuDS manual simple index approach to classifying pollution hazards identifies roof areas and private car parks as very low and low risk. These types of land use are characterised as having the following pollution levels:

Table 5.3 – Pollution indices by land use. Extract of Table 26.2 from the SuDS Manual

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie <300 traffic movements/day	Low	0.5	0.4	0.4

5.4.4. To mitigate the pollution through the simple index approach, any treatment facility/SuDS must have a TSS, Metals, and hydrocarbon mitigation value higher than that produced by the land use (see table 5.4). i.e. for individual property driveways, the mitigation index for hydro-carbons must be 0.4 or greater.

Table 5.4 – Pollution mitigation by treatment feature. Extract of Table 26.3 from the SuDS Manual

Treatment feature	Mitigation Indices		
	Total suspended solids (TSS)	*Metals*	*Hydro-carbons*
Ponds	0.7	0.7	0.5

5.4.5. As shown in the table above, ponds can provide sufficient pollution mitigation for the individual property driveways and residential roofs. Thus, the existing and established pond should be considered capable of treating flows arising from the site.

5.4.6. The SuDS manual also highlights the principle of first flush, which theorises that the majority contaminants from a site are washed into sewer systems within the first 5mm of rainfall. Without mitigation, contaminants can overwhelm treatment features. Traditional trapped gullies, manhole catchpits, and sumps are all capable of containing this first 5mm of rainfall provided regular maintenance is undertaken. The site is collected via trapped gullies and discharge manhole have catchpit.

6. Foul Water

6.1. Existing Foul Water

6.1.1. The proposed development is not currently served by any existing drainage network (private or adopted), however the adjacent road contains an adoptable foul water drain.

6.1.2. The extract below, from PBA drawing 24336/003/007 Rev F, shows the main surface water network running down reef way as a 150mm dia. pipe.

Figure 5.1 - Extract from PBA Drawing 24336/003/007 Rev F

6.2. Proposed Foul Water

6.2.1. Since the plot was not originally considered during the design process, it is expected that introducing these houses will increase the overall foul water discharge volume.

6.2.2. Following Sewers Sector Guidance Appendix C - Design and Construction Guidance the peak flow from residential buildings is regarded as 4000 l/day/dwelling. The proposed plot development includes 6 dwellings;

Q= 6 x 4000 / (24 x 60 x60) = 0.27 l/s peak or 0.04 l/s DWF

6.2.3. The overall peak foul flow for the development is 16.55 l/s (based on PBA S104 Foul Sewer Design). The expected increase in peak flow is 1.6% of the total foul flow.

6.2.4. Technical note 49366-2001-TN02 shows that a reduction in proposed peak foul flows (0.4l/s) with a change in land use. This is greater than the 0.27 l/s gain from these additional 6 houses, thus the capacity within the foul water network should not be negatively impacted.

6.2.5. The proposed design is shown on Stantec drawing 49366-2001-501

7. Conclusions

7.1. The existing surface water network is sufficiently sized to accommodate the additional surface water flows from the development outlined in section 2.2, provided the flow control and attenuation volumes stated in section 5 are provided.

Storm Event	Original Design *Level of Flooding*	Proposed Arrangement *Level of Flooding*
1 in 1-year	No Flooding	No Flooding
1 in 30-year	No Flooding	No Flooding
1 in 100-year + 40% CC	143.33 m^3 Flooding	140.840 m^3 Flooding

Table 6 - Summary of Flooding

7.2. The table above shows that the proposed drainage strategy has an overall positive effect on the development. Thus, no additional site wide upgrades should be considered.

7.3. The existing SuDS features are considered sufficient in mitigating and pollution arising from the development, in line with best practise.

7.4. Any foul water drainage coming from the plots is anticipated to connect to the existing network within Reef Way.

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
49366/2001/TN01	-	12.08.20	AT	DC	PH	PH

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TECHNICAL NOTE

APPENDIX A

Planning Comments – ESSC Comments

eastsussex.gov.uk

wlma.org.uk

Pevensey and Cuckmere Water Level Management Board

East Sussex County Council

Working in partnership with

Claire Turner
Wealden District Council
Council Offices
Vicarage Lane, Hailsham
BN27 2AX

Date: 17 January 2020

Our ref:SUD/PC/WD/20/001
Your ref:WD/2018/1271/F

Dear Mrs Turner

SUD/PC/WD/20/001 - Construction of 6 dwellings ...with associated car parking and landscaping, Land Adjacent to Reefway, Hailsham

Received Date: 8 January 2020

Position of the Pevensey and Cuckmere Water Level Management Board and Lead Local Flood Authority:-

No objection	The information provided is satisfactory and enables the PCWLMB and LLFA to determine that the proposed development is capable of managing flood risk effectively.	
No objection	The information provided is satisfactory and enables the PCWLMB and LLFA to determine that the proposed development is capable of managing flood risk effectively. Although there will be a need for standard conditions which are outlined in this response.	
No objection in principle subject to the imposition of conditions	Whilst the application documentation has not met all the County Council's and the Board's requirements, it is possible that the risk is capable of being mitigated to acceptable levels by the application of planning conditions which are outlined in this response.	
Objection due to Insufficient Information	The applicant has failed to meet the requirements to assess its acceptability in flood risk terms. The PCWLMB and LLFA will respond in 21 days of receipt of the requested information	**X**
Objection	The application presents an unacceptable on site/off site flood risk.	

Cont./…

Flood Risk Management, Communities, Economy and Transport Department
County Hall, St Anne's Crescent, Lewes, East Sussex, BN7 1UE
SuDS@eastsussex.gov.uk 01273 481421

Detailed Comments:

It is our understanding that the proposals involve developing land which was intended to remain green space under planning permission WD/2009/2705/MEA. It is also our understanding that the drainage system which was constructed to implement permission WD/2009/2705/MEA was designed to serve only the details under conditions of the permission.

There have been a few planning applications seeking to make changes to the details approved under permission WD/2009/2705/MEA. Most of the changes resulted in increased impermeable area compared to that allowed for in the design of the strategic drainage system. However, each drainage capacity assessment undertaken in support of the proposed changes only assessed the impact of that particular change. Therefore, there is the risk that the cumulative impact of all the proposed changes will result in unacceptable flooding within the strategic network. It is not yet clear whether this drainage system has already been adopted by Southern Water, if it is adopted the water company usually carries out the capacity assessment.

The drainage capacity assessment only considers the impact of the proposed six dwellings. It also gives an indication of the anticipated flooding in the strategic drainage network following connection of the proposed development at two manholes. It is also not clear whether the surface water runoff from this plot will be attenuated. The assessment should use 40% allowance for climate change for this proposal as it is a new application and is not part of the approved scheme of permission WD/2009/2705/MEA.

The capacity assessment of the strategic drainage network in Reef Way should take into account all the additional connections and impermeable area being proposed by the various applications. This should also include the capacity of the attenuation ponds to receive the additional volume. We are aware that the resulting flooding on the highway to be adopted was agreed by East Sussex Highways when considering only one of the plots. However, it could be that the resulting highway flooding when considering all the additional impermeable area would be unacceptable to the highway authority.

The application site drains surface water runoff to the Pevensey and Cuckmere Water Level Management Board drainage district, which is downstream of the application site. Therefore the applicant should apply for consent to discharge surface water runoff into the Water Level Management Board's area as required by the Board's Byelaw 3, which is the process by which the Board agrees the proposed discharge rates.

If you or the applicant/agent wishes to discuss any of the points raised in this letter, please contact the case officer on SUDS@eastsussex.gov.uk

Yours sincerely

Nick Claxton

Nick Claxton
Team Manager - Flood Risk Management
On behalf of the Lead Local Flood Authority, ESCC and Pevensey and Cuckmere WLMB

Case Officer: Revai Kinsella
T: 01273 335534
E: SUDS@eastsussex.gov.uk

Planning Comments – WDC Comments

My reference GK/LV8000

ask for Graham Kean

date 16 January 2020

Wealden District Council

Council Offices, Vicarage Lane
Hailsham
East Sussex BN27 2AX

website : www.wealden.gov.uk

MEMORANDUM

Mrs C Turner, Planning

your reference

Planning Application WD/2018/1271/F
Reef Way, Hailsham

I write further to our discussions of 15 January 2020 regarding the above planning application and would have the following comments. I have not commented on this application previously as it is de minimus for SUDs purposes as a stand-alone site. However, in this context in constitutes six further dwellings being added to a developing SUDs scheme for the Burfield Valley site. No new information appears to have been submitted on the surface water arrangements at this location since August 2018.

No drainage plan is submitted so I am relying on information supplied in the Technical Note, dated 22 May 2018 and the planning application form.

The latter states that surface water will be discharged to a main sewer via a SUDs scheme. The Technical Note amplifies this by stating that it will discharge into the existing surface water sewer in the highway outside the site. I am unsure as to whether this has been, or is intended to be, adopted as public. The site is proposed to be drained in two parts, which will drain to the same existing surface water sewer with two different connection points. I am not aware of any agreement by Southern Water or the private owners of the existing system to these staggered (or any) connections.

There is no mention of any storage or hydrobraking arrangements on the two parts of the system so all discharge from these areas will be unchecked. Values for the discharge rates are given. For a 1 in 100 year event, it is noted that this will cause additional flooding elsewhere on the parts of the estate which are already constructed. Whilst this is stated to be a small increase “retained in highway or public land” rather than properties, this is **wholly unacceptable** as the clear aim of the national planning system is for new development not to increase the flood risk elsewhere.

The calculations provided have been made using a 30% climate change allowance. Reworking to the correct 40% allowance will obviously further increase the flooding and surcharging.

This site and the others in the area eventually drain to a chain of attenuation ponds to the east of the application site. Sufficient room exists on the ground for these storage devices to be upsized to accommodate the water which the system cannot cope with at present. The pipe sizes and available storage need to be redesigned to accommodate all water without using the highway or public areas as a flood storage device. The whole system will need to be adequate for all the development areas feeding into it, both existing and proposed.

I understand that there are concerns with pollution control and would suggest that suitable devices for the area as a whole need to be provided in the vicinity of the attenuation ponds. This is of particular importance with the Pevensey Levels Ramsar site just downstream of the site.

No comments on maintenance are provided.

For the reasons given above I would **object** to this proposed surface water scheme.

Provision of foul sewage drainage is a matter for Southern Water to comment on.

For information, please note that the development may increase the rate and/or volume of water being discharged into the Pevensey Levels Internal Drainage District (compared to the status quo), and so an application may need to be made to the Pevensey & Cuckmere Water Level Management Board seeking consent under the terms of its Byelaws. If it is considered that a proposed increase in flows can be safely and adequately dealt with by the receiving waterbody and wider drainage network, then consent may be issued (although consent is not guaranteed to be given). Any permission granted by the Board would be subject to conditions, usually including entry into a legal agreement and the payment of a Surface Water Development Contribution to the Board. Details and further information can be found at https://www.wlma.org.uk/uploads/WMA_Table_of_Charges_and_Fees.pdf . Further details regarding the Board's application procedure and associated payments which may become due are also available on this website.

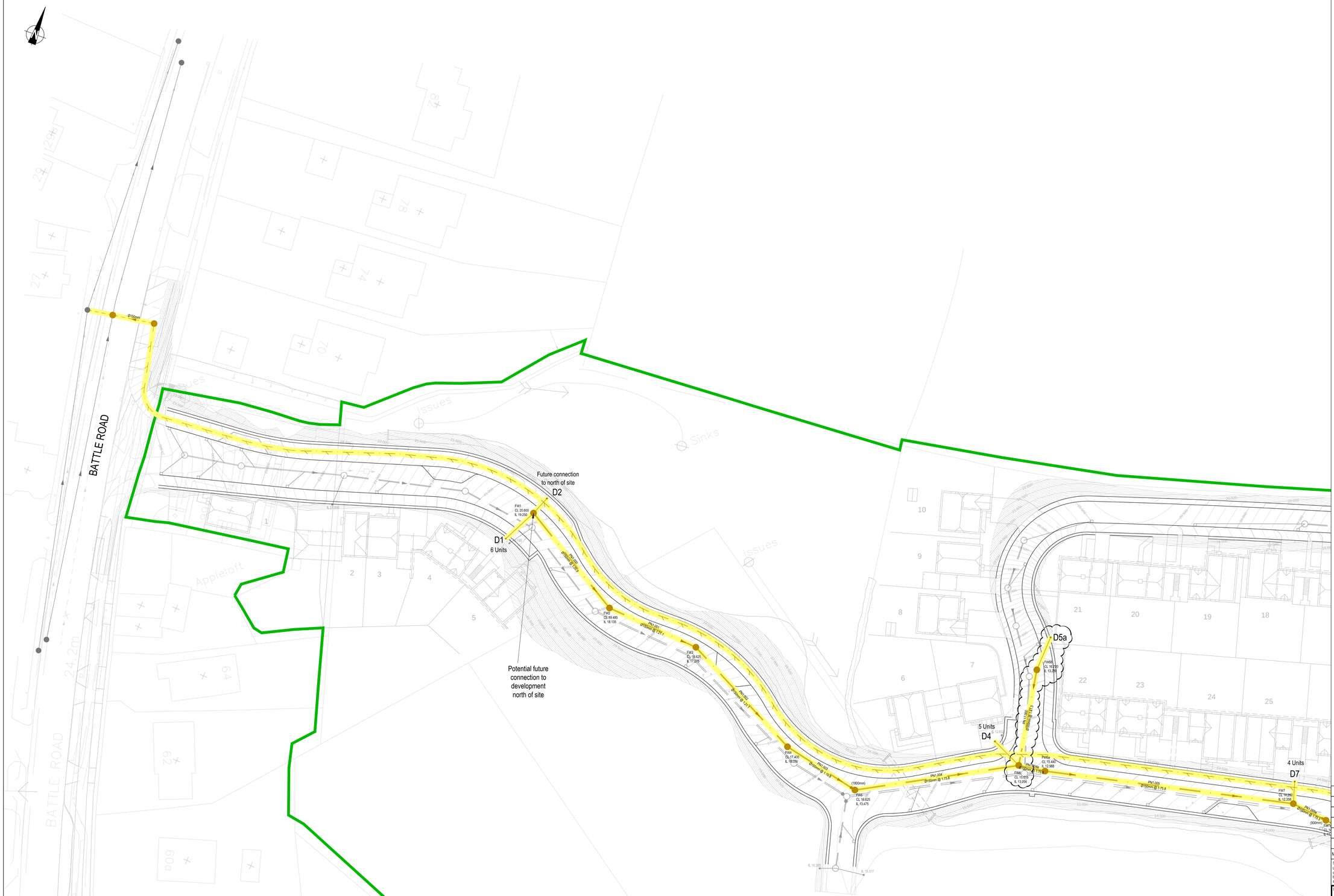
Please contact Graham Kean on extension 3126 if you wish to discuss the matter further or to meet on site.

Graham Kean
Engineer and Countryside Officer

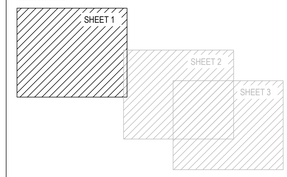
TECHNICAL NOTE

APPENDIX B

Drawings



LOCATION PLAN:



NOTES:

1. Do not scale from this drawing.
2. Drawing based on Topographical Survey by Three Dimensional Services, drawings 05/068/01 to 04 dated 22/09/2010.
3. All work to be undertaken in accordance with the Specification for Highway Works and the East Sussex County Council Highway Construction Specification For Developers.
4. All adoptable sewer design and construction to comply with Water Services Association's "Sewers for Adoption" (6th Edition).
5. All building work to comply with NHBC requirements.
6. All proposed and relevant existing levels are to be checked prior to construction starting and any discrepancies referred back to the designer.
7. Drawing to be read in conjunction with drainage schedule and long section.

