



Land South of Funtley Road,
Funtley

Drainage Strategy

For

Reside Developments Limited

Document Control Sheet

Land South of Funtley Road,
Funtley
Reside Developments Limited

This document has been issued and amended as follows:

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1.0 Introduction

- 1.1 Motion has been commissioned by Reside Developments Limited (Reside) to prepare this Drainage Strategy for a reserved matters application for an area of land south of Funtley Road, Funtley. It presents information about the Drainage Strategy for a Reserved Matters Planning Application following the Outline Approval for 125 dwellings (ref: P/20/1168/OA).
- 1.2 The site is a greenfield site located south of the existing village of Funtley and is approximately 6.08 hectares. The site is bounded by a mobile home park to the north and residential properties to the west, forming the edge of the Funtley settlement. To the east and south of the site is predominantly countryside, with the M27 motorway located approximately 250m south of the development site. A site location plan is included in **Appendix A**.
- 1.3 This Drainage Strategy document supports the Reserved Matters Planning Application for the provision of 125 new affordable dwellings in Fareham. The proposed development illustrative Site Plan is included in **Appendix B**.
- 1.4 The Drainage Strategy builds on the work prepared by Motion for Fareham Borough Council planning application Ref P/20/1168/OA (Flood Risk Assessment and Drainage Strategy referenced 1912032/1rdfun and dated 02/10/20) and provides a more detailed analysis of the site with respect to the foul and surface water drainage.
- 1.5 The Lead Local Flood Authority raised no objections to the planning application Ref P/20/1168/OA subject to conditions. Planning Conditions 7 and 8 from the Appeal Decision referenced 2022APP/A1720/W/21/3283643 and dated 31 May 2022 relate to site drainage and are addressed in this report. The wording of Planning Conditions 7 and 8 are as follows.

Condition 7

No development hereby permitted shall commence until a surface water drainage strategy has been submitted to and approved in writing by the local planning authority. The strategy shall include the following elements:

- a) *Full details of the means of surface water drainage from the site including:*
 - i) *A technical summary highlighting any changes to the design from that within the approved Flood Risk Assessment;*
 - ii) *Detailed drainage layout drawings at an identified scale indicating catchment areas, referenced drainage features, manhole covers and invert levels and pipe diameters, lengths and gradients;*
 - iii) *Detailed hydraulic calculations for all rainfall events, including those listed below. The hydraulic calculations should take into account the connectivity of the entire drainage features including the discharge location. The results should include design and simulation criteria, network design and results tables, manhole schedule tables and summary of critical results by maximum level during the 1 in 1, 1 in 30 and 1 in 100 (plus an allowance for climate change) rainfall events. The drainage features should have the same reference as the submitted drainage layout; and,*
 - iv) *Exceedance plans demonstrating the flow paths and areas of ponding in the event of blockages or storms exceeding design criteria.*
- b) *The detailed design of Sustainable Urban Drainage Systems (SUDS) to be used on the site as well as details on the delivery, long term maintenance and adoption of SUDS features.*

- c) *An assessment of the condition of the existing watercourse which will take surface water from the development site and, if necessary, detailed proposals to improve its condition through reparation, remediation, restitution and replacement as necessary.*
- d) *An assessment of surface water drainage discharge from the site in combination with the development site to the north of Funtley Road (planning application reference P/17/1135/OA) to demonstrate that:*
 - i) *The greenfield runoff rate will not exceed 13.1 l/s during the 1:100 year storm + (40%CC); and,*
 - ii) *The surface water discharged to the Funtley Road ditch will comply with CIRIA C753 2015 Table 26.2 & Table 26.3.*

The development shall be carried out in accordance with the approved details and provided before any dwelling or the local shop community building they serve is first occupied and surface water drainage arrangements shall be retained and kept available for use at all times.

Condition 8

No development hereby permitted shall commence until details of the means of foul water drainage from the site have been submitted to and approved in writing by the local planning authority. The development shall be carried out in accordance with the approved details and completed in full prior to the occupation of the first dwelling or local shop / community building hereby permitted.

- 1.6 This FRA and drainage strategy follows the guidance set out in:
 - ▶ The National Planning Policy Framework (NPPF)
 - ▶ Technical Guidance to the National Planning Policy Framework
 - ▶ CIRIA SuDS Manual 2015 (C753)
 - ▶ Environment Agency Rainfall Runoff Management for Developments.
- 1.7 This drainage strategy report pertains only to the design of the drainage system for the built site. It does not provide details of how the site will be drained during the construction phase. This is considered to be temporary works and can only be prescribed and provided by the eventual appointed contractor.
- 1.8 Similarly, this report does not provide information on how the drainage infrastructure will be protected during the construction phase of the project. The provision of this information will be the responsibility of the appointed contractor.

2.0 Condition 7 Surface Water Drainage

a) i. A technical summary highlighting any changes to the design from that within the approved Flood Risk Assessment

- 2.1 The approved Flood Risk Assessment (Flood Risk Assessment and Drainage Strategy referenced 1912032/1rdfun and dated 02/10/20) contained a Drainage Strategy Plan that proposed a controlled discharge from the site of 24.2 l/s and states 'The proposed discharge rates for the whole of the catchment draining to Funtley Road were set out in the FRA prepared for the previous scheme and it is proposed to keep the total discharge from the site to the previously agreed QBAR rate of 46.9l/s. The catchment area draining to the ditch on Funtley Road is 11.8ha and this equates to 3.97 l/s/ha'. The approved Flood Risk Assessment also states 'The total area of the site is 15.98ha but the net developable area of site is 6.09ha. Therefore, it is proposed to use 24.2l/s as the allowable discharge rate from the developable area and 22.7l/s from the Community Park'.
- 2.2 However, it is noted that item d) i. of condition 7 requires the greenfield runoff rate will not exceed 13.1 l/s during the 1 in 100 year storm +(40%CC) 'in combination with the development site to the north of Funtley Road (planning application reference P/17/1135/OA)'. Appendix G of the approved Flood Risk Assessment shows that 13.1 is QBAR based on an area of 3.3ha (**Appendix B**).
- 2.3 Reference to the Surface Water Drainage Strategy Technical Note¹ for the development site to the north of Funtley Road (planning application reference P/17/1135/OA) proposed a surface water discharge rate of 3.8 l/s for the 1 in 100 year storm + (40%CC). Therefore, the allowable discharge rate for the Site is calculated as follows:
- $$13.1 \text{ l/s} - 3.8 \text{ l/s} = 9.3 \text{ l/s}$$
- 2.4 On the above basis, 9.3 l/s is available for Land South of Funtley Road, and discharge from the proposed 2.19ha impermeable area has been controlled based on 9.3 l/s for up to the 1 in 100 year storm +(45%CC).
- 2.5 Section 5.15 of the approved Flood Risk Assessment states 'In order to attenuate the additional surface water from the development it is proposed to have swales, three ponds and a combination of permeable paving and attenuation tanks. The proposed drainage strategy is to have two pond towards the centre of the site, one has a storage volume of 300m³ and the other 720m³. The internal roads will have permeable paving will have 30% voids and will be 300mm deep and will provide a storage volume of 405m³. There will also be a series of swales which run along the north boundary of the site which provides a storage of 1400m³ and a pond which will provide a storage volume of 580m³. There will also be an attenuation tank to the north which will be 0.5m deep and a volume of 110m³. The SuDS features will also improve water quality onsite as the pond will act as a sedimentation process and the permeable paving will act as a filtration process'.
- 2.6 Based on the updated MicroDrainage network calculations that have been prepared for a proposed 2.19ha impermeable area with 9.3 restriction l/s during the 1 in 100 year storm +(45%CC), the attenuation storage estimated to be required is approximately 2,670m³.
- 2.7 The approved Flood Risk Assessment also stated 'At the location of the attenuation tank ground levels need to be raised by approximately 500mm to there is sufficient cover'. As part of the reserved matters application, ground levels have been raised by approximately 1000mm in this location.
- 2.8 Lastly, the approved Flood Risk Assessment stated 'The runoff from the Country Park area above the development will be captured by a cut-off drain and the restricted to the Qbar rate of 22.7l/s. Storage will be provided on the southern boundary of the development to cater for the 1 in 100 year event with an additional allowance of 40% for climate change. The flow from the southern storage areas will be

¹ JUDWAA CONSULTING LTD, Technical Note, Surface Water Drainage Strategy, Dated 19 July 2019

directed along the western boundary of the site in a swale and will outfall into the existing drainage system in Funtley Road’.