LEGEND:

- Major Contour Line
- Minor Contour Line
- Proposed manhole to drawing numbers 24336/003/SD04 and SD05
- Proposed foul water sewer to be adopted, diameter as shown, laid to details D3 and D4 on drawing number 24336/003/SD03
- Adoptable sewer
- Proposed foul water rising main (125mm Outside Diameter SDR11)
- As-built Phase 1 Foul Water Sewer Network
- Future Phase 4 Foul Water Sewer Network
- Proposed Surface Water Sewer Network
- Site Boundary
- Location of Foul Pumping Station. For Pumping Station Arrangement detail see PBA drawing number 24336/003/032

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following :
CONSTRUCTION: 1. Existing watercourses are located within the site consisting of open ditches, ponds, buried pipes and culverts. 2. Existing utility apparatus is located within the site including overhead electricity cables and buried water main (400mm dia)
MAINTENANCE / CLEANING: To be determined post construction
DECOMMISSIONING / DEMOLITION: To be determined post construction
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

SUBJECT TO S104 TECHNICAL APPROVAL AND AGREEMENT BY SOUTHERN WATER

SURFACE WATER DRAINAGE LAYOUT SHOWN FOR INFORMATION ONLY

Mark	Revision	Drawn	Date	Chkd
F	NETWORK BETWEEN PIPE 10.000 & 10.007 & DEMARCATION CHAMBERS DS & D6 REMOVED & MANHOLE 6B, PIPE 17.000 & DEMARCATION CHAMBER D5a ADDED	WSW	18.04.12	TH / BK
E	RISING MAIN LOCATION UPDATED, EASEMENT HATCH ADDED	KM	15.03.12	TH
D	MANHOLES 6, 6a, 7 &7a INVERT LEVELS REVISED	WSW	19.10.11	TH
C	FOUL WATER NETWORK UPDATED	KM	05.09.11	TH
B	PHASE 1 BOUNDARY ADDED	AM	20.06.11	RE
A	OUTLET CHAMBER FROM RISING MAIN RELOCATED	AM	10.06.11	TH

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.
UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status

FOR APPROVAL

HAILSHAM DEVELOPMENT
FOUL SEWER DRAINAGE PLAN
SHEET 1 OF 3

Client
HILLREED HOMES LIMITED

Date of 1st Issue	Drawn by
21.04.2011	WSW
A0 Scale	Checked by
1:250	TH
Drawing Number	Revision
24336/003/007	F

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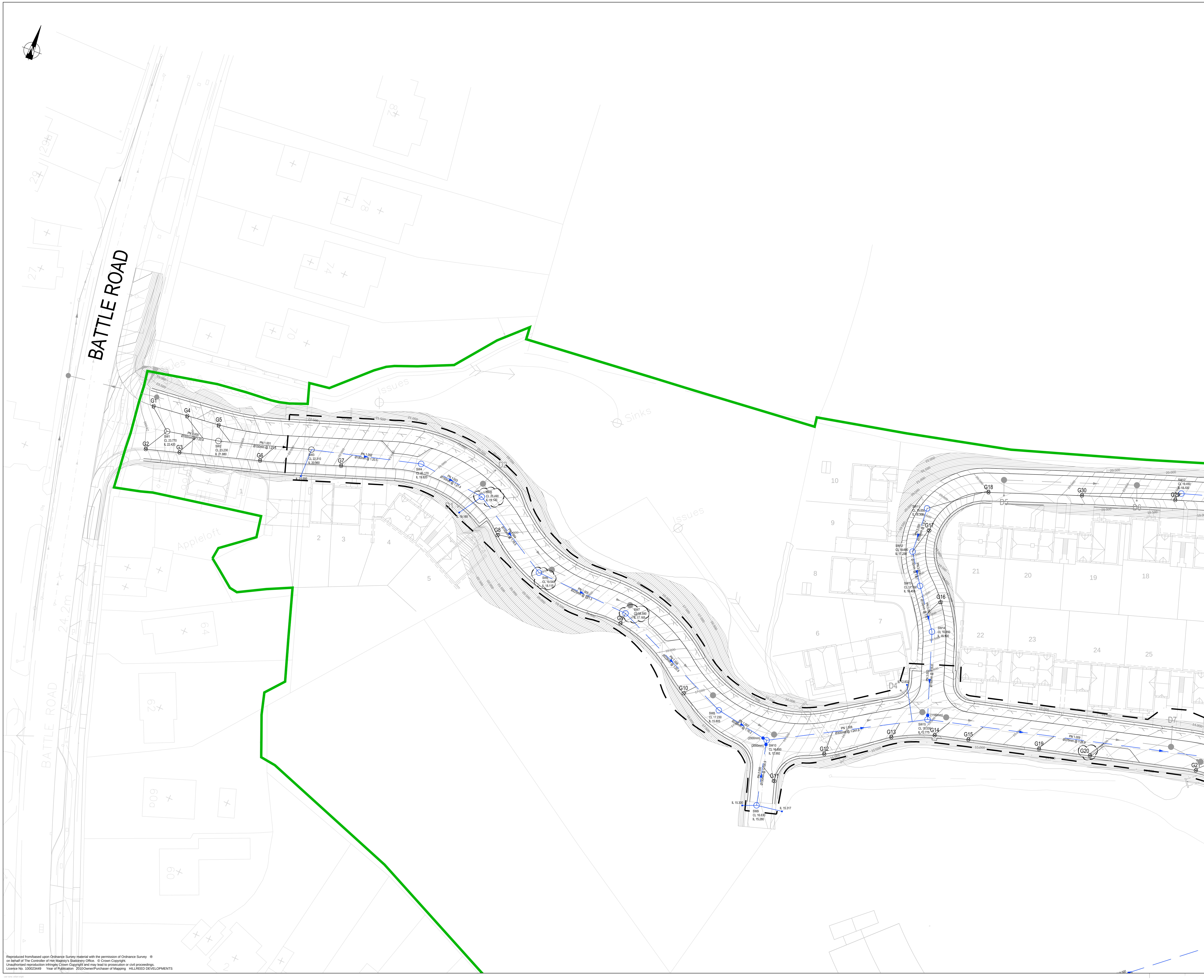
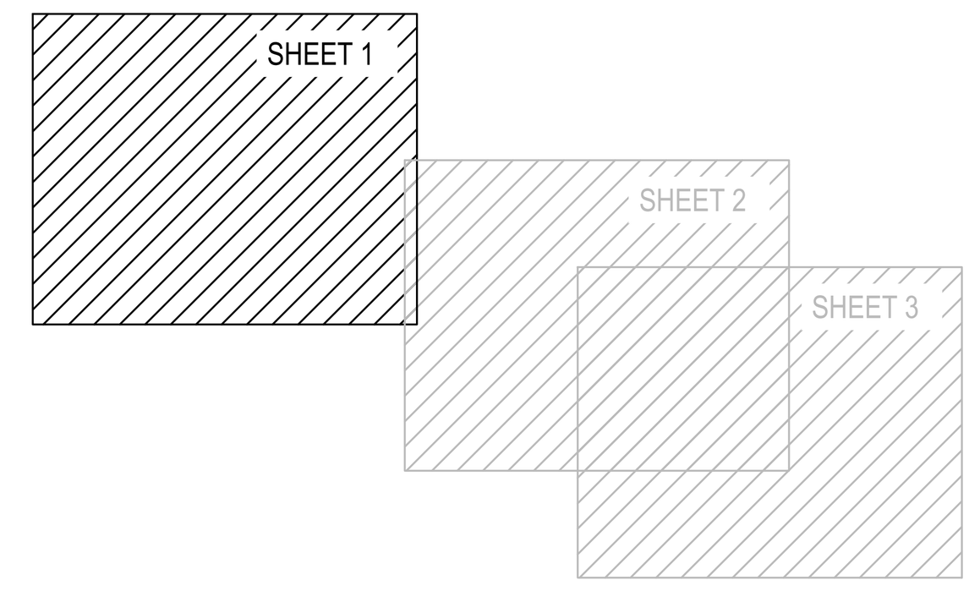


user name: william wright

LOCATION PLAN:



NOTES:

1. Do not scale from this drawing.
2. Drawing based on Topographical Survey by Three Dimensional Services, drawings 05/068/01 to 04 dated 22/09/2010.
3. All work to be undertaken in accordance with the Specification for Highway Works and the East Sussex County Council Highway Construction Specification For Developers.
4. All adoptable sewer design and construction to comply with Water Services Association's "Sewers for Adoption" (6th Edition).
5. All building work to comply with NHBC requirements.
6. All proposed and relevant existing levels are to be checked prior to construction starting and any discrepancies referred back to the designer.
7. Earthworks to be adjusted to suit future adjacent Finished Floor Level's.

LEGEND:

- XXX — Major Contour Line
- XXX — Minor Contour Line
- Proposed foul water sewer to be adopted
- Proposed foul water rising main (150mm Internal Diameter SDR17)
- Existing Southern Water Foul Sewer Network
- Proposed Surface Water Sewer Network, diameter as shown, laid to details D3 and D4 on drawing number 24336/003/SD03
- Proposed manhole to drawing numbers 24336/003/SD04, SD05, SD06 and SD07
- G# Proposed Gully and Pipe run to drawing numbers 24336/003/SD01 and SD02
- Site Boundary
- Limit of Phase 1 Surface Water drainage work

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following :

CONSTRUCTION:
1. Existing watercourses are located within the site consisting of open ditches, ponds, buried pipes and culverts.
2. Existing utility apparatus is located within the site including overhead electricity cables and buried water main (400mm dia)

MAINTENANCE / CLEANING:
To be determined post construction

DECOMMISSIONING / DEMOLITION:
To be determined post construction

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

GULLY SETTING OUT CO-ORDINATES:

	Co-ordinates	
	Eastings	Northings
G1	4656.013E	1233.270N
G2	4654.317E	1224.148N
G3	4661.444E	1223.426N
G4	4663.101E	1231.201N
G5	4669.748E	1229.256N
G6	4678.460E	1221.703N
G7	4695.590E	1220.609N
G8	4728.640E	1205.950N
G9	4754.582E	1187.312N
G10	4767.940E	1172.526N
G11	4787.138E	1153.985N
G12	4797.686E	1159.679N
G13	4811.849E	1163.246N
G14	4821.005E	1163.641N
G15	4828.125E	1162.733N
G16	4822.331E	1191.808N
G17	4819.889E	1206.934N
G18	4832.384E	1215.010N
G19	4843.049E	1160.756N
G20	4853.800E	1159.331N
G21	4876.185E	1156.223N
G29	4871.848E	1213.385N
G30	4852.129E	1214.327N

Mark	Revision	Drawn	Date	Chkd
D	LOCATION OF MANHOLES 5, 6, 7 REVISED	WSW	19.10.11	TH
C	SURFACE WATER MANHOLE BACK DROPS ADDED	KM	22.09.11	TH
B	SURFACE WATER NETWORK UPDATED	KM	09.09.11	TH
A	PHASE 1 BOUNDARY AND LATERAL CONNECTIONS ADDED	AM	20.06.11	RE

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status
FOR APPROVAL

HAILSHAM DEVELOPMENT
SURFACE WATER SEWER DRAINAGE PLAN
SHEET 1 OF 3

Client
HILLREED HOMES LIMITED

Date of 1st Issue	Drawn by
28.04.2011	KM
A0 Scale: 1:250	Checked by: TH

Drawing Number: 24336/003/010 — Revision: D

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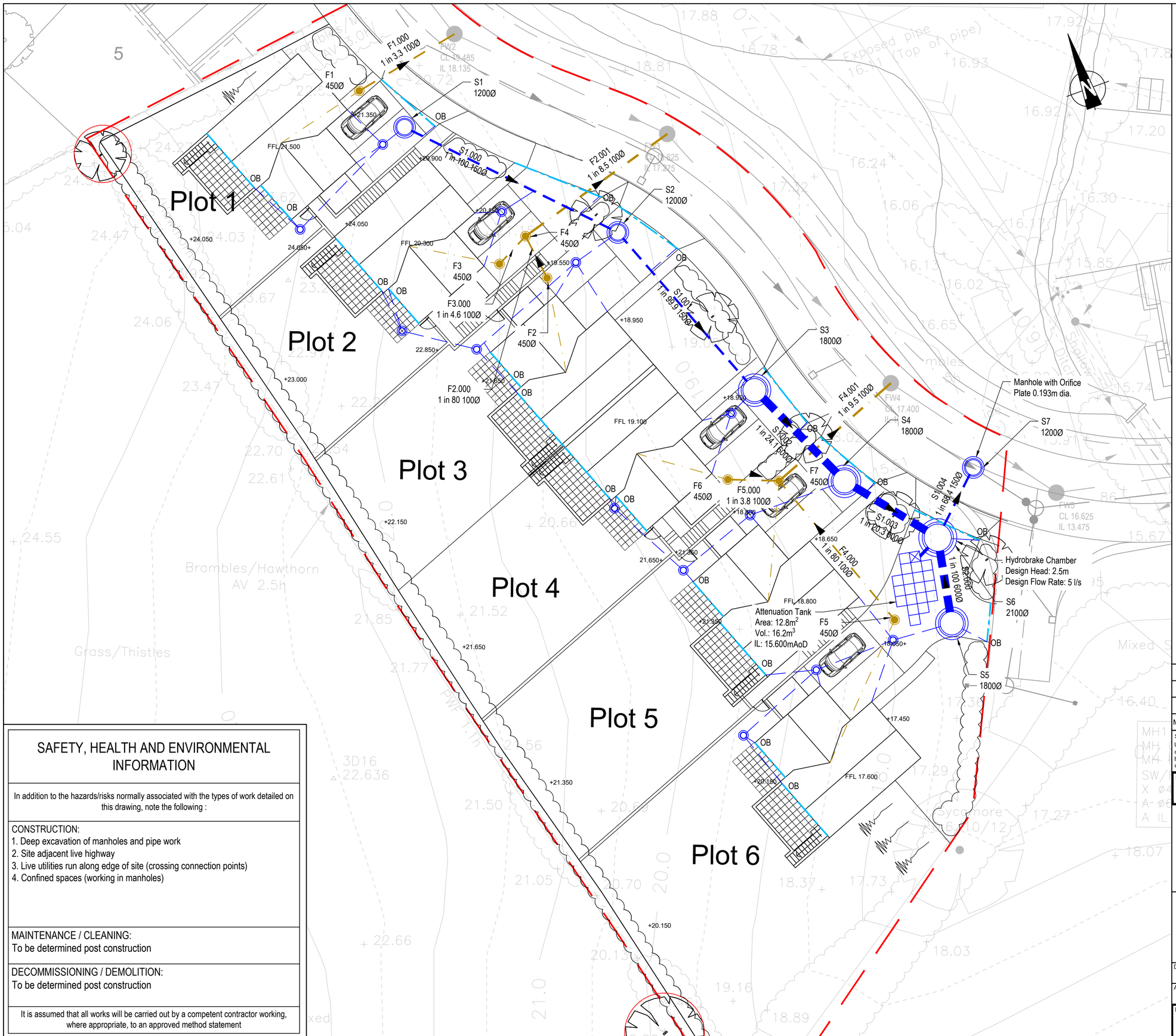
File Location: j:\24336 - tph - hailsham development\003 - drainage and utilities\cad\drawings\24336-003-010d.dwg



NOTES:

1. Do not scale from this drawing.
2. Drawing based on Topographical Survey by Three Dimensional Services, drawings 05/068/01 to 04 dated 22/09/2010.
3. All building work to comply with NHBC requirements.
4. All proposed and relevant existing levels are to be checked prior to construction starting and any discrepancies referred back to the designer.
5. Building Layout based on ECE Architecture drawing 6491-202 rev C.
6. All drainage works shall be in accordance with Sewer Sector Guidance Appendix C - Design and Construction Guidance where appropriate.
7. Linear drainage positions to be confirmed once detailed external levels are finalised.
8. Drainage spur co-ordination will be required once SVP and RWP locations are confirmed.

KEY:

- Plot Boundary
- Private Surface Water Pipe. Refer to SD108 & SD109
- Private Foul Water Pipe. Refer to SD108 & SD109
- Private Foul Water Pipe location to be confirmed
- Private Surface Water Pipe location to be confirmed
- Private Perforated Surface Water Pipe with Rodding Eye
- Private Surface Water Linear Channel Drain
- OB — Private Surface Water Linear Channel Drain Outlet Box with Sump
- Private Surface Water Manhole/Inspection Chamber. Refer to Figures B.7, B.10, B.15, and B.18 of Sewer Sector Guidance Appendix C - Design and Construction Guidance
- Private Foul Water Manhole/Inspection Chamber. Refer to Figures B.7, B.10, B.15, and B.18 of Sewer Sector Guidance Appendix C - Design and Construction Guidance
- Existing Surface Water Drainage
- Existing Foul Water Drainage
- Attenuation tank wrapped in an impermeable membrane
- +18.800 — Proposed Spot Level (based on ECE Architecture Layout)

Mark	Revision	Date	Drawn	Chkd	Appd

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UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status

PLANNING

LAND AT BURFIELD VALLEY AND REEF WAY DRAINAGE LAYOUT

Client

PERSIMMON HOMES

Date of 1st Issue	Designed	Drawn
13.08.2020	AT	AT
A2 Scale	Checked	Approved
1:200	DC	PH
Drawing Number		Revision
49366/2001/500/01		-

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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

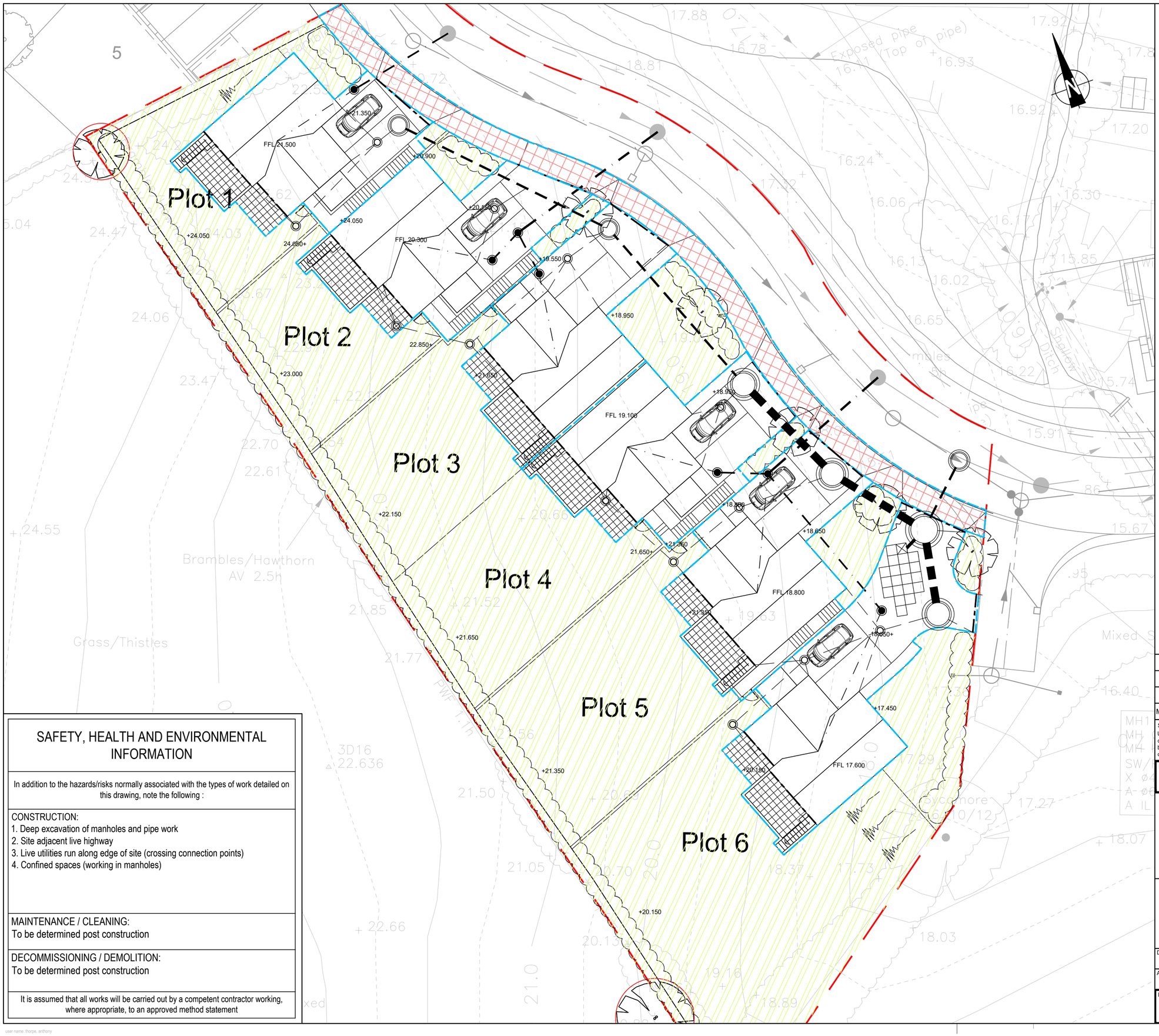
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following :

CONSTRUCTION:
1. Deep excavation of manholes and pipe work
2. Site adjacent live highway
3. Live utilities run along edge of site (crossing connection points)
4. Confined spaces (working in manholes)

MAINTENANCE / CLEANING:
To be determined post construction

DECOMMISSIONING / DEMOLITION:
To be determined post construction

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement



NOTES:

1. Do not scale from this drawing.
2. Drawing based on Topographical Survey by Three Dimensional Services, drawings 05/068/01 to 04 dated 22/09/2010.
3. All building work to comply with NHBC requirements.
4. All proposed and relevant existing levels are to be checked prior to construction starting and any discrepancies referred back to the designer.
5. Building Layout based on ECE Architecture drawing 6491-202 rev C.
6. All drainage works shall be in accordance with Sewer Sector Guidance Appendix C - Design and Construction Guidance where appropriate.
7. Linear drainage positions to be confirmed once detailed external levels are finalised.
8. Drainage spur co-ordination will be required once SVP and RWP locations are confirmed.

KEY:

- Plot Boundary
- Impermeable Area - Total 0.10ha
- Permeable Area - Total 0.16ha (0.01ha to be considered Impermeable)
- Impermeable Area Collected by Highway Draiange - Total 0.01ha

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following :

CONSTRUCTION:
1. Deep excavation of manholes and pipe work
2. Site adjacent live highway
3. Live utilities run along edge of site (crossing connection points)
4. Confined spaces (working in manholes)

MAINTENANCE / CLEANING:
To be determined post construction

DECOMMISSIONING / DEMOLITION:
To be determined post construction

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

Mark	Revision	Date	Drawn	Chkd	Appd

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Drawing Issue Status
PLANNING

LAND AT BURFIELD VALLEY AND REEF WAY CATCHMENT LAYOUT

Client
PERSIMMON HOMES

Date of 1st Issue	Designed	Drawn
13.08.2020	AT	AT
A2 Scale	Checked	Approved
1:200	DC	PH
Drawing Number		Revision
49366/2001/500/02		-

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Surface Water Manhole Schedule

Manhole Name	Cover Level (m)	Depth to Invert (m)	Eastings (m)	Northings (m)	Manhole Dia. (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)
S1	21.350	4.137	559071.676	110048.401	1200	S1.000	17.213	150			
S2	19.550	2.518	559084.459	110035.598	1200	S1.001	17.032	150	S1.000	17.032	150
S3	18.711	2.290	559089.701	110020.385	1800	S1.002	16.421	600	S1.001	16.871	150
S4	18.800	2.800	559094.342	110011.384	1800	S1.003	16.000	600	S1.002	16.000	600
S5	18.050	2.383	559097.871	109998.233	1800	S2.000	15.667	600	S1.003		
S6	18.050	2.450	559099.112	110004.824	2100	S1.004	15.600	150	S1.003	15.600	600
									S2.000	15.600	600
S7	16.926	1.490	559103.551	110008.987	1200	OUTFALL	15.436	225	S1.004	15.511	150

Foul Water Manhole Schedule

Manhole Name	Cover Level (m)	Depth to Invert (m)	Eastings (m)	Northings (m)	Manhole Dia. (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)
F1	21.350	0.650	559068.899	110052.568	450	F1.000	20.700	100			
							OUTFALL		F1.000	18.135	100
F2	19.550	0.650	559077.596	110034.015	450	F2.000	18.900	100			
F3	20.150	0.650	559074.510	110036.288	450	F3.000	19.500	100			
F4	20.150	1.286	559077.137	110037.620	450	F2.001	18.855	100	F2.000	18.855	100
									F3.000	18.855	100
							OUTFALL		F2.001	17.275	100
F5	18.050	0.650	559093.809	110000.004	450	F4.000	17.400	100			
F6	18.950	0.650	559085.402	110014.598	450	F5.000	18.300	100			
F7	18.800	1.540	559089.087	110013.143	450	F4.001	17.255	100	F4.000	17.255	100
									F5.000	17.255	100
							OUTFALL		F4.001	16.050	100

NOTES:

1. Do not scale from this drawing.
2. All building work to comply with NHBC requirements.
3. All proposed and relevant existing levels are to be checked prior to construction starting and any discrepancies referred back to the designer.
4. All drainage works shall be in accordance with Sewer Sector Guidance Appendix C - Design and Construction Guidance where appropriate.
5. Round the houses drainage not included as this is dependant on detailed levels design and location of RWPs and SVPs.

Mark	Revision	Date	Drawn	Chkd	Appd

Drawing Issue Status

PLANNING

LAND AT BURFIELD VALLEY AND REEF WAY DRAINAGE MANHOLE SCHEDULES

Client

PERSIMMON HOMES

Date of 1st Issue	Designed	Drawn
13.08.2020	AT	AT
A2 Scale	**Checked**	**Approved**
NTS	DC	PH

Drawing Number: 49366/2001/500/03

Revision: -

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TECHNICAL NOTE

APPENDIX C

Hydraulic Calculations – Existing Conditions

Free Flowing Outfall Details for Transfer.txt

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
20.024	OUTFALL	8.650	7.753	0.000	0	0

Online Controls for Transfer.txt

Hydro-Brake® Manhole: 97, DS/PN: 41.011, Volume (m³): 15.7

Design Head (m) 0.870 Hydro-Brake® Type Md5 SW Only Invert Level (m) 7.980
Design Flow (l/s) 31.0 Diameter (mm) 226

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.1	1.200	34.1	3.000	53.2	7.000	81.3
0.200	19.6	1.400	36.6	3.500	57.5	7.500	84.2
0.300	27.1	1.600	39.0	4.000	61.5	8.000	86.9
0.400	30.0	1.800	41.3	4.500	65.2	8.500	89.6
0.500	30.5	2.000	43.5	5.000	68.7	9.000	92.2
0.600	30.2	2.200	45.6	5.500	72.1	9.500	94.7
0.800	30.3	2.400	47.6	6.000	75.3		
1.000	31.9	2.600	49.6	6.500	78.4		

Complex Manhole: 109, DS/PN: 20.024, Volume (m³): 73.6

Orifice

Diameter (m) 0.130 Discharge Coefficient 0.600 Invert Level (m) 7.930

Orifice

Diameter (m) 0.204 Discharge Coefficient 0.600 Invert Level (m) 8.530

Offline Controls for Transfer.txt

Weir Manhole: 81, DS/PN: 20.021, Loop to PN: 41.010

Discharge Coef 0.544 Width (m) 0.700 Invert Level (m) 8.382

Weir Manhole: 96, DS/PN: 41.010, Loop to PN: 20.023

Discharge Coef 0.544 Width (m) 2.000 Invert Level (m) 8.800

Storage Structures for Transfer.txt

Tank or Pond Manhole: 96, DS/PN: 41.010

Invert Level (m) 7.990

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	314.0	0.700	883.0	1.400	1166.0	2.100	1209.0
0.100	407.0	0.800	921.0	1.500	1209.0	2.200	1209.0
0.200	696.0	0.900	960.0	1.600	1209.0	2.300	1209.0
0.300	732.0	1.000	1000.0	1.700	1209.0	2.400	1209.0
0.400	769.0	1.100	1041.0	1.800	1209.0	2.500	1209.0
0.500	806.0	1.200	1082.0	1.900	1209.0		
0.600	844.0	1.300	1124.0	2.000	1209.0		

Tank or Pond Manhole: 99, DS/PN: 20.023

Invert Level (m) 7.940

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	348.0	0.700	1333.0	1.400	1853.0	2.100	1933.0
0.100	471.0	0.800	1403.0	1.500	1933.0	2.200	1933.0
0.200	931.0	0.900	1474.0	1.600	1933.0	2.300	1933.0
0.300	1034.0	1.000	1547.0	1.700	1933.0	2.400	1933.0
0.400	1123.0	1.100	1621.0	1.800	1933.0	2.500	1933.0
0.500	1197.0	1.200	1697.0	1.900	1933.0		
0.600	1264.0	1.300	1774.0	2.000	1933.0		

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
20.000	1	15 Winter	100	+40%	100/15 Summer			
20.001	2	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.002	3	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.003	4	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.004	5	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.005	6	15 Winter	100	+40%				
20.006	7	15 Winter	100	+40%				
20.007	8	15 Winter	100	+40%				
21.000	9	15 Winter	100	+40%	100/15 Summer			
20.008	10	15 Winter	100	+40%	30/15 Summer			
22.000	11	15 Winter	100	+40%	100/15 Summer			
22.001	12	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
22.002	13	15 Summer	100	+40%	30/15 Summer			
22.003	14	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.009	15	15 Winter	100	+40%	100/15 Summer			
20.010	16	15 Winter	100	+40%	30/15 Summer			
23.000	17	15 Winter	100	+40%	100/15 Summer			
23.001	18	15 Winter	100	+40%	100/15 Summer			
23.002	19	15 Winter	100	+40%	100/15 Summer			

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	1	23.563	0.993	0.000	0.73		25.8	FLOOD RISK	
20.001	2	23.231	1.201	0.662	1.00		36.2	FLOOD	2
20.002	3	22.315	1.205	5.389	1.00		37.4	FLOOD	5
20.003	4	21.175	1.205	4.781	1.36		47.5	FLOOD	6
20.004	5	20.491	1.201	0.553	1.51		55.4	FLOOD	3
20.005	6	18.253	-0.087	0.000	0.68		70.3	OK	
20.006	7	17.320	-0.070	0.000	0.80		85.3	OK	
20.007	8	15.965	-0.065	0.000	0.83		92.4	OK	
21.000	9	15.636	0.206	0.000	1.56		25.3	SURCHARGED	
20.008	10	14.546	1.254	0.000	2.15		140.3	SURCHARGED	
22.000	11	19.161	0.711	0.000	0.72		37.5	SURCHARGED	
22.001	12	18.601	1.201	1.109	1.01		52.8	FLOOD	2
22.002	13	17.744	1.194	0.000	0.99		52.5	FLOOD RISK	
22.003	14	16.656	1.206	6.340	1.44		59.3	FLOOD	5
20.009	15	14.097	0.947	0.000	0.62		225.6	SURCHARGED	
20.010	16	13.282	2.457	0.000	1.51		214.2	SURCHARGED	
23.000	17	18.791	0.541	0.000	0.95		35.6	SURCHARGED	
23.001	18	17.097	0.747	0.000	1.16		52.6	SURCHARGED	
23.002	19	15.326	0.326	0.000	1.12		52.2	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
23.003	20	15 Winter	100	+40%	100/15 Summer			
24.000	21	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
23.004	22	15 Winter	100	+40%	30/15 Summer			
23.005	23	15 Winter	100	+40%	100/15 Summer			
23.006	24	15 Winter	100	+40%	30/15 Summer			
20.011	25	15 Winter	100	+40%	30/15 Summer			
25.000	26	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
25.001	27	15 Winter	100	+40%	100/15 Summer			
20.012	28	15 Winter	100	+40%	30/15 Summer			
26.000	29	15 Winter	100	+40%	100/15 Summer			
27.000	30	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
28.000	31	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
26.001	32	15 Winter	100	+40%	30/15 Summer			
20.013	33	15 Winter	100	+40%	30/15 Summer			
20.014	34	15 Winter	100	+40%	30/15 Summer			
20.015	35	15 Winter	100	+40%	30/15 Summer			
29.000	36	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
30.000	37	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
29.001	38	15 Summer	100	+40%	30/15 Summer			
20.016	39	15 Winter	100	+40%	30/15 Summer			
31.000	40	15 Winter	100	+40%	100/15 Summer			
31.001	41	15 Winter	100	+40%	30/15 Summer			
31.002	42	15 Winter	100	+40%	30/15 Summer			
31.003	43	15 Winter	100	+40%	30/15 Summer			
20.017	44	15 Winter	100	+40%	30/15 Summer			
32.000	45	15 Winter	100	+40%	100/15 Summer			
32.001	46	15 Winter	100	+40%	30/15 Summer			
32.002	47	30 Winter	100	+40%	30/15 Winter			
32.003	48	30 Winter	100	+40%	100/15 Summer			
33.000	49	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
32.004	50	30 Winter	100	+40%	30/15 Summer			
32.005	51	30 Winter	100	+40%	100/15 Summer			
32.006	52	30 Winter	100	+40%	30/15 Summer			
32.007	53	30 Winter	100	+40%	30/15 Summer			
34.000	56	30 Winter	100	+40%	30/15 Summer			
34.001	57	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
32.008	58	30 Winter	100	+40%	30/15 Summer	100/15 Winter		
32.009	59	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
35.000	60	15 Winter	100	+40%	30/15 Summer			
35.001	61	15 Winter	100	+40%	100/15 Summer			
35.002	62	15 Winter	100	+40%	100/15 Summer			
35.003	63	15 Winter	100	+40%	100/15 Summer			
36.000	64	15 Winter	100	+40%	100/15 Summer			
36.001	65	15 Winter	100	+40%	100/15 Summer			
35.004	66	15 Winter	100	+40%	100/15 Summer			
37.000	67	15 Winter	100	+40%	100/15 Summer			
35.005	68	15 Winter	100	+40%	100/15 Summer			
32.010	69	15 Winter	100	+40%	30/15 Summer			
38.000	70	15 Winter	100	+40%	30/15 Winter			