- 2.9 Cut-off drains (swales) are still proposed in the form of shallow swales. However, as the gradient is steep in this location and there is difficulty running surface or below ground drainage along the western boundary due to levels and root protection zones, runoff from the country park will be collected by the swales located on the southern boundary, which are then connected to the central swales and attenuation basin system.
- 2.10 Guidance from Innovzye on runoff coefficients from different surfaces² provides a recommended runoff coefficient of 0.18 – 0.22 for heavy soils with Average (2-7%) slopes, and a multiplied frequency adjustment of 1.25 for the 1 in 100-year storm. With this in mind, a runoff coefficient of 0.25 has been selected, resulting in an estimated additional country park catchment area of around 0.616ha.
- 2.11 Only around 28% of the proposed development impermeable area will discharge to the central attenuation basin (28%/0.621ha). Therefore this basin will have around 400mm freeboard in the 1 in 100 year storm +(45%CC) critical event to accommodate the additional country park runoff.
- 2.12 In line with the approved Flood Risk Assessment, the central attenuation basin flow control (S49) will have a high level overflow, for the runoff from the Country Park, sized for a maximum discharge rate of 22.7 l/s that discharges to the outfall.
- 2.13 With reference to Motion drawing numbers 2108033-0501-D [Drainage Strategy] and 2108033-0501-B [Surface Water Drainage Exceedance Routing] in **Appendix C**, the pervious pavements will be constructed as Type C No Infiltration Pervious Pavements, and the top surface of the pervious pavement should finish at least 150mm below any adjoining DPC level.
- 2.14 Adjacent areas of hardstanding will comply with building regulations and divert water away from the proposed dwellings. The proposed dwellings will have Finished Floor Levels (FFLs) a minimum of 150mm above adjacent external ground levels.

a) ii. Detailed drainage layout drawings at an identified scale indicating catchment areas, referenced drainage features, manhole covers and invert levels and pipe diameters, lengths and gradients

Motion drawing numbers 2108033-0501-D [Drainage Strategy] and 2108033-0501-B [Surface Water Drainage Exceedance Routing] are included in **Appendix C**.

Appendix B a) iii. Detailed hydraulic calculations for all rainfall events, including those listed below. The hydraulic calculations should take into account the connectivity of the entire drainage features including the discharge location. The results should include design and simulation criteria, network design and result tables, manhole schedule tables and summary of critical result by maximum level during the 1 in 1, 1 in 30 and 1 in 100 (plus an allowance for climate change) rainfall events.

- 2.15 Hydraulic calculations are included in **Appendix D**.

²

<https://help.innovzye.com/space/infosewer/17467264/Runoff+Coefficient#:~:text=Runoff%20coefficient%20is%20loosely%20defined,ranges%20between%200.0%20and%201.0>

a) iv. Exceedance plans demonstrating the flow paths and areas of ponding in the event of blockages or storms exceeding design criteria.

2.16 Motion drawing number 2108033-0501-B [Surface Water Drainage Exceedance Routing] is included in **Appendix C**.

b) The detailed design of Sustainable Urban Drainage Systems (SUDS) to be used on the site as well as details on the delivery, long term maintenance and adoption of SUDS features.

2.17 In addition to above, a Drainage Management and Maintenance Plan has been prepared, which sets out the principles for the long-term management and maintenance of the proposed surface water drainage system on the development. The Drainage Management and Maintenance Plan can be seen in **Appendix E**.

c) An assessment of the condition of the existing watercourse which will take surface water from the development site and, if necessary, detailed proposals to improve its condition through reparation, remediation, restitution and replacement as necessary.

2.18 The Flood Risk Assessment and Drainage Strategy³ available to view on the Fareham Borough Council planning portal for P/180067/OA states a 'drainage survey has been carried out to determine where the surface water flows once it reaches the north boundary – with Funtley Road. Appendix B shows 2 drawings prepared by Cadmap. These show a shallow ditch that stops some distance from the NW corner, discharging into a 300mm riparian culvert. This continues west and then crosses the road. This continues westwards under the railway embankment'. This detail is included on Motion drawing numbers 2108033-0501-D [Drainage Strategy] included in **Appendix C**.

2.19 A site visit was undertaken by Motion on the 8th November 2023 for the purpose of inspecting the ditch running along the south side of Funtley Road on the north site boundary, and the downstream riparian culverts, as described in Para 2.16 above. The weather conditions at the time of the visit was wet, with sporadic heavy rain showers. It was noted that recent maintenance work had been undertaken on the ditch, including the removal of vegetation, and the ditch was running well with flows unimpeded. The ditch is shown on Photograph 1 below.

³ Gta Civils, Flood Risk Assessment and Drainage Strategy, Job No: 6390C, Date: Jan 2018



Photograph 1: Maintained ditch on Funtley Road.

- 2.20 An inspection of the culvert and headwall located at the downstream end of the ditch, revealed that the entrance to the culvert was submerged. It was considered that the cause could be due to the heavy rainfall on this day, and the build-up of water in the ditch is caused by the restriction of the downstream 300mm culvert with water being temporarily stored within the ditch. It is however possible that it could also indicate a restriction or a blockage in the downstream culvert. Photograph 2 below show the location of the headwall and 300mm diameter culvert.



Photograph 2: Submerged 300mm diameter culvert and headwall.

- 2.21 Downstream of the ditch the 300mm riparian culvert continues in the verge west and then crosses the road and continues westwards under the railway embankment. Downstream of the railway bridge the culvert discharges into a ditch system. The outfall of the culvert to this ditch system was observed to be clear and freely flowing. Photograph 3 below shows the culvert outfall.



Photograph 3: Culvert outfall to ditch system to the west of the railway bridge.

- 2.22 It was confirmed at the site visit that the system of 300mm culverts downstream appeared to be in good condition and were operating well in wet conditions. The 300mm culvert and headwall at the downstream end of the ditch along the Funtley Road site boundary being submerged could indicate either, normal operation of the ditch where water is temporarily stored due to the restriction of the downstream 300mm culvert, or it could indicate an issue with the downstream pipework up to a point where it crossed Funtley Road. Downstream of the crossing of Funtley Road the outfall to the ditch to the west of the railway bridge was observed to be free flowing (photograph 3).
- 2.23 The repair, remediation, restitution and replacement works to the existing watercourse that takes surface water from the development site, is proposed as follows.
- ▶ Clearing a section of the Funtley Road ditch of silt down to a solid bed layer from a point 4m upstream of the inlet of the 300mm riparian culvert to reveal the headwall and pipe.
 - ▶ Cleaning, jetting and silt removal of the 300mm culvert from the ditch headwall west to the point where it crosses Funtley Road, including the road crossing and undertaking a CCTV survey of this length of culvert to assess its condition.
- 2.24 The CCTV survey will be issued to Fareham Borough Council. The developer will also engage with Fareham Borough Council if the CCTV survey of the culverts, up to and including the crossing of Funtley Road, reveals any major defects that require correcting, in order to agree any appropriate repair, remediation, restitution and replacement works that are necessary.

d) An assessment of surface water drainage discharge from the site in combination with the development site to the north of Funtley Road (planning application reference P/17/1135/OA) to demonstrate that:

i. the greenfield runoff rate will not exceed 13.1 l/s during the 1 in 100 year storm +(40%CC)

- 2.25 Reference to the Surface Water Drainage Strategy Technical Note⁴ for the development site to the north of Funtley Road (planning application reference P/17/1135/OA) proposed a surface water discharge rate of 3.8 l/s for the 1 in 100 year storm + (40%CC).
- 2.26 On the above basis, 9.3 l/s is available for Land South of Funtley Road, and discharge from the proposed 2.19ha impermeable area has been controlled based on 9.3 l/s for up to the 1 in 100 year storm +(40%CC). The hydraulic modelling for the development site shows that for the 1 in 100 year storm + (45% climate change) the discharge rate does not exceed 9.3 l/s.

d) An assessment of surface water drainage discharge from the site in combination with the development site to the north of Funtley Road (planning application reference P/17/1135/OA) to demonstrate that:

ii. the surface water discharged to the Funtley Road ditch will comply with CIRIA C753 2015 Table 26.2 & Table 26.3

- 2.27 The NPPF states that the development should not have a detrimental impact on the environment, including the water environment. The technical guidance to the NPPF provides further advice on the benefits of ensuring runoff quality is to an appropriate standard.
- 2.28 The CIRIA SuDS Manual provides guidance on the treatment of surface water runoff. With regards to the proposed development, Table 4.3 of the CIRIA SuDS Manual rates the pollution hazard from roof water runoff as 'very low'. The only requirement for roof water runoff is the removal of gross solids and sediments, which would be achieved using catchpits and silt traps upstream of the pervious pavements and open SuDS.
- 2.29 With regards to the driveways, private drives, shared surfaces and main access, Table 4.3 of the CIRIA SuDS Manual rates the pollution hazard from low traffic roads as 'low'. To mitigate a 'low' pollution hazard, the CIRIA SuDS Manual recommends using a simple index approach in line with Section 26.7.1. This is discussed, below.
- 2.30 Table 26.2 of the CIRIA SuDS Manual provides pollution hazard indices for different land use classifications. The land use classification that requires consideration for the roads, streets and parking on the site is in Table 2.1 below.

Table 2.1: Excerpt from Table 26.2 of CIRIA SuDS Manual

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
Individual property driveways, residential car parks, low traffic roads (e.g. cul-de-sacs, homezones and general access roads) with less than 300 traffic movements per day.	Low	0.5	0.4	0.4

⁴ JUDWAA CONSULTING LTD, Technical Note, Surface Water Drainage Strategy, Dated 19 July 2019

- 2.31 To deliver adequate pollution treatment and mitigation, the CIRIA SuDS Manual recommends using a SuDS component that has a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type).
- 2.32 Table 26.3 of the CIRIA SuDS Manual provides indicative SuDS mitigation indices for each SuDS type when discharging to surface water. Table 2.2, below, which is an excerpt from Table 26.3, shows the mitigation index for swales.

Table 2.2: Pollution Mitigation Indices for Swales

Type of pollution removal component	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
Swale	0.5	0.6	0.6

- 2.33 The mitigation indices for a swale meet or exceed those of the highest pollution hazard index figures from Table 9.1.
- 2.34 The site’s vehicle entrance - that will experience the most traffic movements per day - will drain through an attenuation basin and three swales prior to outfalling to the roadside ditch, thus surface water will pass through two mitigation components. Where two mitigation components are used in series, the SuDS manual states that:

$$\text{Total SuDS mitigation index} = \text{mitigation index (component one)} + 0.5 \text{ mitigation index (component two)}$$

- 2.35 Thus, the SuDS basin will provide the below further mitigation indices in Table 2.3 for the site’s vehicle entrance:

Table 2.3: Pollution Mitigation Indices for Secondary SuDS Feature

Type of pollution removal component	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
Detention Basin	0.25 (0.5 ÷ 2)	0.25 (0.6 ÷ 2)	0.3 (0.6 ÷ 2)

- 2.36 And the total mitigation indices for the site is as per Table 9.4:

Table 2.4: Total Pollution Mitigation Offered by the Swale and the Online SuDS Basin:

Contaminant Type	Pollution Hazard Index	Pollution Mitigation Index	Difference
Total Suspended Solids	0.5	0.75 (0.5 + 0.25)	+ 0.25
Metals	0.4	0.85 (0.6 + 0.25)	+ 0.45
Hydrocarbons	0.4	0.90 (0.6 + 0.3)	+ 0.50

- 2.37 The above evidence shows how the swales may be constructed to provide sufficient pollution mitigation on their own, but with the online SuDS basin upstream of the swales, they combine to ensure all pollution hazards are completely mitigated prior to discharge to the roadside ditch.

3.0 Condition 8 Foul Water Drainage

- 3.1 It is proposed that foul drainage from the site connects by gravity to the closest available foul sewer in Roebuck Avenue (Existing Foul Water manhole 9302).
- 3.2 A capacity check was lodged with Southern Water and the response is included in **Appendix F**. At the time of the enquiry the calculated foul sewer design flow from the proposed development was estimated to be 1.14 l/s based on the Southern Water Developer Services Calculation Spreadsheet V1.1 15th January 2018.
- 3.3 The letter in **Appendix F** states that Southern Water will aim to provide capacity for the development to connect to manhole reference SU55089302 within 24 months following the date that planning has been granted for development.
- 3.4 Motion sought clarification from Southern Water on what the next steps were with regards to the requested investigation to confirm the Roebuck Avenue Funtley WPS pump can accommodate the flows without causing detriment. The Southern Water email response in **Appendix F** states 'The outcome is that we have capacity to provide for this development at the WPS'.

4.0 Surface Water Drainage Strategy

4.1 Table 4.1 below provides a summary of the changes to the surface water drainage.

Table 4.1 – Summary of Changes to the Surface Water Drainage Strategy

Flood Risk Assessment and Drainage Strategy referenced 1912032/1rdfun and dated 02/10/20	Motion Drainage Strategy November 2023
Drainage Strategy Plan (Appendix H) that proposed a controlled discharge from the site of 24.2 l/s.	Item d) i. of condition 7 requires the greenfield runoff rate will not exceed 13.1 l/s during the 1 in 100 year storm +(40%CC) 'in combination with the development site to the north of Funtley Road (planning application reference P/17/1135/OA)'. 9.3 l/s is available for Land South of Funtley Road, and discharge from the proposed 2.19ha impermeable area has been controlled based on 9.3 l/s for up to the 1 in 100 year storm +(45%CC).
Section 5.15 of the approved drainage strategy states 'In order to attenuate the additional surface water from the development it is proposed to have swales, three ponds and a combination of permeable paving and attenuation tanks. The proposed drainage strategy is to have two pond towards the centre of the site, one has a storage volume of 300m ³ and the other 720m ³ . The internal roads will have permeable paving will have 30% voids and will be 300mm deep and will provide a storage volume of 405m ³ . There will also be a series of swales which run along the north boundary of the site which provides a storage of 1400m ³ and a pond which will provide a storage volume of 580m ³ . There will also be an attenuation tank to the north which will be 0.5m deep and a volume of 110m ³ . The SuDS features will also improve water quality onsite as the pond will act as a sedimentation process and the permeable paving will act as a filtration process'.	Based on MicroDrainage network calculations that have been prepared for a proposed 2.19ha impermeable area with a 9.3 restriction l/s during the 1 in 100 year storm +(45%CC), the attenuation storage estimated to be required is approximately 2,670m ³ .
The approved Flood Risk Assessment also stated 'At the location of the attenuation tank ground levels need to be raised by approximately 500mm to there is sufficient cover'	As part of the reserved matters application, ground levels have been raised by approximately 1000mm in this location.
Section 8.8 'proposed to use 24.2l/s as the allowable discharge rate from the developable area and 22.7l/s from the Community Park'	The central attenuation basin flow control (S49) will have a high level overflow sized for a maximum discharge rate of 22.7 l/s that discharges to outfall.

4.2 With reference to the Greenfield Runoff Rate Estimation for the Proposed Impermeable Area in **Appendix B**, surface water discharge rates will not exceed QBAR (9.3 l/s) for all rainfall events up to and including those with a 1 in 100 (+45% for climate change) annual probability of occurrence. Evidence of this in the form of the Drainage Strategy drawings and hydraulic calculations are included in **Appendix C** and **Appendix D**.

4.3 Table 4.2 below provides a summary of the existing greenfield runoff rates and the proposed impermeable area discharge rates for the relevant return periods.