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
23.003	20	14.067	0.117	0.000	0.57		83.5	SURCHARGED	
24.000	21	13.471	1.021	6.362	2.28		45.6	FLOOD	4
23.004	22	13.626	1.303	0.000	2.20		94.4	FLOOD RISK	
23.005	23	13.455	1.225	0.000	0.69		99.0	SURCHARGED	
23.006	24	13.214	2.014	0.000	0.84		84.2	SURCHARGED	
20.011	25	12.982	2.288	0.000	2.11		292.3	SURCHARGED	
25.000	26	18.018	1.218	18.500	1.18		52.8	FLOOD	6
25.001	27	14.407	0.607	0.000	0.89		56.4	SURCHARGED	
20.012	28	12.636	2.020	0.000	1.79		352.1	SURCHARGED	
26.000	29	13.268	0.493	0.000	1.14		118.8	SURCHARGED	
27.000	30	13.911	1.211	11.345	1.78		77.0	FLOOD	5
28.000	31	13.908	1.208	7.761	1.71		79.6	FLOOD	4
26.001	32	12.657	0.507	0.000	1.54		271.4	SURCHARGED	
20.013	33	12.249	1.754	0.000	2.36		576.2	SURCHARGED	
20.014	34	11.920	1.477	0.000	2.30		585.0	SURCHARGED	
20.015	35	11.562	1.187	0.000	2.40		614.2	SURCHARGED	
29.000	36	13.600	1.125	0.125	1.33		53.2	FLOOD	2
30.000	37	13.609	1.134	8.605	2.16		86.3	FLOOD	4
29.001	38	13.460	1.065	0.000	1.51		140.2	FLOOD RISK	
20.016	39	11.154	0.848	0.000	2.32		768.3	SURCHARGED	
31.000	40	12.231	0.956	0.000	0.89		63.5	FLOOD RISK	
31.001	41	11.849	1.074	0.000	1.27		60.7	FLOOD RISK	
31.002	42	11.666	1.032	0.000	2.20		75.2	SURCHARGED	
31.003	43	11.386	0.822	0.000	1.51		89.8	SURCHARGED	
20.017	44	10.780	0.535	0.000	2.93		857.1	SURCHARGED	
32.000	45	13.916	1.016	0.000	1.06		43.6	FLOOD RISK	
32.001	46	12.501	1.051	0.000	1.67		38.9	FLOOD RISK	
32.002	47	11.729	0.579	0.000	1.16		34.6	SURCHARGED	
32.003	48	11.657	0.547	0.000	0.70		47.4	SURCHARGED	
33.000	49	13.005	1.205	5.122	1.34		53.1	FLOOD	4
32.004	50	11.435	0.835	0.000	1.58		96.1	SURCHARGED	
32.005	51	11.286	0.721	0.000	0.73		102.5	SURCHARGED	
32.006	52	10.983	0.983	0.000	0.92		102.6	FLOOD RISK	
32.007	53	10.815	1.015	0.000	0.71		102.5	FLOOD RISK	
34.000	56	11.035	1.135	0.000	0.91		24.9	FLOOD RISK	
34.001	57	10.606	1.206	6.499	2.25		67.3	FLOOD	6
32.008	58	10.603	1.233	2.988	1.30		139.1	FLOOD	3
32.009	59	10.523	1.223	22.800	0.88		144.3	FLOOD	5
35.000	60	12.697	0.897	0.000	2.11		38.9	SURCHARGED	
35.001	61	11.913	0.313	0.000	1.36		66.1	SURCHARGED	
35.002	62	11.764	0.295	0.000	0.64		59.6	SURCHARGED	
35.003	63	11.555	0.755	0.000	1.00		54.4	SURCHARGED	
36.000	64	11.689	0.259	0.000	0.55		16.8	SURCHARGED	
36.001	65	11.644	0.594	0.000	1.01		31.4	SURCHARGED	
35.004	66	11.404	0.769	0.000	1.38		97.9	SURCHARGED	
37.000	67	10.899	0.469	0.000	0.94		15.5	SURCHARGED	
35.005	68	10.857	0.587	0.000	0.57		99.5	SURCHARGED	
32.010	69	10.542	1.188	0.000	1.07		183.8	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
38.000	70	10.568	0.683	0.000	0.28		10.1	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
32.011	71	15 Winter	100	+40%	30/15 Summer			
32.012	72	15 Winter	100	+40%	30/15 Summer			
32.013	73	15 Winter	100	+40%	30/15 Summer			
32.014	74	15 Winter	100	+40%	30/15 Summer			
20.018	75	15 Winter	100	+40%	30/15 Summer			
39.000	76	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
40.000	77	15 Winter	100	+40%	100/15 Summer			
39.001	78	15 Winter	100	+40%	1/15 Summer			
20.019	79	15 Winter	100	+40%	30/15 Summer			
20.020	80	15 Winter	100	+40%	30/15 Summer			
20.021	81	60 Winter	100	+40%			1/15 Summer	66
41.000	82	15 Winter	100	+40%				
41.001	83	15 Winter	100	+40%				
41.002	84	15 Winter	100	+40%	100/15 Summer			
41.003	85	15 Winter	100	+40%	100/15 Summer			
41.004	86	15 Winter	100	+40%	30/15 Summer			
42.000	87	15 Winter	100	+40%	30/15 Summer			
41.005	88	15 Winter	100	+40%	100/15 Summer			
43.000	89	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
43.001	90	15 Winter	100	+40%	30/15 Summer			
43.002	91	15 Winter	100	+40%	30/15 Summer			
41.006	92	15 Winter	100	+40%	100/15 Summer			
41.007	93	15 Winter	100	+40%	100/15 Summer			
41.008	94	15 Winter	100	+40%	30/15 Summer			
41.009	95	360 Winter	100	+40%				
41.010	96	360 Winter	100	+40%			100/30 Summer	20
41.011	97	360 Winter	100	+40%	30/240 Winter			
20.022	98	360 Winter	100	+40%				
20.023	99	360 Winter	100	+40%				
20.024	109	360 Winter	100	+40%	30/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
32.011	71	10.536	1.202	0.000	1.16		202.8	SURCHARGED	
32.012	72	10.528	1.215	0.000	1.13		192.4	SURCHARGED	
32.013	73	10.520	1.227	0.000	0.85		180.0	SURCHARGED	
32.014	74	10.513	1.234	0.000	0.62		178.3	SURCHARGED	
20.018	75	10.482	1.258	0.000	3.84		1007.2	SURCHARGED	
39.000	76	10.059	0.929	29.337	1.85		68.2	FLOOD	6
40.000	77	10.711	0.536	0.000	1.22		77.8	FLOOD RISK	
39.001	78	10.165	1.180	0.000	2.22		140.0	SURCHARGED	
20.019	79	10.061	0.862	0.000	4.31		1079.7	SURCHARGED	
20.020	80	9.573	0.395	0.000	2.78		1074.6	SURCHARGED	
20.021	81	9.132	0.000	0.000	1.08	523.9	495.7	OK	
41.000	82	21.528	-0.102	0.000	0.22		13.0	OK	
41.001	83	19.321	-0.079	0.000	0.46		23.4	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
41.002	84	18.857	0.706	0.000	0.95		41.2	SURCHARGED	
41.003	85	15.708	1.119	0.000	1.20		50.2	FLOOD RISK	
41.004	86	14.764	0.909	0.000	1.72		74.9	FLOOD RISK	
42.000	87	14.858	0.955	0.000	1.71		28.8	FLOOD RISK	
41.005	88	14.116	0.482	0.000	1.09		129.2	SURCHARGED	
43.000	89	12.255	1.205	4.855	2.39		39.3	FLOOD	4
43.001	90	12.319	1.440	0.000	1.12		50.5	FLOOD RISK	
43.002	91	12.245	1.505	0.000	1.73		64.9	FLOOD RISK	
41.006	92	11.832	1.202	0.000	1.25		215.1	SURCHARGED	
41.007	93	10.697	0.792	0.000	1.21		213.3	SURCHARGED	
41.008	94	9.771	0.516	0.000	1.12		211.8	SURCHARGED	
41.009	95	9.076	-0.985	0.000	0.13		46.0	OK	
41.010	96	9.075	-0.425	0.000	0.13	44.0	24.1	OK	
41.011	97	9.121	0.391	0.000	0.09		23.0	SURCHARGED	
20.022	98	9.050	-0.450	0.000	0.25		298.9	OK	
20.023	99	9.047	-0.453	0.000	0.06		101.8	OK	
20.024	109	9.032	0.577	0.000	0.28		90.9	SURCHARGED	

Hydraulic Calculations – Site and 6 Homes Free Flowing

Simulation Criteria for Transfer.txt

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.840
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.300	Storm Duration (mins)	15
Ratio R	0.356		

Online Controls for Transfer.txt

Hydro-Brake® Manhole: 97, DS/PN: 42.008, Volume (m³): 15.7

Design Head (m) 0.870 Hydro-Brake® Type Md5 SW Only Invert Level (m) 7.980
Design Flow (l/s) 31.0 Diameter (mm) 226

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.1	1.200	34.1	3.000	53.2	7.000	81.3
0.200	19.6	1.400	36.6	3.500	57.5	7.500	84.2
0.300	27.1	1.600	39.0	4.000	61.5	8.000	86.9
0.400	30.0	1.800	41.3	4.500	65.2	8.500	89.6
0.500	30.5	2.000	43.5	5.000	68.7	9.000	92.2
0.600	30.2	2.200	45.6	5.500	72.1	9.500	94.7
0.800	30.3	2.400	47.6	6.000	75.3		
1.000	31.9	2.600	49.6	6.500	78.4		

Complex Manhole: 109, DS/PN: 20.024, Volume (m³): 73.6

Orifice

Diameter (m) 0.130 Discharge Coefficient 0.600 Invert Level (m) 7.930

Orifice

Diameter (m) 0.204 Discharge Coefficient 0.600 Invert Level (m) 8.530

Offline Controls for Transfer.txt

Weir Manhole: 81, DS/PN: 20.021, Loop to PN: 42.007

Discharge Coef 0.544 Width (m) 0.700 Invert Level (m) 8.382

Weir Manhole: 96, DS/PN: 42.007, Loop to PN: 20.023

Discharge Coef 0.544 Width (m) 2.000 Invert Level (m) 8.800

Storage Structures for Transfer.txt

Tank or Pond Manhole: 96, DS/PN: 42.007

Invert Level (m) 7.990

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	314.0	0.700	883.0	1.400	1166.0	2.100	1209.0
0.100	407.0	0.800	921.0	1.500	1209.0	2.200	1209.0
0.200	696.0	0.900	960.0	1.600	1209.0	2.300	1209.0
0.300	732.0	1.000	1000.0	1.700	1209.0	2.400	1209.0
0.400	769.0	1.100	1041.0	1.800	1209.0	2.500	1209.0
0.500	806.0	1.200	1082.0	1.900	1209.0		
0.600	844.0	1.300	1124.0	2.000	1209.0		

Tank or Pond Manhole: 99, DS/PN: 20.023

Invert Level (m) 7.940

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	348.0	0.700	1333.0	1.400	1853.0	2.100	1933.0
0.100	471.0	0.800	1403.0	1.500	1933.0	2.200	1933.0
0.200	931.0	0.900	1474.0	1.600	1933.0	2.300	1933.0
0.300	1034.0	1.000	1547.0	1.700	1933.0	2.400	1933.0
0.400	1123.0	1.100	1621.0	1.800	1933.0	2.500	1933.0
0.500	1197.0	1.200	1697.0	1.900	1933.0		
0.600	1264.0	1.300	1774.0	2.000	1933.0		

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
20.000	1	15 Winter	100	+40%	100/15 Summer			
20.001	2	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.002	3	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.003	4	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.004	5	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.005	6	15 Winter	100	+40%				
20.006	7	15 Winter	100	+40%				
20.007	8	15 Winter	100	+40%				
21.000	S1	15 Winter	100	+40%				
21.001	S2	15 Winter	100	+40%				
21.002	S3	15 Winter	100	+40%				
21.003	S4	15 Summer	100	+40%	100/15 Summer			
21.004	S5	15 Summer	100	+40%				
22.000	S6	15 Winter	100	+40%				
21.005	S7	15 Winter	100	+40%	100/15 Winter			
21.006	S8	15 Winter	100	+40%	30/15 Summer			
21.007	S9	15 Winter	100	+40%	100/15 Summer			
20.008	10	15 Winter	100	+40%	30/15 Summer			
23.000	11	15 Winter	100	+40%	100/15 Summer			

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	1	23.563	0.993	0.000	0.73		25.8	FLOOD RISK	
20.001	2	23.231	1.201	0.662	1.00		36.2	FLOOD	2
20.002	3	22.315	1.205	5.389	1.00		37.4	FLOOD	5
20.003	4	21.175	1.205	4.781	1.36		47.5	FLOOD	6
20.004	5	20.491	1.201	0.552	1.51		55.4	FLOOD	3
20.005	6	18.253	-0.087	0.000	0.68		70.3	OK	
20.006	7	17.320	-0.070	0.000	0.80		85.3	OK	
20.007	8	15.965	-0.065	0.000	0.83		92.4	OK	
21.000	S1	20.304	-0.096	0.000	0.28		11.7	OK	
21.001	S2	19.566	-0.084	0.000	0.40		24.0	OK	
21.002	S3	18.282	-0.093	0.000	0.65		35.7	OK	
21.003	S4	18.171	0.041	0.000	1.28		48.3	SURCHARGED	
21.004	S5	17.921	-0.138	0.000	0.32		60.2	OK	
22.000	S6	16.742	-0.183	0.000	0.08		11.0	OK	
21.005	S7	16.190	0.240	0.000	0.49		77.2	SURCHARGED	
21.006	S8	16.048	1.573	0.000	2.08		82.0	SURCHARGED	
21.007	S9	15.817	1.421	0.000	0.46		70.6	SURCHARGED	
20.008	10	15.596	2.304	0.000	2.68		175.2	SURCHARGED	
23.000	11	19.161	0.711	0.000	0.72		37.5	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
23.001	12	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
23.002	13	15 Summer	100	+40%	30/15 Summer			
23.003	14	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.009	15	15 Winter	100	+40%	100/15 Summer			
20.010	16	15 Winter	100	+40%	30/15 Summer			
24.000	17	15 Winter	100	+40%	100/15 Summer			
24.001	18	15 Winter	100	+40%	100/15 Summer			
24.002	19	15 Winter	100	+40%	100/15 Summer			
24.003	20	15 Winter	100	+40%	100/15 Summer			
25.000	21	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
24.004	22	15 Winter	100	+40%	30/15 Summer	100/15 Winter		
24.005	23	15 Winter	100	+40%	100/15 Summer			
24.006	24	15 Winter	100	+40%	30/15 Summer			
20.011	25	15 Winter	100	+40%	30/15 Summer			
26.000	26	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
26.001	27	15 Winter	100	+40%	100/15 Summer			
20.012	28	15 Winter	100	+40%	30/15 Summer			
27.000	29	15 Winter	100	+40%	100/15 Summer			
28.000	30	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
29.000	31	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
27.001	32	15 Winter	100	+40%	30/15 Summer			
20.013	33	15 Winter	100	+40%	30/15 Summer			
20.014	34	15 Winter	100	+40%	30/15 Summer			
20.015	35	15 Winter	100	+40%	30/15 Summer			
30.000	36	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
31.000	37	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
30.001	38	15 Summer	100	+40%	30/15 Summer			
20.016	39	15 Winter	100	+40%	30/15 Summer			
32.000	40	15 Winter	100	+40%	100/15 Summer			
32.001	41	15 Winter	100	+40%	30/15 Summer			
32.002	42	15 Winter	100	+40%	30/15 Summer			
32.003	43	15 Winter	100	+40%	30/15 Summer			
20.017	44	15 Winter	100	+40%	30/15 Summer			
33.000	45	15 Winter	100	+40%	100/15 Summer			
33.001	46	15 Winter	100	+40%	30/15 Summer			
33.002	47	30 Winter	100	+40%	30/15 Winter			
33.003	48	15 Winter	100	+40%	100/15 Summer			
34.000	49	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
33.004	50	30 Winter	100	+40%	30/15 Summer			
33.005	51	30 Winter	100	+40%	100/15 Summer			
33.006	52	30 Winter	100	+40%	30/15 Summer			
33.007	53	30 Winter	100	+40%	30/15 Summer			
35.000	56	30 Winter	100	+40%	30/15 Summer			
35.001	57	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
33.008	58	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
33.009	59	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
36.000	60	15 Winter	100	+40%	30/15 Summer			
36.001	61	15 Winter	100	+40%	100/15 Summer			
36.002	62	15 Winter	100	+40%	100/15 Summer			

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
23.001	12	18.601	1.201	1.109	1.01		52.8	FLOOD	2
23.002	13	17.744	1.194	0.000	0.99		52.5	FLOOD RISK	
23.003	14	16.657	1.207	7.076	1.44		59.3	FLOOD	5
20.009	15	14.721	1.571	0.000	0.72		262.7	SURCHARGED	
20.010	16	13.615	2.790	0.000	1.76		249.4	SURCHARGED	
24.000	17	18.791	0.541	0.000	0.95		35.6	SURCHARGED	
24.001	18	17.100	0.750	0.000	1.16		52.5	SURCHARGED	
24.002	19	15.359	0.359	0.000	1.11		51.4	SURCHARGED	
24.003	20	14.106	0.156	0.000	0.56		82.5	SURCHARGED	
25.000	21	13.474	1.024	8.858	2.39		47.8	FLOOD	5
24.004	22	13.700	1.377	0.075	2.14		91.9	FLOOD	1
24.005	23	13.590	1.360	0.000	0.67		95.7	SURCHARGED	
24.006	24	13.408	2.208	0.000	0.84		83.9	SURCHARGED	
20.011	25	13.214	2.520	0.000	2.32		320.6	SURCHARGED	
26.000	26	18.019	1.219	18.606	1.18		52.8	FLOOD	6
26.001	27	14.519	0.719	0.000	0.89		56.7	SURCHARGED	
20.012	28	12.806	2.190	0.000	1.93		380.1	SURCHARGED	
27.000	29	13.268	0.493	0.000	1.13		117.9	SURCHARGED	
28.000	30	13.911	1.211	11.490	1.77		76.7	FLOOD	5
29.000	31	13.908	1.208	7.914	1.69		78.3	FLOOD	4
27.001	32	12.740	0.590	0.000	1.53		268.5	SURCHARGED	
20.013	33	12.358	1.863	0.000	2.44		595.6	SURCHARGED	
20.014	34	12.007	1.564	0.000	2.37		604.0	SURCHARGED	
20.015	35	11.624	1.249	0.000	2.48		632.6	SURCHARGED	
30.000	36	13.600	1.125	0.125	1.33		53.2	FLOOD	2
31.000	37	13.609	1.134	8.604	2.16		86.3	FLOOD	4
30.001	38	13.460	1.065	0.000	1.51		140.2	FLOOD RISK	
20.016	39	11.190	0.884	0.000	2.37		785.6	SURCHARGED	
32.000	40	12.234	0.959	0.000	0.88		63.4	FLOOD RISK	
32.001	41	11.855	1.080	0.000	1.27		60.5	FLOOD RISK	
32.002	42	11.682	1.048	0.000	2.20		74.9	SURCHARGED	
32.003	43	11.404	0.840	0.000	1.51		89.4	SURCHARGED	
20.017	44	10.801	0.556	0.000	2.98		873.1	SURCHARGED	
33.000	45	13.917	1.017	0.000	1.06		43.6	FLOOD RISK	
33.001	46	12.505	1.055	0.000	1.67		38.9	FLOOD RISK	
33.002	47	11.734	0.584	0.000	1.16		34.7	SURCHARGED	
33.003	48	11.662	0.552	0.000	0.77		52.7	SURCHARGED	
34.000	49	13.006	1.207	5.128	1.34		53.1	FLOOD	4
33.004	50	11.439	0.839	0.000	1.58		96.2	SURCHARGED	
33.005	51	11.290	0.725	0.000	0.73		102.7	SURCHARGED	
33.006	52	10.985	0.985	0.000	0.92		102.8	FLOOD RISK	
33.007	53	10.818	1.018	0.000	0.71		102.8	FLOOD RISK	
35.000	56	11.041	1.141	0.000	0.92		25.1	FLOOD RISK	
35.001	57	10.607	1.208	7.139	2.21		66.0	FLOOD	6
33.008	58	10.604	1.234	4.265	1.27		135.7	FLOOD	4
33.009	59	10.527	1.227	27.080	0.88		143.4	FLOOD	6
36.000	60	12.698	0.898	0.000	2.11		38.9	SURCHARGED	
36.001	61	11.919	0.319	0.000	1.36		66.1	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
36.002	62	11.769	0.300	0.000	0.64		59.6	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

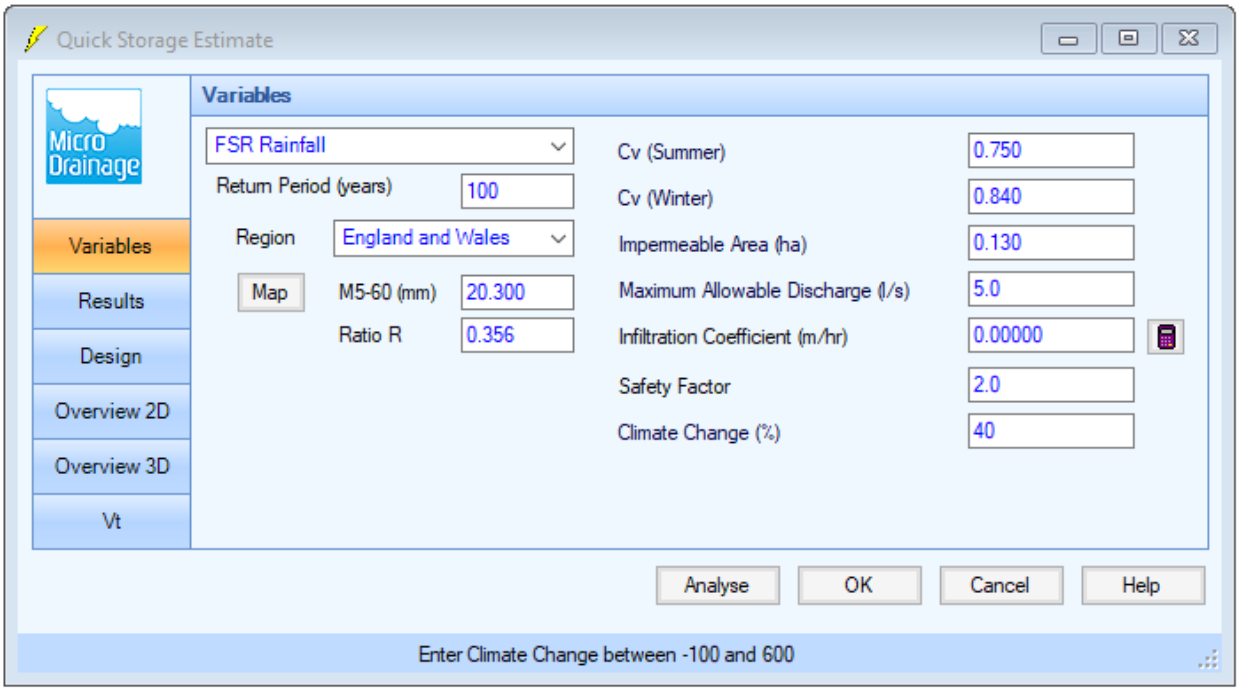
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
36.003	63	15 Winter	100	+40%	100/15 Summer			
37.000	64	15 Winter	100	+40%	100/15 Summer			
37.001	65	15 Winter	100	+40%	100/15 Summer			
36.004	66	15 Winter	100	+40%	100/15 Summer			
38.000	67	15 Winter	100	+40%	100/15 Summer			
36.005	68	15 Winter	100	+40%	100/15 Summer			
33.010	69	15 Winter	100	+40%	30/15 Summer			
39.000	70	15 Winter	100	+40%	30/15 Winter			
33.011	71	15 Winter	100	+40%	30/15 Summer			
33.012	72	15 Winter	100	+40%	30/15 Summer			
33.013	73	15 Winter	100	+40%	30/15 Summer			
33.014	74	15 Winter	100	+40%	30/15 Summer			
20.018	75	15 Winter	100	+40%	30/15 Summer			
40.000	76	30 Winter	100	+40%	1/30 Winter	100/15 Summer		
41.000	77	15 Winter	100	+40%	100/15 Summer			
40.001	78	15 Winter	100	+40%	1/15 Summer			
20.019	79	15 Winter	100	+40%	30/15 Summer			
20.020	80	15 Winter	100	+40%	30/15 Summer			
20.021	81	60 Winter	100	+40%			1/15 Summer	66
42.000	89	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
42.001	90	15 Winter	100	+40%	30/15 Summer			
42.002	91	15 Winter	100	+40%	30/15 Summer			
43.000	82	15 Winter	100	+40%				
43.001	83	15 Winter	100	+40%				
43.002	84	15 Winter	100	+40%	100/15 Summer			
43.003	85	15 Winter	100	+40%	100/15 Summer			
43.004	86	15 Winter	100	+40%	30/15 Summer			
44.000	87	15 Winter	100	+40%	30/15 Summer			
43.005	88	15 Winter	100	+40%	100/15 Summer			
42.003	92	15 Winter	100	+40%	100/15 Summer			
42.004	93	15 Winter	100	+40%	100/15 Summer			
42.005	94	15 Winter	100	+40%	30/15 Summer			
42.006	95	360 Winter	100	+40%				
42.007	96	360 Winter	100	+40%			100/30 Summer	20
42.008	97	360 Winter	100	+40%	30/120 Winter			
20.022	98	360 Winter	100	+40%				
20.023	99	360 Winter	100	+40%				
20.024	109	360 Winter	100	+40%	30/60 Summer			

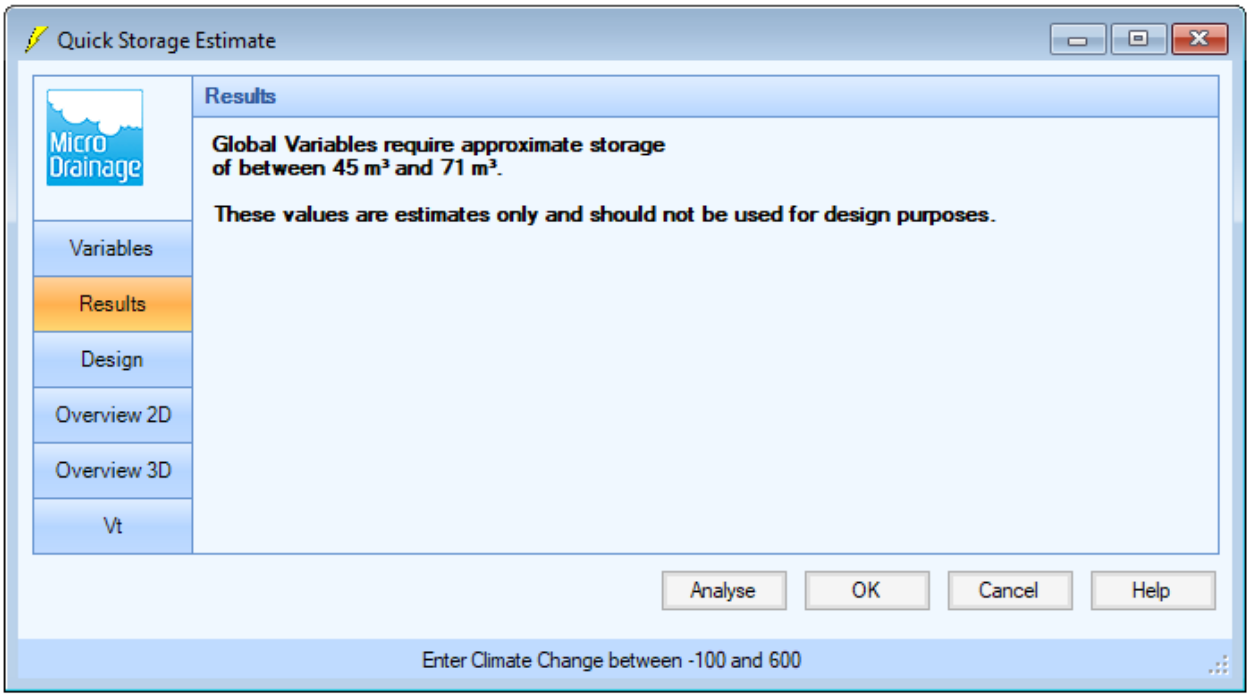
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
36.003	63	11.561	0.761	0.000	1.00		54.3	SURCHARGED	
37.000	64	11.694	0.264	0.000	0.55		16.8	SURCHARGED	
37.001	65	11.649	0.599	0.000	1.01		31.4	SURCHARGED	
36.004	66	11.410	0.775	0.000	1.38		97.9	SURCHARGED	
38.000	67	10.908	0.478	0.000	0.94		15.4	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
36.005	68	10.865	0.595	0.000	0.57		99.1	SURCHARGED	
33.010	69	10.548	1.194	0.000	1.07		183.6	SURCHARGED	
39.000	70	10.573	0.688	0.000	0.28		10.1	SURCHARGED	
33.011	71	10.543	1.209	0.000	1.16		202.6	SURCHARGED	
33.012	72	10.536	1.223	0.000	1.13		192.1	SURCHARGED	
33.013	73	10.528	1.235	0.000	0.85		179.6	SURCHARGED	
33.014	74	10.522	1.243	0.000	0.60		173.4	SURCHARGED	
20.018	75	10.494	1.270	0.000	3.85		1011.5	SURCHARGED	
40.000	76	10.062	0.932	30.712	1.86		68.6	FLOOD	6
41.000	77	10.713	0.538	0.000	1.21		77.6	FLOOD RISK	
40.001	78	10.171	1.186	0.000	2.22		139.9	SURCHARGED	
20.019	79	10.070	0.871	0.000	4.33		1083.2	SURCHARGED	
20.020	80	9.579	0.401	0.000	2.79		1079.8	SURCHARGED	
20.021	81	9.132	0.000	0.000	1.13	538.0	521.2	OK	
42.000	89	12.255	1.205	4.855	2.39		39.3	FLOOD	4
42.001	90	12.319	1.440	0.000	1.12		50.5	FLOOD RISK	
42.002	91	12.245	1.505	0.000	1.73		64.9	FLOOD RISK	
43.000	82	21.528	-0.102	0.000	0.22		13.0	OK	
43.001	83	19.321	-0.079	0.000	0.46		23.4	OK	
43.002	84	18.857	0.706	0.000	0.95		41.2	SURCHARGED	
43.003	85	15.709	1.120	0.000	1.20		50.2	FLOOD RISK	
43.004	86	14.764	0.909	0.000	1.72		74.9	FLOOD RISK	
44.000	87	14.858	0.955	0.000	1.71		28.8	FLOOD RISK	
43.005	88	14.116	0.482	0.000	1.09		129.2	SURCHARGED	
42.003	92	11.832	1.202	0.000	1.25		215.1	SURCHARGED	
42.004	93	10.697	0.792	0.000	1.21		213.3	SURCHARGED	
42.005	94	9.771	0.516	0.000	1.12		211.8	SURCHARGED	
42.006	95	9.100	-0.961	0.000	0.13		46.0	OK	
42.007	96	9.099	-0.401	0.000	0.13	51.3	24.2	OK	
42.008	97	9.141	0.411	0.000	0.09		23.0	SURCHARGED	
20.022	98	9.073	-0.427	0.000	0.25		308.0	OK	
20.023	99	9.069	-0.431	0.000	0.06		104.0	OK	
20.024	109	9.053	0.598	0.000	0.29		92.6	SURCHARGED	

Quick Storage Attenuation Calculations





Hydraulic Calculations – Site and 6 homes with Flow Control

Online Controls for Transfer.txt

Hydro-Brake® Optimum Manhole: S6, DS/PN: 21.004, Volume (m³): 9.4

Unit Reference	MD-SHE-0087-5000-2450-5000
Design Head (m)	2.450
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	87
Invert Level (m)	15.600
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.450	5.0
Flush-Flo™	0.379	3.7
Kick-Flo®	0.779	2.9
Mean Flow over Head Range	-	3.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	1.200	3.6	3.000	5.5	7.000	8.2
0.200	3.4	1.400	3.8	3.500	5.9	7.500	8.5
0.300	3.6	1.600	4.1	4.000	6.3	8.000	8.7
0.400	3.7	1.800	4.3	4.500	6.6	8.500	9.0
0.500	3.6	2.000	4.5	5.000	7.0	9.000	9.2
0.600	3.5	2.200	4.7	5.500	7.3	9.500	9.5
0.800	3.0	2.400	4.9	6.000	7.6		
1.000	3.3	2.600	5.1	6.500	7.9		

Orifice Manhole: S7, DS/PN: 20.008, Volume (m³): 2.0

Diameter (m) 0.193 Discharge Coefficient 0.600 Invert Level (m) 15.436

Hydro-Brake® Manhole: 97, DS/PN: 43.008, Volume (m³): 15.7

Design Head (m) 0.870 Hydro-Brake® Type Md5 SW Only Invert Level (m) 7.980
Design Flow (l/s) 31.0 Diameter (mm) 226

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.1	0.400	30.0	0.800	30.3	1.400	36.6
0.200	19.6	0.500	30.5	1.000	31.9	1.600	39.0
0.300	27.1	0.600	30.2	1.200	34.1	1.800	41.3

Hydro-Brake® Manhole: 97, DS/PN: 43.008, Volume (m³): 15.7

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
2.000	43.5	3.500	57.5	6.000	75.3	8.500	89.6
2.200	45.6	4.000	61.5	6.500	78.4	9.000	92.2
2.400	47.6	4.500	65.2	7.000	81.3	9.500	94.7
2.600	49.6	5.000	68.7	7.500	84.2		
3.000	53.2	5.500	72.1	8.000	86.9		