Table 4.2 – Surface Water Discharge Rates –Proposed Impermeable Area

Return Period	QBAR	1 in 30 + 40% CC	1 in 100 + 45% CC
Greenfield Runoff Rate (l/s)	8.7	-	-

Proposed Impermeable Area Discharge Rate (l/s)	9.3	9.3	9.3
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- 4.4 The drainage strategy drawings and hydraulic calculations included in **Appendix C** and **Appendix D** represent a more detailed assessment of the required Surface Drainage and SuDS, with reference to the site levels. For example, while the areas of the open SuDS have remained the same, a more detailed assessment of the site levels has reduced the available capacity. Therefore, additional pervious pavements and below ground geocellular attenuation storage has been provided.
- 4.5 All the driveways, private drives, shared surfaces will be constructed as pervious pavements. The Interpave document Guide to the Design, Construction and Maintenance of Concrete Block Permeable Pavements edition 6 states 'Concrete block permeable pavements reduce the volume of rainfall that flows out from them significantly and the time it takes for the water to flow out is much longer than for conventional drainage systems. Studies reported in CIRIA report C 582 (CIRIA, 2001) have shown that some 11% to 45% of rainfall flows out from the pavement during a rainfall event. Subsequently over the 2 to 4 days after an event, more water flows out to give a total outfall of between 55% and 100%'. On this basis, it is concluded that the long-term storage volumes provided by the 0.70ha area of proposed pervious pavements are likely to be more than what is indicated by the half drain times in the hydraulic calculations, and volumetric runoff coefficients of 0.75 and 0.84 for the summer and winter scenarios have been used in the model to more accurately reflect this.
- 4.6 It is noted Condition 7 d) i. states 'during the 1 in 100 year storm +(40%CC)'. Hydraulic calculations have been provided for 45%CC in **Appendix D**.
- 4.7 When not including a proportion of the country park as part of the catchment, the attenuation basin and swale network along the northern site boundary show flooding at a single location, and the central attenuation basin provides around 400mm freeboard for the critical 1 in 100 +45% for climate change rainfall event. This freeboard is provided as a precautionary safety measure against additional rainfall runoff from the country park.
- 4.8 The SuDS have been located to integrate with and not compromise the function of the natural drainage systems and will also receive exceedance flows.
- 4.9 When including a proportion of the country park as part of the catchment, there is still negligible flooding for the critical 1 in 100 +45% for climate change rainfall event, as the modelled overflow provides an additional discharge rate of 20.0l/s.
- 4.10 A sensitivity test has been undertaken to assess the impact of urban creep on the drainage system based on discharge being controlled at 9.3 l/s for up to the 1 in 100 year storm +(45%CC). The test shows an additional overflow rate of 20.01l/s and 191m³ flooding predominantly from the open SuDS if an additional 10% development catchment area is added. It is estimated the proposed cut-off drains (swales) not included in the model will intercept and store around 103m³ of this flooding. The development will be unaffected by the remainder, with excess flooding managed in the open SuDS and associated soft landscaping areas.
- 4.11 Whilst the drainage strategy for the site has been designed to current standards, there would remain a small residual risk of flooding due to blockage or failure of on-site infrastructure in the future. Therefore, appropriate and regular maintenance of the drainage infrastructure should be undertaken by the site management company or their agents (and the residents, where applicable).
- 4.12 To assist with this process, a Drainage Management and Maintenance Plan has been prepared, which sets out the principles for the long-term management and maintenance of the proposed surface water drainage system on the development. The Drainage Management and Maintenance Plan can be seen in **Appendix E**.

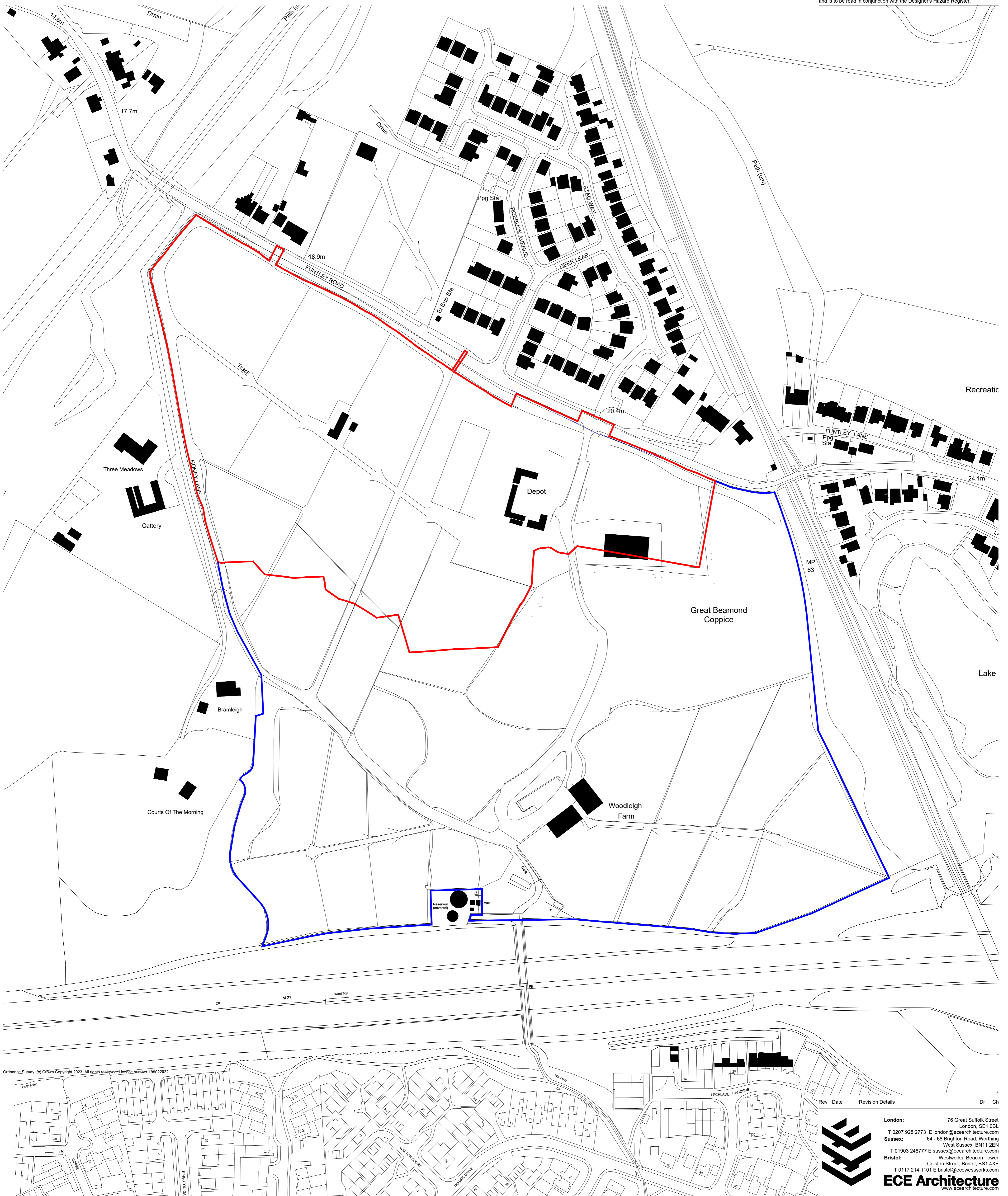
- 4.13 The purpose of this document is to ensure that those responsible for site maintenance have a robust inspection and maintenance plan going forwards. This will help ensure the optimum operation of the surface water drainage system and that it will be regularly maintained for the lifetime of the development. This will contribute to reducing the risk of surface water flooding both on and off-site.

5.0 Conclusions

- 5.1 This drainage strategy presents information for a Reserved Matters Planning Application following the Outline Approval for 125 dwellings (ref: P/20/1168/OA).
- 5.2 Notwithstanding that areas of proposed hardstanding will be designed to comply with building regulations and divert water away from the proposed buildings, it is a requirement of the strategy that site levels integrate with and not compromise the function of the natural drainage systems; 0.70ha of hard landscaping areas will be constructed as pervious; and the overall SuDS system will have capacity that can accommodate rainfall for the 100 year + 45% allowance for climate change critical event with negligible flooding.
- 5.3 The drainage strategy will use permeable pavements, shallow geocellular attenuation storage and open SuDS in the form of detention basins and swales for the attenuation of surface water runoff from the development. Flow control chambers to control discharge to the Funtley Road ditch are incorporated into the design, as is a high level overflow, for the runoff from the Country Park, designed for a maximum gravity discharge rate of 22.7 l/s.
- 5.4 The results of the hydraulic modelling show that the drainage strategy can attenuate and discharge surface water generated in the 1 in 100-year + 45% cc critical rainfall event with negligible flooding. This manages flood risk on and off-site and reduces overall local flood risk.
- 5.5 A sensitivity test has been undertaken to assess the impact of urban creep on the drainage system based on discharge being controlled at 9.3 l/s for up to the 1 in 100 year storm +(45%CC). The test shows an additional overflow rate of 20.01l/s and 191m³ flooding predominantly from the open SuDS if an additional 10% development catchment area is added. It is estimated the proposed cut-off drains (swales) not included in the model will intercept and store around 103m³ of this flooding. The development will be unaffected by the remainder, with excess flooding managed in the open SuDS and associated soft landscaping areas.
- 5.6 It is proposed that foul drainage from the site connects by gravity to the closest available foul sewer in Roebuck Avenue (Existing Foul Water manhole 9302). Southern Water have stated that they will aim to provide capacity for the development to connect to manhole reference SU55089302 within 24 months following the date that planning has been granted for development.
- 5.7 The proposed surface water drainage strategy is also able to mitigate all pollution hazards created on site using SuDS features and no further pollution mitigation is needed.
- 5.8 Residual risk has been addressed through the development of a drainage management and maintenance plan that provides a framework through which the site's drainage system should be managed in perpetuity.
- 5.9 In conclusion, this report presents information about the Detailed Drainage Strategy for a reserved matters application for the provision of 125 new affordable dwellings. The strategy has been demonstrated to meet the requirements of the Flood Risk Assessment approved as part of the outline planning permission, the Lead Local Flood Authority (LLFA) and NPPF.