Complex Manhole: 109, DS/PN: 20.025, Volume (m³): 73.6

Orifice

Diameter (m) 0.130 Discharge Coefficient 0.600 Invert Level (m) 7.930

Orifice

Diameter (m) 0.204 Discharge Coefficient 0.600 Invert Level (m) 8.530

Storage Structures for Transfer.txt

Cellular Storage Manhole: S6, DS/PN: 21.004

Invert Level (m) 15.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.96
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	12.8	0.0	1.321	0.0	0.0
1.320	12.8	0.0			

Tank or Pond Manhole: 96, DS/PN: 43.007

Invert Level (m) 7.990

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	314.0	0.700	883.0	1.400	1166.0	2.100	1209.0
0.100	407.0	0.800	921.0	1.500	1209.0	2.200	1209.0
0.200	696.0	0.900	960.0	1.600	1209.0	2.300	1209.0
0.300	732.0	1.000	1000.0	1.700	1209.0	2.400	1209.0
0.400	769.0	1.100	1041.0	1.800	1209.0	2.500	1209.0
0.500	806.0	1.200	1082.0	1.900	1209.0		
0.600	844.0	1.300	1124.0	2.000	1209.0		

Tank or Pond Manhole: 99, DS/PN: 20.024

Invert Level (m) 7.940

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	348.0	0.700	1333.0	1.400	1853.0	2.100	1933.0
0.100	471.0	0.800	1403.0	1.500	1933.0	2.200	1933.0
0.200	931.0	0.900	1474.0	1.600	1933.0	2.300	1933.0
0.300	1034.0	1.000	1547.0	1.700	1933.0	2.400	1933.0
0.400	1123.0	1.100	1621.0	1.800	1933.0	2.500	1933.0
0.500	1197.0	1.200	1697.0	1.900	1933.0		
0.600	1264.0	1.300	1774.0	2.000	1933.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
20.000	1	15 Winter	1	+0%	100/15 Summer			
20.001	2	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
20.002	3	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
20.003	4	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
20.004	5	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
20.005	6	15 Winter	1	+0%				
20.006	7	15 Winter	1	+0%	100/15 Summer			
20.007	8	15 Winter	1	+0%	30/15 Summer			
21.000	S1	15 Winter	1	+0%	100/15 Summer			
21.001	S2	15 Winter	1	+0%	100/15 Summer			
21.002	S3	15 Winter	1	+0%	100/15 Winter			
21.003	S4	15 Winter	1	+0%	100/15 Summer			
22.000	S5	30 Winter	1	+0%	30/15 Summer			
21.004	S6	30 Winter	1	+0%	1/15 Summer			
20.008	S7	15 Winter	1	+0%	1/15 Summer			
23.000	9	15 Winter	1	+0%	100/15 Summer			
20.009	10	15 Winter	1	+0%	30/15 Summer			
24.000	11	15 Winter	1	+0%	100/15 Summer			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	1	22.467	-0.103	0.000	0.21		7.6	OK	
20.001	2	21.938	-0.092	0.000	0.32		11.5	OK	2
20.002	3	21.031	-0.079	0.000	0.45		16.8	OK	5
20.003	4	19.903	-0.067	0.000	0.58		20.2	OK	6
20.004	5	19.232	-0.058	0.000	0.68		25.1	OK	3
20.005	6	18.195	-0.145	0.000	0.27		28.1	OK	
20.006	7	17.248	-0.142	0.000	0.29		31.1	OK	
20.007	8	15.903	-0.127	0.000	0.39		33.5	OK	
21.000	S1	17.253	-0.110	0.000	0.16		2.6	OK	
21.001	S2	17.087	-0.095	0.000	0.29		4.7	OK	
21.002	S3	16.442	-0.579	0.000	0.01		4.8	OK	
21.003	S4	16.041	-0.559	0.000	0.01		9.0	OK	
22.000	S5	15.921	-0.346	0.000	0.01		1.8	OK	
21.004	S6	15.921	0.171	0.000	0.20		3.7	SURCHARGED	
20.008	S7	15.737	0.076	0.000	0.41		34.9	SURCHARGED	
23.000	9	16.340	-0.090	0.000	0.33		5.4	FLOOD RISK	
20.009	10	13.179	-0.113	0.000	0.69		45.1	OK	
24.000	11	18.345	-0.105	0.000	0.20		10.5	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
24.001	12	15 Winter	1	+0%	100/15 Summer	100/15 Summer		
24.002	13	15 Winter	1	+0%	30/15 Summer			
24.003	14	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
20.010	15	15 Winter	1	+0%	100/15 Summer			
20.011	16	15 Winter	1	+0%	30/15 Summer			
25.000	17	15 Winter	1	+0%	100/15 Summer			
25.001	18	15 Winter	1	+0%	100/15 Summer			
25.002	19	15 Winter	1	+0%	100/15 Summer			
25.003	20	15 Winter	1	+0%	100/15 Summer			
26.000	21	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
25.004	22	15 Winter	1	+0%	30/15 Summer			
25.005	23	15 Winter	1	+0%	100/15 Summer			
25.006	24	15 Winter	1	+0%	30/15 Summer			
20.012	25	15 Winter	1	+0%	30/15 Summer			
27.000	26	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
27.001	27	15 Winter	1	+0%	100/15 Summer			
20.013	28	15 Winter	1	+0%	30/15 Summer			
28.000	29	15 Winter	1	+0%	100/15 Summer			
29.000	30	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
30.000	31	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
28.001	32	15 Summer	1	+0%	30/15 Summer			
20.014	33	15 Winter	1	+0%	30/15 Summer			
20.015	34	15 Winter	1	+0%	30/15 Summer			
20.016	35	15 Winter	1	+0%	30/15 Summer			
31.000	36	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
32.000	37	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
31.001	38	15 Winter	1	+0%	30/15 Summer			
20.017	39	15 Winter	1	+0%	30/15 Summer			
33.000	40	15 Winter	1	+0%	100/15 Summer			
33.001	41	15 Summer	1	+0%	30/15 Summer			
33.002	42	15 Winter	1	+0%	30/15 Summer			
33.003	43	15 Winter	1	+0%	30/15 Summer			
20.018	44	15 Winter	1	+0%	30/15 Summer			
34.000	45	15 Winter	1	+0%	100/15 Summer			
34.001	46	15 Summer	1	+0%	30/15 Summer			
34.002	47	15 Summer	1	+0%	30/15 Winter			
34.003	48	15 Winter	1	+0%	100/15 Summer			
35.000	49	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
34.004	50	15 Winter	1	+0%	30/15 Summer			
34.005	51	15 Winter	1	+0%	100/15 Summer			
34.006	52	15 Winter	1	+0%	30/15 Summer			
34.007	53	15 Winter	1	+0%	30/15 Summer			
36.000	56	15 Winter	1	+0%	30/15 Winter			
36.001	57	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
34.008	58	30 Winter	1	+0%	30/15 Summer	100/15 Summer		
34.009	59	30 Winter	1	+0%	30/15 Summer	100/15 Summer		
37.000	60	15 Summer	1	+0%	30/15 Summer			
37.001	61	15 Winter	1	+0%	100/15 Summer			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
24.001	12	17.308	-0.092	0.000	0.31		16.4	OK	2
24.002	13	16.457	-0.093	0.000	0.31		16.4	OK	
24.003	14	15.382	-0.068	0.000	0.57		23.4	OK	5
20.010	15	12.892	-0.258	0.000	0.21		76.2	OK	
20.011	16	10.648	-0.177	0.000	0.54		76.6	OK	
25.000	17	18.153	-0.097	0.000	0.27		10.0	OK	
25.001	18	16.258	-0.092	0.000	0.31		14.3	OK	
25.002	19	14.907	-0.093	0.000	0.31		14.2	OK	
25.003	20	13.781	-0.169	0.000	0.14		20.7	OK	
26.000	21	12.344	-0.106	0.000	0.19		3.8	OK	4
25.004	22	12.228	-0.095	0.000	0.62		26.8	OK	
25.005	23	12.075	-0.155	0.000	0.21		30.3	OK	
25.006	24	11.060	-0.140	0.000	0.30		30.4	OK	
20.012	25	10.549	-0.145	0.000	0.78		108.4	OK	
27.000	26	16.743	-0.056	0.000	0.71		31.6	OK	6
27.001	27	13.725	-0.075	0.000	0.50		31.5	OK	
20.013	28	10.425	-0.191	0.000	0.66		131.0	OK	
28.000	29	12.630	-0.145	0.000	0.27		28.6	OK	
29.000	30	12.643	-0.057	0.000	0.70		30.4	OK	5
30.000	31	12.635	-0.065	0.000	0.62		28.6	OK	4
28.001	32	11.965	-0.185	0.000	0.51		89.5	OK	
20.014	33	10.317	-0.178	0.000	0.76		184.9	OK	
20.015	34	10.254	-0.189	0.000	0.72		182.1	OK	
20.016	35	10.168	-0.207	0.000	0.73		186.8	OK	
31.000	36	12.336	-0.139	0.000	0.31		12.6	OK	2
32.000	37	12.391	-0.084	0.000	0.71		28.3	OK	4
31.001	38	12.283	-0.112	0.000	0.50		46.8	OK	
20.017	39	10.060	-0.245	0.000	0.63		209.1	OK	
33.000	40	11.127	-0.148	0.000	0.25		18.2	OK	
33.001	41	10.647	-0.128	0.000	0.38		18.3	OK	
33.002	42	10.541	-0.093	0.000	0.64		21.9	OK	
33.003	43	10.443	-0.121	0.000	0.43		25.7	OK	
20.018	44	9.985	-0.261	0.000	0.76		221.8	OK	
34.000	45	12.807	-0.093	0.000	0.31		12.8	OK	
34.001	46	11.380	-0.070	0.000	0.55		12.9	OK	
34.002	47	11.029	-0.121	0.000	0.43		12.9	OK	
34.003	48	10.960	-0.150	0.000	0.24		16.3	OK	
35.000	49	11.725	-0.074	0.000	0.51		20.3	OK	4
34.004	50	10.475	-0.125	0.000	0.63		38.4	OK	
34.005	51	10.375	-0.190	0.000	0.29		40.2	OK	
34.006	52	9.825	-0.174	0.000	0.36		40.7	OK	
34.007	53	9.607	-0.192	0.000	0.28		40.9	OK	
36.000	56	9.799	-0.175	0.000	0.11		8.7	OK	
36.001	57	9.266	-0.133	0.000	0.35		10.5	OK	6
34.008	58	9.217	-0.152	0.000	0.39		41.5	OK	3
34.009	59	9.205	-0.095	0.000	0.24		39.4	OK	5
37.000	60	11.730	-0.070	0.000	0.56		10.2	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
37.001	61	11.463	-0.137	0.000	0.32		15.8	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
37.002	62	15 Winter	1	+0%	100/15 Summer			
37.003	63	15 Winter	1	+0%	100/15 Summer			
38.000	64	15 Winter	1	+0%	100/15 Summer			
38.001	65	15 Winter	1	+0%	100/15 Summer			
37.004	66	15 Winter	1	+0%	100/15 Summer			
39.000	67	15 Winter	1	+0%	100/15 Summer			
37.005	68	15 Winter	1	+0%	100/15 Summer			
34.010	69	15 Winter	1	+0%	30/15 Summer			
40.000	70	15 Summer	1	+0%	30/15 Winter			
34.011	71	15 Winter	1	+0%	30/15 Summer			
34.012	72	15 Winter	1	+0%	30/15 Summer			
34.013	73	15 Winter	1	+0%	30/15 Summer			
34.014	74	15 Winter	1	+0%	30/15 Summer			
20.019	75	15 Winter	1	+0%	30/15 Summer			
41.000	76	30 Winter	1	+0%	1/30 Winter	100/15 Summer		
42.000	77	15 Summer	1	+0%	100/15 Summer			
41.001	78	30 Winter	1	+0%	1/15 Summer			
20.020	79	15 Winter	1	+0%	30/15 Summer			
20.021	80	15 Winter	1	+0%	30/15 Summer			
20.022	81	15 Winter	1	+0%			1/15 Summer	66
43.000	89	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
43.001	90	15 Winter	1	+0%	30/15 Summer			
43.002	91	15 Winter	1	+0%	30/15 Summer			
44.000	82	15 Winter	1	+0%				
44.001	83	15 Winter	1	+0%				
44.002	84	15 Winter	1	+0%	100/15 Summer			
44.003	85	15 Winter	1	+0%	100/15 Summer			
44.004	86	15 Winter	1	+0%	30/15 Summer			
45.000	87	15 Winter	1	+0%	30/15 Summer			
44.005	88	15 Winter	1	+0%	100/15 Summer			
43.003	92	15 Winter	1	+0%	100/15 Summer			
43.004	93	15 Winter	1	+0%	100/15 Summer			
43.005	94	15 Winter	1	+0%	30/15 Summer			
43.006	95	240 Winter	1	+0%				
43.007	96	240 Winter	1	+0%			100/30 Summer	20
43.008	97	240 Winter	1	+0%	30/120 Winter			
20.023	98	480 Winter	1	+0%				
20.024	99	480 Winter	1	+0%				
20.025	109	480 Winter	1	+0%	30/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
37.002	62	11.306	-0.163	0.000	0.17		15.7	OK	
37.003	63	10.658	-0.142	0.000	0.29		15.7	OK	
38.000	64	11.317	-0.113	0.000	0.14		4.2	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
38.001	65	10.952	-0.098	0.000	0.26		8.2	OK	
37.004	66	10.506	-0.129	0.000	0.38		26.8	OK	
39.000	67	10.328	-0.102	0.000	0.22		3.6	OK	
37.005	68	10.054	-0.216	0.000	0.17		30.4	OK	
34.010	69	9.171	-0.183	0.000	0.44		75.9	OK	
40.000	70	9.760	-0.125	0.000	0.07		2.3	OK	
34.011	71	9.163	-0.171	0.000	0.45		77.8	OK	
34.012	72	9.154	-0.159	0.000	0.43		72.5	OK	
34.013	73	9.146	-0.147	0.000	0.31		65.9	OK	
34.014	74	9.137	-0.142	0.000	0.22		61.8	OK	
20.019	75	9.076	-0.148	0.000	1.03		269.3	OK	
41.000	76	9.129	0.000	0.000	0.41		15.0	SURCHARGED	6
42.000	77	10.037	-0.138	0.000	0.32		20.3	OK	
41.001	78	9.108	0.122	0.000	0.49		30.6	SURCHARGED	
20.020	79	9.041	-0.158	0.000	1.16		289.9	OK	
20.021	80	8.914	-0.264	0.000	0.74		288.5	OK	
20.022	81	8.648	-0.484	0.000	0.27	163.0	125.5	OK	
43.000	89	10.976	-0.074	0.000	0.51		8.4	OK	4
43.001	90	10.744	-0.135	0.000	0.34		15.1	OK	
43.002	91	10.639	-0.101	0.000	0.58		21.6	OK	
44.000	82	21.502	-0.128	0.000	0.05		2.9	OK	
44.001	83	19.281	-0.119	0.000	0.09		4.8	OK	
44.002	84	18.049	-0.102	0.000	0.22		9.7	OK	
44.003	85	14.494	-0.095	0.000	0.29		12.1	OK	
44.004	86	13.734	-0.121	0.000	0.43		18.7	OK	
45.000	87	13.828	-0.075	0.000	0.50		8.4	OK	
44.005	88	13.491	-0.143	0.000	0.28		33.5	OK	
43.003	92	10.454	-0.176	0.000	0.36		61.9	OK	
43.004	93	9.727	-0.178	0.000	0.35		61.6	OK	
43.005	94	9.073	-0.182	0.000	0.32		61.2	OK	
43.006	95	8.474	-1.587	0.000	0.04		15.4	OK	
43.007	96	8.473	-1.027	0.000	0.12	0.0	21.6	OK	
43.008	97	8.468	-0.262	0.000	0.08		21.1	OK	
20.023	98	8.332	-1.168	0.000	0.04		51.3	OK	
20.024	99	8.331	-1.169	0.000	0.03		54.2	OK	
20.025	109	8.328	-0.127	0.000	0.06		20.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
20.000	1	15 Winter	30	+0%	100/15 Summer			
20.001	2	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
20.002	3	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
20.003	4	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
20.004	5	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
20.005	6	15 Winter	30	+0%				
20.006	7	15 Winter	30	+0%	100/15 Summer			
20.007	8	15 Winter	30	+0%	30/15 Summer			
21.000	S1	15 Winter	30	+0%	100/15 Summer			
21.001	S2	15 Winter	30	+0%	100/15 Summer			
21.002	S3	60 Winter	30	+0%	100/15 Winter			
21.003	S4	60 Winter	30	+0%	100/15 Summer			
22.000	S5	60 Winter	30	+0%	30/15 Summer			
21.004	S6	60 Winter	30	+0%	1/15 Summer			
20.008	S7	15 Winter	30	+0%	1/15 Summer			
23.000	9	15 Winter	30	+0%	100/15 Summer			
20.009	10	15 Winter	30	+0%	30/15 Summer			
24.000	11	15 Winter	30	+0%	100/15 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	1	22.497	-0.073	0.000	0.52		18.6	OK	
20.001	2	22.184	0.154	0.000	0.80		28.8	SURCHARGED	2
20.002	3	21.798	0.688	0.000	0.92		34.4	SURCHARGED	5
20.003	4	20.892	0.922	0.000	1.14		40.1	FLOOD RISK	6
20.004	5	20.005	0.715	0.000	1.32		48.7	SURCHARGED	3
20.005	6	18.234	-0.106	0.000	0.54		55.3	OK	
20.006	7	17.292	-0.098	0.000	0.60		63.4	OK	
20.007	8	16.480	0.450	0.000	0.79		67.5	SURCHARGED	
21.000	S1	17.278	-0.085	0.000	0.39		6.4	OK	
21.001	S2	17.134	-0.048	0.000	0.80		13.1	OK	
21.002	S3	16.521	-0.500	0.000	0.01		6.7	OK	
21.003	S4	16.521	-0.079	0.000	0.02		11.9	OK	
22.000	S5	16.521	0.254	0.000	0.01		3.3	SURCHARGED	
21.004	S6	16.521	0.771	0.000	0.20		3.7	SURCHARGED	
20.008	S7	16.248	0.587	0.000	0.77		65.8	SURCHARGED	
23.000	9	16.385	-0.045	0.000	0.81		13.1	FLOOD RISK	
20.009	10	13.422	0.130	0.000	1.39		90.9	SURCHARGED	
24.000	11	18.374	-0.076	0.000	0.49		25.7	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
24.001	12	15 Winter	30	+0%	100/15 Summer	100/15 Summer		
24.002	13	15 Winter	30	+0%	30/15 Summer			
24.003	14	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
20.010	15	15 Winter	30	+0%	100/15 Summer			
20.011	16	15 Winter	30	+0%	30/15 Summer			
25.000	17	15 Winter	30	+0%	100/15 Summer			
25.001	18	15 Winter	30	+0%	100/15 Summer			
25.002	19	15 Winter	30	+0%	100/15 Summer			
25.003	20	15 Winter	30	+0%	100/15 Summer			
26.000	21	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
25.004	22	15 Winter	30	+0%	30/15 Summer			
25.005	23	15 Winter	30	+0%	100/15 Summer			
25.006	24	15 Winter	30	+0%	30/15 Summer			
20.012	25	15 Winter	30	+0%	30/15 Summer			
27.000	26	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
27.001	27	15 Winter	30	+0%	100/15 Summer			
20.013	28	15 Winter	30	+0%	30/15 Summer			
28.000	29	15 Winter	30	+0%	100/15 Summer			
29.000	30	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
30.000	31	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
28.001	32	15 Winter	30	+0%	30/15 Summer			
20.014	33	15 Winter	30	+0%	30/15 Summer			
20.015	34	15 Winter	30	+0%	30/15 Summer			
20.016	35	15 Winter	30	+0%	30/15 Summer			
31.000	36	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
32.000	37	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
31.001	38	15 Winter	30	+0%	30/15 Summer			
20.017	39	15 Winter	30	+0%	30/15 Summer			
33.000	40	15 Winter	30	+0%	100/15 Summer			
33.001	41	15 Winter	30	+0%	30/15 Summer			
33.002	42	15 Winter	30	+0%	30/15 Summer			
33.003	43	15 Winter	30	+0%	30/15 Summer			
20.018	44	15 Winter	30	+0%	30/15 Summer			
34.000	45	15 Winter	30	+0%	100/15 Summer			
34.001	46	15 Winter	30	+0%	30/15 Summer			
34.002	47	15 Winter	30	+0%	30/15 Winter			
34.003	48	15 Summer	30	+0%	100/15 Summer			
35.000	49	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
34.004	50	15 Winter	30	+0%	30/15 Summer			
34.005	51	15 Winter	30	+0%	100/15 Summer			
34.006	52	30 Winter	30	+0%	30/15 Summer			
34.007	53	15 Winter	30	+0%	30/15 Summer			
36.000	56	15 Winter	30	+0%	30/15 Winter			
36.001	57	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
34.008	58	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
34.009	59	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
37.000	60	15 Winter	30	+0%	30/15 Summer			
37.001	61	15 Winter	30	+0%	100/15 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
24.001	12	17.367	-0.033	0.000	0.84		43.8	OK	2
24.002	13	16.893	0.343	0.000	0.74		39.3	SURCHARGED	
24.003	14	16.332	0.882	0.000	1.33		54.7	SURCHARGED	5
20.010	15	12.957	-0.193	0.000	0.47		169.9	OK	
20.011	16	11.758	0.933	0.000	1.14		162.1	SURCHARGED	
25.000	17	18.189	-0.061	0.000	0.66		24.6	OK	
25.001	18	16.305	-0.045	0.000	0.83		37.8	OK	
25.002	19	14.953	-0.047	0.000	0.81		37.7	OK	
25.003	20	13.823	-0.127	0.000	0.39		57.9	OK	
26.000	21	12.530	0.080	0.000	0.47		9.4	SURCHARGED	4
25.004	22	12.501	0.178	0.000	1.69		72.8	SURCHARGED	
25.005	23	12.130	-0.100	0.000	0.58		82.6	OK	
25.006	24	11.806	0.606	0.000	0.73		72.7	SURCHARGED	
20.012	25	11.588	0.894	0.000	1.67		231.4	SURCHARGED	
27.000	26	17.882	1.083	0.000	1.16		51.9	FLOOD RISK	6
27.001	27	13.753	-0.047	0.000	0.82		51.9	OK	
20.013	28	11.369	0.753	0.000	1.46		287.0	SURCHARGED	
28.000	29	12.685	-0.090	0.000	0.67		70.1	OK	
29.000	30	13.348	0.648	0.000	1.44		62.3	SURCHARGED	5
30.000	31	13.156	0.456	0.000	1.32		61.3	SURCHARGED	4
28.001	32	12.205	0.055	0.000	1.10		193.3	SURCHARGED	
20.014	33	11.102	0.607	0.000	1.82		444.1	SURCHARGED	
20.015	34	10.906	0.463	0.000	1.76		447.1	SURCHARGED	
20.016	35	10.691	0.316	0.000	1.80		459.8	SURCHARGED	
31.000	36	12.683	0.208	0.000	0.66		26.4	SURCHARGED	2
32.000	37	12.794	0.319	0.000	1.54		61.3	SURCHARGED	4
31.001	38	12.600	0.205	0.000	1.12		103.7	SURCHARGED	
20.017	39	10.458	0.152	0.000	1.65		547.0	SURCHARGED	
33.000	40	11.179	-0.096	0.000	0.62		44.7	OK	
33.001	41	10.891	0.116	0.000	0.90		43.0	SURCHARGED	
33.002	42	10.785	0.151	0.000	1.56		53.2	SURCHARGED	
33.003	43	10.617	0.053	0.000	1.07		63.4	SURCHARGED	
20.018	44	10.261	0.016	0.000	2.02		593.1	SURCHARGED	
34.000	45	12.849	-0.051	0.000	0.77		31.5	OK	
34.001	46	11.683	0.233	0.000	1.31		30.6	SURCHARGED	
34.002	47	11.168	0.018	0.000	0.99		29.5	SURCHARGED	
34.003	48	11.011	-0.099	0.000	0.58		39.5	OK	
35.000	49	12.102	0.303	0.000	1.08		43.0	SURCHARGED	4
34.004	50	10.680	0.080	0.000	1.46		88.8	SURCHARGED	
34.005	51	10.447	-0.118	0.000	0.67		95.0	OK	
34.006	52	10.352	0.353	0.000	0.68		76.2	SURCHARGED	
34.007	53	10.218	0.419	0.000	0.59		85.7	SURCHARGED	
36.000	56	10.099	0.125	0.000	0.28		21.4	SURCHARGED	
36.001	57	10.073	0.674	0.000	0.77		23.0	SURCHARGED	6
34.008	58	10.065	0.696	0.000	0.99		106.6	SURCHARGED	3
34.009	59	9.967	0.667	0.000	0.62		101.9	SURCHARGED	5
37.000	60	11.949	0.149	0.000	1.30		23.9	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
37.001	61	11.535	-0.065	0.000	0.83		40.3	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
37.002	62	15 Winter	30	+0%	100/15 Summer			
37.003	63	15 Winter	30	+0%	100/15 Summer			
38.000	64	15 Winter	30	+0%	100/15 Summer			
38.001	65	15 Summer	30	+0%	100/15 Summer			
37.004	66	15 Winter	30	+0%	100/15 Summer			
39.000	67	15 Winter	30	+0%	100/15 Summer			
37.005	68	15 Winter	30	+0%	100/15 Summer			
34.010	69	15 Winter	30	+0%	30/15 Summer			
40.000	70	15 Winter	30	+0%	30/15 Winter			
34.011	71	15 Winter	30	+0%	30/15 Summer			
34.012	72	15 Winter	30	+0%	30/15 Summer			
34.013	73	15 Winter	30	+0%	30/15 Summer			
34.014	74	15 Winter	30	+0%	30/15 Summer			
20.019	75	15 Winter	30	+0%	30/15 Summer			
41.000	76	15 Winter	30	+0%	1/30 Winter	100/15 Summer		
42.000	77	15 Summer	30	+0%	100/15 Summer			
41.001	78	15 Winter	30	+0%	1/15 Summer			
20.020	79	15 Winter	30	+0%	30/15 Summer			
20.021	80	15 Winter	30	+0%	30/15 Summer			
20.022	81	15 Winter	30	+0%			1/15 Summer	66
43.000	89	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
43.001	90	15 Winter	30	+0%	30/15 Summer			
43.002	91	15 Winter	30	+0%	30/15 Summer			
44.000	82	15 Winter	30	+0%				
44.001	83	15 Winter	30	+0%				
44.002	84	15 Summer	30	+0%	100/15 Summer			
44.003	85	15 Winter	30	+0%	100/15 Summer			
44.004	86	15 Winter	30	+0%	30/15 Summer			
45.000	87	15 Winter	30	+0%	30/15 Summer			
44.005	88	15 Winter	30	+0%	100/15 Summer			
43.003	92	15 Winter	30	+0%	100/15 Summer			
43.004	93	15 Winter	30	+0%	100/15 Summer			
43.005	94	15 Winter	30	+0%	30/15 Summer			
43.006	95	15 Winter	30	+0%				
43.007	96	480 Winter	30	+0%			100/30 Summer	20
43.008	97	480 Winter	30	+0%	30/120 Winter			
20.023	98	480 Winter	30	+0%				
20.024	99	480 Winter	30	+0%				
20.025	109	480 Winter	30	+0%	30/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
37.002	62	11.348	-0.121	0.000	0.43		40.0	OK	
37.003	63	10.722	-0.078	0.000	0.75		40.4	OK	
38.000	64	11.340	-0.090	0.000	0.34		10.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
38.001	65	10.995	-0.055	0.000	0.73		22.5	OK	
37.004	66	10.602	-0.033	0.000	1.00		70.7	OK	
39.000	67	10.359	-0.071	0.000	0.54		8.9	OK	
37.005	68	10.112	-0.158	0.000	0.45		79.3	OK	
34.010	69	9.905	0.551	0.000	0.97		166.2	SURCHARGED	
40.000	70	9.904	0.019	0.000	0.16		5.7	SURCHARGED	
34.011	71	9.893	0.559	0.000	1.00		174.3	SURCHARGED	
34.012	72	9.879	0.566	0.000	1.00		169.7	SURCHARGED	
34.013	73	9.865	0.572	0.000	0.78		164.7	SURCHARGED	
34.014	74	9.854	0.575	0.000	0.53		152.4	SURCHARGED	
20.019	75	9.823	0.599	0.000	2.78		730.6	SURCHARGED	
41.000	76	9.771	0.642	0.000	1.08		39.8	FLOOD RISK	6
42.000	77	10.100	-0.075	0.000	0.78		49.7	OK	
41.001	78	9.684	0.698	0.000	1.66		104.6	SURCHARGED	
20.020	79	9.602	0.403	0.000	3.14		784.8	SURCHARGED	
20.021	80	9.347	0.169	0.000	2.02		780.9	SURCHARGED	
20.022	81	8.883	-0.249	0.000	0.78	420.2	359.7	OK	
43.000	89	11.259	0.209	0.000	1.07		17.7	SURCHARGED	4
43.001	90	11.062	0.183	0.000	0.79		35.7	SURCHARGED	
43.002	91	10.957	0.218	0.000	1.42		53.3	SURCHARGED	
44.000	82	21.515	-0.115	0.000	0.12		7.1	OK	
44.001	83	19.301	-0.099	0.000	0.25		12.9	OK	
44.002	84	18.090	-0.061	0.000	0.66		28.4	OK	
44.003	85	14.546	-0.043	0.000	0.85		35.5	OK	
44.004	86	13.989	0.134	0.000	1.26		54.6	SURCHARGED	
45.000	87	14.000	0.097	0.000	1.15		19.5	SURCHARGED	
44.005	88	13.562	-0.071	0.000	0.79		92.9	OK	
43.003	92	10.566	-0.064	0.000	0.96		164.9	OK	
43.004	93	9.854	-0.051	0.000	0.93		163.7	OK	
43.005	94	9.301	0.046	0.000	0.86		162.5	SURCHARGED	
43.006	95	8.866	-1.195	0.000	0.46		160.3	OK	
43.007	96	8.736	-0.764	0.000	0.12	0.0	22.3	OK	
43.008	97	8.757	0.027	0.000	0.08		21.5	SURCHARGED	
20.023	98	8.708	-0.792	0.000	0.11		139.3	OK	
20.024	99	8.705	-0.795	0.000	0.03		51.6	OK	
20.025	109	8.697	0.242	0.000	0.14		45.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
20.000	1	15 Winter	100	+40%	100/15 Summer			
20.001	2	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.002	3	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.003	4	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.004	5	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.005	6	15 Winter	100	+40%				
20.006	7	15 Winter	100	+40%	100/15 Summer			
20.007	8	15 Winter	100	+40%	30/15 Summer			
21.000	S1	120 Winter	100	+40%	100/15 Summer			
21.001	S2	120 Winter	100	+40%	100/15 Summer			
21.002	S3	120 Winter	100	+40%	100/15 Winter			
21.003	S4	120 Winter	100	+40%	100/15 Summer			
22.000	S5	120 Winter	100	+40%	30/15 Summer			
21.004	S6	120 Winter	100	+40%	1/15 Summer			
20.008	S7	15 Winter	100	+40%	1/15 Summer			
23.000	9	15 Winter	100	+40%	100/15 Summer			
20.009	10	15 Winter	100	+40%	30/15 Summer			
24.000	11	15 Winter	100	+40%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	1	23.563	0.993	0.000	0.73		25.8	FLOOD RISK	
20.001	2	23.231	1.201	0.662	1.00		36.2	FLOOD	2
20.002	3	22.315	1.205	5.389	1.00		37.4	FLOOD	5
20.003	4	21.175	1.205	4.781	1.36		47.5	FLOOD	6
20.004	5	20.491	1.201	0.552	1.51		55.4	FLOOD	3
20.005	6	18.286	-0.054	0.000	0.69		71.6	OK	
20.006	7	17.878	0.488	0.000	0.76		80.5	SURCHARGED	
20.007	8	17.122	1.092	0.000	1.02		87.7	FLOOD RISK	
21.000	S1	18.035	0.672	0.000	0.22		3.7	SURCHARGED	
21.001	S2	18.032	0.850	0.000	0.47		7.7	SURCHARGED	
21.002	S3	18.025	1.004	0.000	0.01		7.0	SURCHARGED	
21.003	S4	18.025	1.425	0.000	0.01		9.4	SURCHARGED	
22.000	S5	18.025	1.758	0.000	0.01		3.8	FLOOD RISK	
21.004	S6	18.025	2.275	0.000	0.27		4.9	FLOOD RISK	
20.008	S7	16.747	1.086	0.000	1.00		85.7	FLOOD RISK	
23.000	9	16.560	0.130	0.000	1.39		22.6	FLOOD RISK	
20.009	10	14.418	1.126	0.000	1.89		123.5	SURCHARGED	
24.000	11	19.161	0.711	0.000	0.72		37.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
24.001	12	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
24.002	13	15 Summer	100	+40%	30/15 Summer			
24.003	14	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
20.010	15	15 Winter	100	+40%	100/15 Summer			
20.011	16	15 Winter	100	+40%	30/15 Summer			
25.000	17	15 Winter	100	+40%	100/15 Summer			
25.001	18	15 Winter	100	+40%	100/15 Summer			
25.002	19	15 Winter	100	+40%	100/15 Summer			
25.003	20	15 Winter	100	+40%	100/15 Summer			
26.000	21	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
25.004	22	15 Winter	100	+40%	30/15 Summer			
25.005	23	15 Winter	100	+40%	100/15 Summer			
25.006	24	15 Winter	100	+40%	30/15 Summer			
20.012	25	15 Winter	100	+40%	30/15 Summer			
27.000	26	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
27.001	27	30 Winter	100	+40%	100/15 Summer			
20.013	28	15 Winter	100	+40%	30/15 Summer			
28.000	29	15 Winter	100	+40%	100/15 Summer			
29.000	30	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
30.000	31	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
28.001	32	15 Winter	100	+40%	30/15 Summer			
20.014	33	15 Winter	100	+40%	30/15 Summer			
20.015	34	15 Winter	100	+40%	30/15 Summer			
20.016	35	15 Winter	100	+40%	30/15 Summer			
31.000	36	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
32.000	37	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
31.001	38	15 Summer	100	+40%	30/15 Summer			
20.017	39	15 Winter	100	+40%	30/15 Summer			
33.000	40	15 Winter	100	+40%	100/15 Summer			
33.001	41	15 Winter	100	+40%	30/15 Summer			
33.002	42	15 Winter	100	+40%	30/15 Summer			
33.003	43	15 Winter	100	+40%	30/15 Summer			
20.018	44	15 Winter	100	+40%	30/15 Summer			
34.000	45	15 Winter	100	+40%	100/15 Summer			
34.001	46	15 Winter	100	+40%	30/15 Summer			
34.002	47	30 Winter	100	+40%	30/15 Winter			
34.003	48	30 Winter	100	+40%	100/15 Summer			
35.000	49	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
34.004	50	30 Winter	100	+40%	30/15 Summer			
34.005	51	30 Winter	100	+40%	100/15 Summer			
34.006	52	30 Winter	100	+40%	30/15 Summer			
34.007	53	30 Winter	100	+40%	30/15 Summer			
36.000	56	30 Winter	100	+40%	30/15 Winter			
36.001	57	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
34.008	58	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
34.009	59	30 Winter	100	+40%	30/15 Summer	100/15 Summer		
37.000	60	15 Winter	100	+40%	30/15 Summer			
37.001	61	15 Winter	100	+40%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
24.001	12	18.601	1.201	1.109	1.01		52.8	FLOOD	2
24.002	13	17.744	1.194	0.000	0.99		52.5	FLOOD RISK	
24.003	14	16.656	1.206	6.340	1.44		59.3	FLOOD	5
20.010	15	13.930	0.780	0.000	0.59		213.4	SURCHARGED	
20.011	16	13.161	2.336	0.000	1.47		208.1	SURCHARGED	
25.000	17	18.791	0.541	0.000	0.95		35.6	SURCHARGED	
25.001	18	17.096	0.746	0.000	1.16		52.7	SURCHARGED	
25.002	19	15.316	0.316	0.000	1.13		52.3	SURCHARGED	
25.003	20	14.055	0.105	0.000	0.57		84.0	SURCHARGED	
26.000	21	13.470	1.020	5.543	2.13		42.6	FLOOD	4
25.004	22	13.599	1.276	0.000	2.22		95.4	FLOOD RISK	
25.005	23	13.405	1.175	0.000	0.70		100.4	SURCHARGED	
25.006	24	13.138	1.938	0.000	0.84		84.3	SURCHARGED	
20.012	25	12.886	2.192	0.000	2.09		289.3	SURCHARGED	
27.000	26	18.018	1.219	18.458	1.18		52.8	FLOOD	6
27.001	27	14.376	0.576	0.000	0.87		55.0	SURCHARGED	
20.013	28	12.563	1.947	0.000	1.77		349.2	SURCHARGED	
28.000	29	13.268	0.493	0.000	1.14		119.0	SURCHARGED	
29.000	30	13.911	1.211	11.296	1.78		76.8	FLOOD	5
30.000	31	13.908	1.208	7.712	1.72		79.8	FLOOD	4
28.001	32	12.626	0.476	0.000	1.55		272.1	SURCHARGED	
20.014	33	12.205	1.709	0.000	2.33		568.6	SURCHARGED	
20.015	34	11.885	1.442	0.000	2.27		577.7	SURCHARGED	
20.016	35	11.536	1.161	0.000	2.38		606.7	SURCHARGED	
31.000	36	13.600	1.125	0.125	1.33		53.2	FLOOD	2
32.000	37	13.609	1.134	8.604	2.16		86.3	FLOOD	4
31.001	38	13.460	1.065	0.000	1.51		140.2	FLOOD RISK	
20.017	39	11.137	0.832	0.000	2.30		761.2	SURCHARGED	
33.000	40	12.229	0.954	0.000	0.89		63.6	FLOOD RISK	
33.001	41	11.847	1.072	0.000	1.27		60.8	FLOOD RISK	
33.002	42	11.661	1.027	0.000	2.21		75.2	SURCHARGED	
33.003	43	11.378	0.814	0.000	1.52		89.9	SURCHARGED	
20.018	44	10.769	0.524	0.000	2.90		850.6	SURCHARGED	
34.000	45	13.917	1.017	0.000	1.06		43.5	FLOOD RISK	
34.001	46	12.500	1.050	0.000	1.67		38.9	FLOOD RISK	
34.002	47	11.729	0.579	0.000	1.16		34.6	SURCHARGED	
34.003	48	11.657	0.547	0.000	0.70		47.4	SURCHARGED	
35.000	49	13.006	1.207	5.117	1.34		53.0	FLOOD	4
34.004	50	11.434	0.834	0.000	1.58		96.1	SURCHARGED	
34.005	51	11.286	0.721	0.000	0.73		102.5	SURCHARGED	
34.006	52	10.983	0.984	0.000	0.92		102.5	FLOOD RISK	
34.007	53	10.815	1.016	0.000	0.71		102.5	FLOOD RISK	
36.000	56	10.695	0.721	0.000	0.37		28.2	SURCHARGED	
36.001	57	10.606	1.207	6.140	2.45		73.1	FLOOD	6
34.008	58	10.603	1.234	2.813	1.31		140.4	FLOOD	3
34.009	59	10.522	1.222	22.239	0.88		144.0	FLOOD	5
37.000	60	12.697	0.897	0.000	2.11		38.9	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
37.001	61	11.912	0.312	0.000	1.36		66.1	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
37.002	62	15 Winter	100	+40%	100/15 Summer			
37.003	63	15 Winter	100	+40%	100/15 Summer			
38.000	64	15 Winter	100	+40%	100/15 Summer			
38.001	65	15 Winter	100	+40%	100/15 Summer			
37.004	66	15 Winter	100	+40%	100/15 Summer			
39.000	67	15 Winter	100	+40%	100/15 Summer			
37.005	68	15 Winter	100	+40%	100/15 Summer			
34.010	69	15 Winter	100	+40%	30/15 Summer			
40.000	70	15 Winter	100	+40%	30/15 Winter			
34.011	71	15 Winter	100	+40%	30/15 Summer			
34.012	72	15 Winter	100	+40%	30/15 Summer			
34.013	73	15 Winter	100	+40%	30/15 Summer			
34.014	74	15 Winter	100	+40%	30/15 Summer			
20.019	75	15 Winter	100	+40%	30/15 Summer			
41.000	76	30 Winter	100	+40%	1/30 Winter	100/15 Summer		
42.000	77	15 Winter	100	+40%	100/15 Summer			
41.001	78	15 Winter	100	+40%	1/15 Summer			
20.020	79	15 Winter	100	+40%	30/15 Summer			
20.021	80	15 Winter	100	+40%	30/15 Summer			
20.022	81	60 Winter	100	+40%			1/15 Summer	66
43.000	89	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
43.001	90	15 Winter	100	+40%	30/15 Summer			
43.002	91	15 Winter	100	+40%	30/15 Summer			
44.000	82	15 Winter	100	+40%				
44.001	83	15 Winter	100	+40%				
44.002	84	15 Winter	100	+40%	100/15 Summer			
44.003	85	15 Winter	100	+40%	100/15 Summer			
44.004	86	15 Winter	100	+40%	30/15 Summer			
45.000	87	15 Winter	100	+40%	30/15 Summer			
44.005	88	15 Winter	100	+40%	100/15 Summer			
43.003	92	15 Winter	100	+40%	100/15 Summer			
43.004	93	15 Winter	100	+40%	100/15 Summer			
43.005	94	15 Winter	100	+40%	30/15 Summer			
43.006	95	360 Winter	100	+40%				
43.007	96	360 Winter	100	+40%			100/30 Summer	20
43.008	97	360 Winter	100	+40%	30/120 Winter			
20.023	98	360 Winter	100	+40%				
20.024	99	360 Winter	100	+40%				
20.025	109	360 Winter	100	+40%	30/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
37.002	62	11.762	0.293	0.000	0.64		59.6	SURCHARGED	
37.003	63	11.554	0.754	0.000	1.00		54.4	SURCHARGED	
38.000	64	11.689	0.259	0.000	0.55		16.8	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
38.001	65	11.642	0.592	0.000	1.01		31.4	SURCHARGED	
37.004	66	11.402	0.767	0.000	1.38		97.9	SURCHARGED	
39.000	67	10.896	0.466	0.000	0.95		15.5	SURCHARGED	
37.005	68	10.853	0.583	0.000	0.57		99.5	SURCHARGED	
34.010	69	10.537	1.183	0.000	1.09		186.9	SURCHARGED	
40.000	70	10.563	0.678	0.000	0.28		10.1	SURCHARGED	
34.011	71	10.531	1.197	0.000	1.18		205.6	SURCHARGED	
34.012	72	10.522	1.209	0.000	1.15		194.8	SURCHARGED	
34.013	73	10.514	1.221	0.000	0.86		182.0	SURCHARGED	
34.014	74	10.507	1.228	0.000	0.62		179.1	SURCHARGED	
20.019	75	10.475	1.251	0.000	3.83		1004.6	SURCHARGED	
41.000	76	10.060	0.931	29.105	1.86		68.1	FLOOD	6
42.000	77	10.711	0.536	0.000	1.22		77.8	FLOOD RISK	
41.001	78	10.163	1.178	0.000	2.22		140.0	SURCHARGED	
20.020	79	10.056	0.857	0.000	4.30		1077.6	SURCHARGED	
20.021	80	9.571	0.393	0.000	2.77		1072.2	SURCHARGED	
20.022	81	9.132	0.000	0.000	1.08	525.2	499.4	OK	
43.000	89	12.255	1.205	4.855	2.39		39.3	FLOOD	4
43.001	90	12.319	1.440	0.000	1.12		50.5	FLOOD RISK	
43.002	91	12.245	1.505	0.000	1.73		64.9	FLOOD RISK	
44.000	82	21.528	-0.102	0.000	0.22		13.0	OK	
44.001	83	19.321	-0.079	0.000	0.46		23.4	OK	
44.002	84	18.857	0.706	0.000	0.95		41.2	SURCHARGED	
44.003	85	15.709	1.120	0.000	1.20		50.2	FLOOD RISK	
44.004	86	14.764	0.909	0.000	1.72		74.9	FLOOD RISK	
45.000	87	14.858	0.955	0.000	1.71		28.8	FLOOD RISK	
44.005	88	14.116	0.482	0.000	1.09		129.2	SURCHARGED	
43.003	92	11.832	1.202	0.000	1.25		215.1	SURCHARGED	
43.004	93	10.697	0.792	0.000	1.21		213.3	SURCHARGED	
43.005	94	9.771	0.516	0.000	1.12		211.8	SURCHARGED	
43.006	95	9.092	-0.969	0.000	0.13		46.0	OK	
43.007	96	9.091	-0.409	0.000	0.13	48.5	24.1	OK	
43.008	97	9.129	0.399	0.000	0.09		22.9	SURCHARGED	
20.023	98	9.066	-0.434	0.000	0.25		303.0	OK	
20.024	99	9.062	-0.438	0.000	0.06		102.8	OK	
20.025	109	9.046	0.591	0.000	0.29		92.1	SURCHARGED	