Appendix A

Site Location Plan



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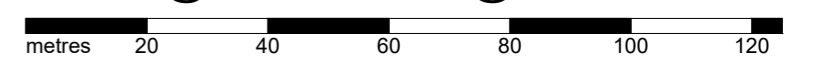
Rev	Date	Revision Details	Dr	Ch

London: 76 Great Suffolk Street, London, SE1 0BL
 T 0207 928 2773 E london@ecearchitecture.com
 Sussex: 64 - 68 Brighton Road, Worthing, West Sussex, BN11 2EN
 T 01903 248777 E sussex@ecearchitecture.com
 Bristol: Westworks, Beacon Tower, Colston Street, Bristol, BS1 4XE
 T 0117 214 1101 E bristol@eceworks.com
ECE Architecture
 www.ecearchitecture.com

Client's Name
Reside Developments & Hampshire Homes
 Job Title
Land at Funtley Road, Funtley

Drawing Title
Location Plan

Scale
1:1250 @ A1 / 1:2500 @ A3



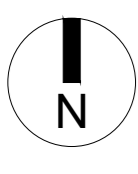
Drawn	Checked	Date
KE	PF	03.11.23

Job No	Drawing No	Rev
7365	PL-01	

Status
PRELIMINARY

Appendix B

Proposed Site Layout



CDM 2015 Health & Safety Information

- This information relates only to 'Significant Hazards' identified on this drawing and is to be read in conjunction with the Designer's Hazard Register.
- 1) Conflict between construction traffic / work and pedestrians, cyclists and vehicles using Funtley Road
 - 2) All site boundaries to be suitably fenced and provided with warning signage during construction works
 - 3) All retained trees should be protected at all times in accordance with British Standards regarding tree and construction
 - 4) Existing overhead cables to be protected with proposed diversion agreed with authorities. Suitable fencing and offsets to be established during construction stage
 - 5) All underground services and structures should be identified and surveyed prior to any on-site works with these clearly marked on the ground
 - 6) Assessment of existing drainage ditch and condition of sidings to be reviewed and protected and secured during construction works to avoid contamination or damage
 - 7) New site drainage and bathroom works to facilitate development to be carried out by suitable highways contractor with risk assessments
 - 8) New sub-station to be located and secured with design and specification undertaken by suitable specialist
 - 9) New attention barriers to be protected with secure line during both construction and occupation stage
 - 10) Existing Farm Buildings, due to be removed to accommodate site access. Work to be carried out by competent demolition contractor with strategy prepared prior to works.

Residential Accommodation Schedule

10no. 1-Bed House	
35no. 2-Bed Houses	
23no. 3-Bed / 4 person Houses	
36no. 3-Bed / 5 person Houses	
15no. 4-Bed Houses	
6no. 3 / 4-Bed Custom Build Houses	
Total	125 Dwellings
Car Parking	1 space per 1 bed dwelling 2 spaces per 2, 3 & 4 dwellings 25 Visitors spaces throughout site
Cycle Parking	2 spaces per House in rear garden stores or garages
Gross Site Area:	6.08Ha

D	14.05.24	Revised layout following Planning Officer discussions	NK	KE
C	21.11.23	Custom Build Dwellings omitted	KE	AK
B	15.11.23	Revised following consultant feedback	NK	KE
A	14.11.23	Planning Submission	NK	KE
Rev.	Date	Revision Details	Dr	Ch

London: 76 Great Suffolk Street
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ECE Architecture
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Client's Name
Reside Developments

Job Title
Land at Funtley Road, Funtley

Drawing Title
Proposed Site Layout

Scale
1:500 @ A0 / 1:1000 @ A2

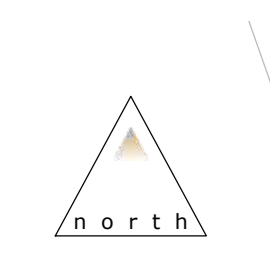
Drawn	Checked	Date
KE	PF	06.11.23

Job No	Drawing No	Rev
7365	PL-03	D

Status
APPROVAL

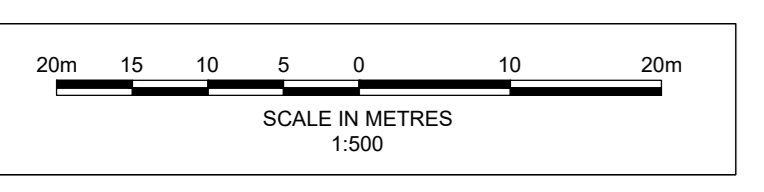
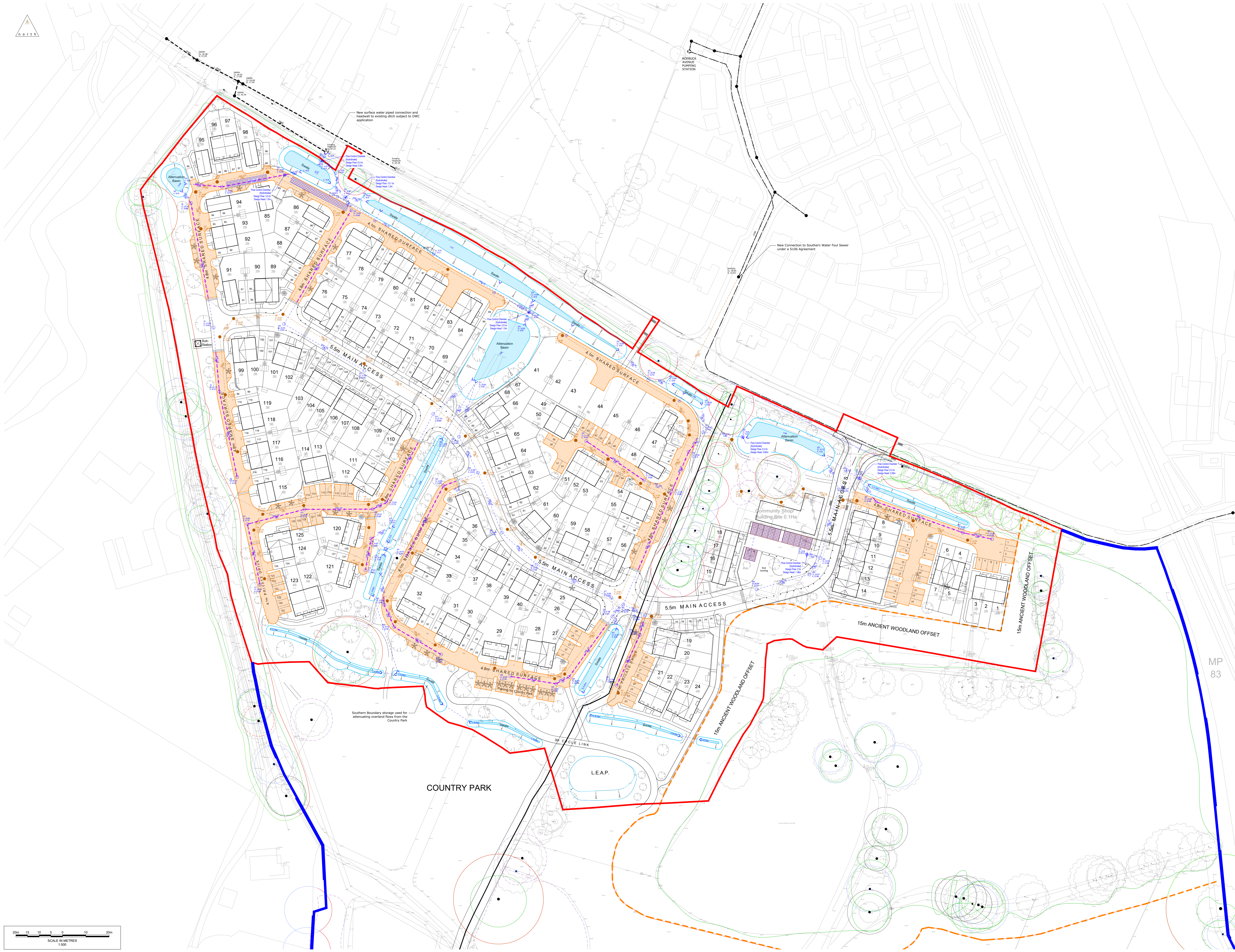
Appendix C

Drainage Strategy Drawing and Exceedance Plan



- Notes**
- All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
 - This drawing has been based upon survey information supplied by Sunshine Survey Ltd and Motion cannot guarantee the accuracy of the data provided.
 - Any discrepancies should be reported to the architect and/or engineer immediately, so that clarification can be sought prior to the commencement of works.
 - This drawing should be read in conjunction with all other relevant architect and engineering details, drawings and specification.
 - All works to the private drainage system to be in accordance with the Building Regulations Approved Document 'F', 2015 edition.
 - 350mm minimum cover is to be provided for private pipes laid in soft/graded areas, with 500mm minimum cover to be provided for private pipes laid beneath roads / driveways unless not practicable. Where unsuitable, shallow pipe drains may require protection using concrete surround or paving slabs bridging the trench, subject to the H&M Inspector's requirements.
 - Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.

- Legend**
- Site Boundary
 - Ancient Woodland Easement
 - Existing Surface Water Pipe
 - Existing Southern Water adopted foul network - Gravity Pipe
 - Existing Southern Water adopted foul network - Rising Main
 - Existing Manhole
 - Existing Pumping Station
 - Existing Headwall
 - New Surface Water Gravity Pipe
 - New Surface Water Perforated Pipe
 - New Foul Water Gravity Pipe
 - New Surface Water Manhole
 - New Surface Water Flow Control Manhole
 - New Foul Water Manhole
 - New Attenuation Basin / Swale
 - Geocellular Attenuation Storage Tank
 - Proposed Headwall
 - Permeable Pavement



D	Drainage amended following updated site layout	ST	CG	JM	24/05/2024
C	Small updates, flow control and tree changes	CC	CC	JM	16/10/2023
B	Layout updated, existing drainage layout added	ST	CC	JM	14/11/2023
A	Final Issue W/P	CC	JM	JM	03/11/2023
Rev	Description	Rev	App	Date	

Drawing Status:
FOR PLANNING
NOT FOR CONSTRUCTION



Client:
Reside Developments Limited

Project:
Land at Funtley Road, Funtley

Title:
Drainage Strategy

Scale: 1:500 (A0)
Drawing No: 1912032-0501
Revision: D



Legend
 → Exceedance Route - Direction of Flow
 --- Exceedance Route - Storage Area



B	Amended following updated site layout	ST	CC	JM	24/05/2024
A	Final Issue	CC	CC	JM	16/11/2023
Rev	Description	Drn	Chk	App	Date

Drawing Status:
FOR PLANNING
 NOT FOR CONSTRUCTION



Client:
 Reside Developments Limited


Project:
 Land at Funtley Road, Funtley

Title:
 Surface Water Drainage Exceedance Routing

Scale: 1:500 (A0)
 Drawing No: 1912032-0502
 Revision: B

Appendix D

Greenfield Runoff Rate Estimation and Hydraulic Calculations

GTA Civils Ltd		Page 1
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	Land South of Funtley Rd 6390 Developed Area Pre-development Runoff	
Date 18/01/2018 18:55 File	Designed by SFC Checked by MR	
XP Solutions	Source Control 2017.1.2	

ICP SUDS Mean Annual Flood

Input


Return Period (years)	10	Soil	0.400
Area (ha)	3.300	Urban	0.000
SAAR (mm)	800	Region Number	Region 7

Results 1/s

QBAR Rural 13.1
QBAR Urban 13.1

Q10 years 21.3

Q1 year 11.2
Q30 years 29.7
Q100 years 41.9

Motion		Page 0
84 North Street Guildford Surrey GU1 4AU		
Date 24/05/2024 07:34 File 100Y 45CC FEH 1912032 24052024.MDX	Designed by Chris Gray Checked by Jason Morgans	
Causeway	Network 2020.1.3	


STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 455750 108500 SU 55750 08500
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Motion		Page 1
84 North Street Guildford Surrey GU1 4AU		
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Causeway		Network 2020.1.3

Time Area Diagram for Surface Network 1




Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.352	4-8	1.150	8-12	0.362	12-16	0.190	16-20	0.127	20-24	0.007

Total Area Contributing (ha) = 2.188

Total Pipe Volume (m³) = 1642.390


Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow








PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	19.855	0.761	26.1	0.068	15.00	0.0	0.600		o	150	Pipe/Conduit	
1.001	6.097	0.234	26.1	0.006	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.002	30.232	1.305	23.2	0.032	0.00	0.0	0.600		o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	15.17	25.344	0.068	0.0	0.0	0.0	1.98	35.0	9.2
1.001	50.00	15.22	24.582	0.074	0.0	0.0	0.0	1.98	35.0	10.0
1.002	50.00	15.46	24.349	0.106	0.0	0.0	0.0	2.10	37.1	14.3


Motion		Page 2
84 North Street Guildford Surrey GU1 4AU		
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Causeway		Network 2020.1.3

Network Design Table for Surface Network 1









PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	7.072	0.305	23.2	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.000	23.851	1.916	12.5	0.061	15.00	0.0	0.600		o	150	Pipe/Conduit	
2.001	8.593	0.667	12.9	0.012	0.00	0.0	0.600		o	150	Pipe/Conduit	
2.002	10.343	0.522	19.8	0.036	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.004	54.507	3.049	17.9	0.090	0.00	0.0	0.600		o	225	Pipe/Conduit	
3.000	29.815	0.145	205.0	0.069	15.00	0.0	0.600		o	225	Pipe/Conduit	
3.001	13.005	0.063	205.0	0.015	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	15.50	22.968	0.106	0.0	0.0	0.0	2.73	108.5	14.3
2.000	50.00	15.14	25.844	0.061	0.0	0.0	0.0	2.87	50.7	8.2
2.001	50.00	15.19	23.928	0.072	0.0	0.0	0.0	2.82	49.9	9.8
2.002	50.00	15.27	23.261	0.108	0.0	0.0	0.0	2.27	40.2	14.7
1.004	50.00	15.79	22.663	0.304	0.0	0.0	0.0	3.11	123.6	41.1
3.000	50.00	15.55	19.973	0.069	0.0	0.0	0.0	0.91	36.2	9.4
3.001	50.00	15.78	19.828	0.084	0.0	0.0	0.0	0.91	36.2	11.4

Motion		Page 3
84 North Street Guildford Surrey GU1 4AU		
Date 24/05/2024 07:34 File 100Y 45CC FEH 1912032 24052024.MDX	Designed by Chris Gray Checked by Jason Morgans	
Causeway		Network 2020.1.3

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.005	16.618	0.510	32.6	0.014	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.006	10.538	0.105	100.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.000	12.859	0.086	149.6	0.019	15.00	0.0	0.600		o	150	Pipe/Conduit	
4.001	39.419	1.259	31.3	0.109	0.00	0.0	0.600		o	225	Pipe/Conduit	
4.002	12.514	0.224	55.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
4.003	18.907	0.300	63.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
5.000	23.471	1.142	20.6	0.065	15.00	0.0	0.600		o	150	Pipe/Conduit	
5.001	8.464	0.535	15.8	0.025	0.00	0.0	0.600		o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.005	50.00	15.89	19.690	0.402	0.0	0.0	0.0	2.76	195.4	54.5
1.006	50.00	16.01	19.180	0.402	0.0	0.0	0.0	1.57	110.9	54.5
4.000	50.00	15.26	22.033	0.019	0.0	0.0	0.0	0.82	14.5	2.6
4.001	50.00	15.54	21.947	0.129	0.0	0.0	0.0	2.35	93.3	17.4
4.002	50.00	15.66	20.688	0.129	0.0	0.0	0.0	1.75	69.7	17.4
4.003	50.00	15.85	19.500	0.129	0.0	0.0	0.0	1.65	65.6	17.4
5.000	50.00	15.18	23.710	0.065	0.0	0.0	0.0	2.23	39.4	8.8
5.001	50.00	15.23	22.568	0.090	0.0	0.0	0.0	2.55	45.0	12.2