TECHNICAL NOTE

Hydraulic Calculations – 6 Homes with Flow Control

Online Controls for Transfer.txt

Hydro-Brake® Optimum Manhole: S6, DS/PN: 21.004, Volume (m³): 9.4

Unit Reference	MD-SHE-0087-5000-2450-5000
Design Head (m)	2.450
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	87
Invert Level (m)	15.600
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.450	5.0
Flush-Flo™	0.379	3.7
Kick-Flo®	0.779	2.9
Mean Flow over Head Range	-	3.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	1.200	3.6	3.000	5.5	7.000	8.2
0.200	3.4	1.400	3.8	3.500	5.9	7.500	8.5
0.300	3.6	1.600	4.1	4.000	6.3	8.000	8.7
0.400	3.7	1.800	4.3	4.500	6.6	8.500	9.0
0.500	3.6	2.000	4.5	5.000	7.0	9.000	9.2
0.600	3.5	2.200	4.7	5.500	7.3	9.500	9.5
0.800	3.0	2.400	4.9	6.000	7.6		
1.000	3.3	2.600	5.1	6.500	7.9		

Orifice Manhole: S7, DS/PN: 20.008, Volume (m³): 2.0

Diameter (m) 0.193 Discharge Coefficient 0.600 Invert Level (m) 15.436

Storage Structures for Transfer.txt

Cellular Storage Manhole: S6, DS/PN: 21.004

Invert Level (m) 15.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.96
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	12.8	0.0	1.321	0.0	0.0
1.320	12.8	0.0			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
21.000	S1	15 Winter	1	+0%	100/15 Summer				17.253
21.001	S2	15 Winter	1	+0%	100/15 Summer				17.087
21.002	S3	15 Winter	1	+0%	100/15 Winter				16.442
21.003	S4	15 Winter	1	+0%	100/15 Summer				16.041
22.000	S5	30 Winter	1	+0%	30/15 Summer				15.921
21.004	S6	30 Winter	1	+0%	1/15 Summer				15.921
20.008	S7	15 Winter	1	+0%	1/15 Summer				15.737

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
21.000	S1	-0.110	0.000	0.16		2.6	OK	
21.001	S2	-0.095	0.000	0.29		4.7	OK	
21.002	S3	-0.579	0.000	0.01		4.8	OK	
21.003	S4	-0.559	0.000	0.01		9.0	OK	
22.000	S5	-0.346	0.000	0.01		1.8	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
21.004	S6	0.171	0.000	0.20		3.7	SURCHARGED	
20.008	S7	0.076	0.000	0.41		34.9	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
21.000	S1	15 Winter	30	+0%	100/15 Summer				17.278
21.001	S2	15 Winter	30	+0%	100/15 Summer				17.134
21.002	S3	60 Winter	30	+0%	100/15 Winter				16.521
21.003	S4	60 Winter	30	+0%	100/15 Summer				16.521
22.000	S5	60 Winter	30	+0%	30/15 Summer				16.521
21.004	S6	60 Winter	30	+0%	1/15 Summer				16.521
20.008	S7	15 Winter	30	+0%	1/15 Summer				16.248

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
21.000	S1	-0.085	0.000	0.39		6.4	OK	
21.001	S2	-0.048	0.000	0.80		13.1	OK	
21.002	S3	-0.500	0.000	0.01		6.7	OK	
21.003	S4	-0.079	0.000	0.02		11.9	OK	
22.000	S5	0.254	0.000	0.01		3.3	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
21.004	S6	0.771	0.000	0.20		3.7	SURCHARGED	
20.008	S7	0.587	0.000	0.77		65.8	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
21.000	S1	120 Winter	100	+40%	100/15 Summer				18.035
21.001	S2	120 Winter	100	+40%	100/15 Summer				18.032
21.002	S3	120 Winter	100	+40%	100/15 Winter				18.025
21.003	S4	120 Winter	100	+40%	100/15 Summer				18.025
22.000	S5	120 Winter	100	+40%	30/15 Summer				18.025
21.004	S6	120 Winter	100	+40%	1/15 Summer				18.025
20.008	S7	15 Winter	100	+40%	1/15 Summer				16.747

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
21.000	S1	0.672	0.000	0.22		3.7	SURCHARGED	
21.001	S2	0.850	0.000	0.47		7.7	SURCHARGED	
21.002	S3	1.004	0.000	0.01		7.0	SURCHARGED	
21.003	S4	1.425	0.000	0.01		9.4	SURCHARGED	
22.000	S5	1.758	0.000	0.01		3.8	FLOOD RISK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Transfer.txt

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
21.004	S6	2.275	0.000	0.27		4.9	FLOOD RISK	
20.008	S7	1.086	0.000	1.00		85.7	FLOOD RISK	