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
6.000	2.188	0.015	150.0	0.000	15.00	0.0	0.600		o	150	Pipe/Conduit	🔒
6.001	5.754	0.038	150.0	0.090	0.00	0.0	0.600		o	150	Pipe/Conduit	🔒
5.002	30.495	2.512	12.1	0.055	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
5.003	16.676	0.571	29.2	0.017	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
4.004	34.757	0.003	11585.6	0.000	0.00	0.0		0.010	→_/		Pond/Tank	🔒
4.005	16.974	0.125	135.8	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
1.007	12.601	0.100	126.0	0.036	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
1.008	14.198	0.001	14197.9	0.000	0.00	0.0		0.010	→_/		Pond/Tank	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
6.000	50.00	15.04	22.080	0.000	0.0	0.0	0.0	0.82	14.5	0.0
6.001	50.00	15.16	22.071	0.090	0.0	0.0	0.0	0.82	14.5	12.1
5.002	50.00	15.37	21.958	0.234	0.0	0.0	0.0	3.78	150.2	31.7
5.003	50.00	15.48	19.446	0.251	0.0	0.0	0.0	2.43	96.6	34.0
4.004	50.00	16.89	19.200	0.380	0.0	0.0	0.0	0.56	2048.5	51.4
4.005	50.00	17.10	19.200	0.380	0.0	0.0	0.0	1.35	95.2	51.4
1.007	50.00	17.23	19.000	0.818	0.0	0.0	0.0	1.61	178.1	110.8
1.008	50.00	17.77	18.900	0.818	0.0	0.0	0.0	0.44	1111.5	110.8

84 North Street
 Guildford
 Surrey GU1 4AU



Date 24/05/2024 07:34
 File 100Y 45CC FEH 1912032 24052024.MDX

Designed by Chris Gray
 Checked by Jason Morgans

Causeway

Network 2020.1.3









Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.009	11.081	0.225	49.2	0.053	0.00	0.0	0.600		o	300	Pipe/Conduit	🚫
1.010	18.698	0.283	66.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	🚫
1.011	41.786	0.100	418.0	0.011	0.00	0.0	0.600		o	600	Pipe/Conduit	🚫
7.000	27.148	1.807	15.0	0.062	15.00	0.0	0.600		o	150	Pipe/Conduit	🚫
7.001	25.257	0.805	31.4	0.032	0.00	0.0	0.600		o	150	Pipe/Conduit	🚫
7.002	29.250	0.933	31.4	0.047	0.00	0.0	0.600		o	225	Pipe/Conduit	🚫
7.003	6.489	0.207	31.4	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	🚫
7.004	42.960	1.370	31.4	0.044	0.00	0.0	0.600		o	225	Pipe/Conduit	🚫
7.005	23.320	1.804	12.9	0.040	0.00	0.0	0.600		o	225	Pipe/Conduit	🚫

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.009	50.00	17.86	18.900	0.871	0.0	0.0	0.0	2.25	158.7	117.9
1.010	50.00	18.02	18.733	0.871	0.0	0.0	0.0	1.94	136.9	117.9
1.011	50.00	18.60	18.450	0.882	0.0	0.0	0.0	1.18	335.0	119.4
7.000	50.00	15.17	25.526	0.062	0.0	0.0	0.0	2.61	46.2	8.4
7.001	50.00	15.41	23.719	0.094	0.0	0.0	0.0	1.80	31.9	12.7
7.002	50.00	15.61	22.913	0.141	0.0	0.0	0.0	2.34	93.2	19.1
7.003	50.00	15.66	21.980	0.141	0.0	0.0	0.0	2.34	93.2	19.1
7.004	50.00	15.97	21.774	0.185	0.0	0.0	0.0	2.34	93.2	25.1
7.005	50.00	16.07	20.404	0.226	0.0	0.0	0.0	3.66	145.5	30.6









Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
8.000	23.233	0.920	25.2	0.052	15.00	0.0	0.600		o	150	Pipe/Conduit	
8.001	10.041	0.398	25.2	0.014	0.00	0.0	0.600		o	150	Pipe/Conduit	
8.002	15.953	0.410	38.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
8.003	18.684	0.700	26.7	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
9.000	12.329	0.617	20.0	0.035	15.00	0.0	0.600		o	150	Pipe/Conduit	
9.001	13.318	0.057	233.7	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
8.004	40.911	1.400	29.2	0.000	0.00	0.0		0.010	-> _ /->		Swale	
8.005	29.657	2.525	11.7	0.000	0.00	0.0		0.010	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.000	50.00	15.19	25.303	0.052	0.0	0.0	0.0	2.01	35.6	7.1
8.001	50.00	15.28	24.383	0.066	0.0	0.0	0.0	2.01	35.6	9.0
8.002	50.00	15.44	23.985	0.066	0.0	0.0	0.0	1.62	28.6	9.0
8.003	50.00	15.54	23.425	0.066	0.0	0.0	0.0	3.06	216.0	9.0
9.000	50.00	15.09	23.574	0.035	0.0	0.0	0.0	2.26	40.0	4.7
9.001	50.00	15.43	22.957	0.035	0.0	0.0	0.0	0.65	11.5	4.7
8.004	50.00	15.64	22.900	0.101	0.0	0.0	0.0	7.28	7444.2	13.7
8.005	50.00	15.72	21.464	0.101	0.0	0.0	0.0	6.02	665.1	13.7









Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
10.000	26.786	1.176	22.8	0.051	15.00	0.0	0.600		o	150	Pipe/Conduit	
10.001	20.729	0.760	27.3	0.008	0.00	0.0	0.600		o	150	Pipe/Conduit	
11.000	12.940	1.050	12.3	0.000	15.00	0.0	0.600		o	300	Pipe/Conduit	
11.001	35.056	0.442	79.3	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
11.002	20.259	0.277	73.1	0.126	0.00	0.0	0.600		o	300	Pipe/Conduit	
11.003	26.057	0.552	47.2	0.060	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.002	19.537	0.414	47.2	0.017	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.003	24.834	1.665	14.9	0.040	0.00	0.0	0.600		o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
10.000	50.00	15.21	23.065	0.051	0.0	0.0	0.0	2.12	37.5	7.0
10.001	50.00	15.39	21.889	0.060	0.0	0.0	0.0	1.94	34.2	8.1
11.000	50.00	15.05	23.300	0.000	0.0	0.0	0.0	4.50	318.3	0.0
11.001	50.00	15.38	22.250	0.000	0.0	0.0	0.0	1.77	124.9	0.0
11.002	50.00	15.56	21.808	0.126	0.0	0.0	0.0	1.84	130.1	17.0
11.003	50.00	15.75	21.531	0.185	0.0	0.0	0.0	2.29	162.2	25.1
10.002	50.00	15.89	20.979	0.262	0.0	0.0	0.0	2.29	162.2	35.4
10.003	50.00	15.99	20.565	0.301	0.0	0.0	0.0	4.09	289.2	40.8

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
7.006	31.313	0.003	10437.7	0.006	0.00	0.0		0.010	→_/		Pond/Tank	
7.007	6.113	0.124	49.3	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
7.008	6.188	0.126	49.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.012	82.344	0.008	10293.0	0.091	0.00	0.0		0.010	→_/		Pond/Tank	
1.013	9.919	0.020	496.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
12.000	39.807	0.377	105.5	0.165	15.00	0.0	0.600		o	225	Pipe/Conduit	
12.001	57.342	0.963	59.5	0.170	0.00	0.0	0.600		o	300	Pipe/Conduit	
12.002	5.995	0.329	18.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
7.006	50.00	16.60	18.600	0.634	0.0	0.0	0.0	0.99	21882.4	85.8
7.007	50.00	16.63	18.600	0.634	0.0	0.0	0.0	3.47	982.3	85.8
7.008	50.00	16.68	18.476	0.634	0.0	0.0	0.0	2.25	159.0	85.8
1.012	50.00	20.55	18.350	1.607	0.0	0.0	0.0	0.71	5743.0	217.6
1.013	50.00	20.73	18.350	1.607	0.0	0.0	0.0	0.91	144.1«	217.6
12.000	50.00	15.52	20.000	0.165	0.0	0.0	0.0	1.27	50.6	22.4
12.001	50.00	15.99	19.622	0.335	0.0	0.0	0.0	2.04	144.3	45.3
12.002	50.00	16.02	18.659	0.335	0.0	0.0	0.0	3.70	261.6	45.3

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Network Design Table for Surface Network 1




PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.014	16.645	0.030	554.8	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	🔴
13.000	37.379	1.720	21.7	0.066	15.00	0.0	0.600		o	150	Pipe/Conduit	🔴
13.001	27.580	1.269	21.7	0.030	0.00	0.0	0.600		o	150	Pipe/Conduit	🔴
13.002	54.117	0.792	68.4	0.065	0.00	0.0	0.600		o	225	Pipe/Conduit	🔴
13.003	7.498	0.100	75.0	0.011	0.00	0.0	0.600		o	225	Pipe/Conduit	🔴
13.004	3.800	0.010	380.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	🔴
13.005	16.176	0.072	224.7	0.006	0.00	0.0	0.600		o	300	Pipe/Conduit	🔴
13.006	27.352	0.123	223.1	0.051	0.00	0.0	0.600		o	300	Pipe/Conduit	🔴
13.007	12.254	0.055	222.8	0.017	0.00	0.0	0.600		o	300	Pipe/Conduit	🔴

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.014	50.00	21.06	18.330	1.941	0.0	0.0	0.0	0.86	136.1	262.9
13.000	50.00	15.29	22.441	0.066	0.0	0.0	0.0	2.17	38.4	8.9
13.001	50.00	15.50	20.721	0.095	0.0	0.0	0.0	2.17	38.4	12.9
13.002	50.00	16.07	19.451	0.161	0.0	0.0	0.0	1.58	63.0	21.8
13.003	50.00	16.15	18.660	0.172	0.0	0.0	0.0	1.51	60.1	23.3
13.004	50.00	16.25	18.560	0.172	0.0	0.0	0.0	0.66	26.4	23.3
13.005	50.00	16.50	18.550	0.178	0.0	0.0	0.0	1.04	73.9	24.1
13.006	50.00	16.94	18.478	0.229	0.0	0.0	0.0	1.05	74.1	31.0
13.007	50.00	17.13	18.355	0.246	0.0	0.0	0.0	1.05	74.2	33.4

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Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.015	6.944	0.010	694.4	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.016	0.937	0.008	117.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.017	2.588	0.021	123.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.015	50.00	21.21	18.310	2.188	0.0	0.0	0.0	0.76	121.5«	296.3
1.016	50.00	21.22	18.300	2.188	0.0	0.0	0.0	1.45	102.6«	296.3
1.017	50.00	21.25	18.292	2.188	0.0	0.0	0.0	1.42	100.0«	296.3

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Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out		Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	
S56	26.694	1.350	Open Manhole	1350	1.000	25.344	150			
S55	25.970	1.387	Open Manhole	1350	1.001	24.582	150	1.000	24.582	150
S54	25.699	1.350	Open Manhole	1350	1.002	24.349	150	1.001	24.349	150
S53	24.196	1.228	Open Manhole	1350	1.003	22.968	225	1.002	23.043	150
S67	27.194	1.350	Open Manhole	1350	2.000	25.844	150			
S68	25.278	1.350	Open Manhole	1350	2.001	23.928	150	2.000	23.928	150
S69	24.611	1.350	Open Manhole	1350	2.002	23.261	150	2.001	23.261	150
S52	24.089	1.426	Open Manhole	1350	1.004	22.663	225	1.003	22.663	225
								2.002	22.739	150
S70	21.123	1.150	Open Manhole	1350	3.000	19.973	225			
S71	21.400	1.572	Open Manhole	1350	3.001	19.828	225	3.000	19.828	225
S51	21.372	1.758	Open Manhole	1350	1.005	19.690	300	1.004	19.614	225
								3.001	19.765	225
S50	20.590	1.410	Open Manhole	1350	1.006	19.180	300	1.005	19.180	300
S60	23.383	1.350	Open Manhole	1350	4.000	22.033	150			
S61	23.297	1.350	Open Manhole	1350	4.001	21.947	225	4.000	21.947	150
S62	22.038	1.350	Open Manhole	1350	4.002	20.688	225	4.001	20.688	225
S31	21.787	2.287	Open Manhole	1500	4.003	19.500	225	4.002	20.464	225
S66	25.060	1.350	Open Manhole	1350	5.000	23.710	150			
S65	24.010	1.442	Open Manhole	1350	5.001	22.568	150	5.000	22.568	150

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Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
-	23.850	1.770	Junction		6.000	22.080	150				
S76	23.850	1.785	Open Manhole	1500	6.001	22.071	150	6.000	22.065	150	
S64	23.374	1.416	Open Manhole	1350	5.002	21.958	225	5.001	22.033	150	
S63	21.271	1.825	Open Manhole	1350	5.003	19.446	225	6.001	22.033	150	
S30	19.800	0.925	Open Manhole	1350	4.004	19.200		5.002	19.446	225	
S28	19.800	0.603	Open Manhole	1500	4.004	19.200	300	4.003	19.200	225	
S27	20.412	1.412	Open Manhole	1350	1.007	19.000	375	5.003	18.875	225	
S26	19.565	0.665	Open Manhole	1500	4.005	19.200		4.004	19.197		
S25	19.565	0.666	Open Manhole	1500	1.007	19.000		1.006	19.075	300	
S75	20.008	1.333	Open Manhole	1350	4.005	19.075		4.005	19.075	300	
S24	19.304	0.854	Open Manhole	1500	1.008	18.900		1.007	18.900	375	
S11	26.876	1.350	Open Manhole	1350	1.009	18.900	300	1.008	18.899		
S12	25.069	1.350	Open Manhole	1350	1.009	18.733	300	1.008	18.899		
S14	24.299	1.385	Open Manhole	1350	1.010	18.733	300	1.009	18.675	300	
S22	23.419	1.439	Open Manhole	1350	1.011	18.450	600	1.009	18.675	300	
S15	23.234	1.460	Open Manhole	1350	7.000	25.526	150	1.010	18.450	300	
S16	21.753	1.350	Open Manhole	1350	7.001	23.719	150	7.000	23.719	150	
					7.002	22.913	225	7.001	22.913	150	
					7.003	21.980	225	7.002	21.980	225	
					7.004	21.774	225	7.003	21.774	225	
					7.005	20.404	225	7.004	20.404	225	

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Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
S44	26.653	1.350	Open Manhole	1350	8.000	25.303	150				
S43	25.752	1.369	Open Manhole	1350	8.001	24.383	150	8.000	24.383	150	
S42	25.335	1.350	Open Manhole	1350	8.002	23.985	150	8.001	23.985	150	
S72	23.800	0.375	Open Manhole	1350	8.003	23.425	300	8.002	23.575	150	
S73	24.624	1.050	Open Manhole	1350	9.000	23.574	150				
S48	24.007	1.050	Open Manhole	1350	9.001	22.957	150	9.000	22.957	150	
S74	23.100	0.375	Open Manhole	1350	8.004	22.900		8.003	22.725	300	
								9.001	22.900	150	
S45	21.839	0.375	Open Manhole	1350	8.005	21.464	375	8.004	21.500		
S41	24.415	1.350	Open Manhole	1350	10.000	23.065	150				
S40	23.200	1.311	Open Manhole	1350	10.001	21.889	150	10.000	21.889	150	
S57	24.323	1.023	Open Manhole	1350	11.000	23.300	300				
S77	23.850	1.600	Open Manhole	1350	11.001	22.250	300	11.000	22.250	300	
S59	23.158	1.350	Open Manhole	1350	11.002	21.808	300	11.001	21.808	300	
S58	22.881	1.350	Open Manhole	1350	11.003	21.531	300	11.002	21.531	300	
S39	22.380	1.401	Open Manhole	1350	10.002	20.979	300	10.001	21.129	150	
								11.003	20.979	300	
S38	21.915	1.350	Open Manhole	1350	10.003	20.565	300	10.002	20.565	300	
S17	20.000	1.400	Open Manhole	1800	7.006	18.600		7.005	18.600	225	
								8.005	18.939	375	

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Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S18	20.000	1.403	Open Manhole	1800	7.007	18.600	600	10.003	18.900	300	
S49	20.235	1.759	Open Manhole	1800	7.008	18.476	300	7.006	18.597		
S19	19.304	0.954	Open Manhole	1800	1.012	18.350		7.007	18.476	600	
								1.011	18.350	600	
								7.008	18.350	300	
S20	19.304	0.962	Open Manhole	1800	1.013	18.350	450	1.012	18.342		
S37	21.350	1.350	Open Manhole	1350	12.000	20.000	225				
S36	20.972	1.350	Open Manhole	1350	12.001	19.622	300	12.000	19.622	225	
S35	19.659	1.000	Open Manhole	1350	12.002	18.659	300	12.001	18.659	300	
S23	19.561	1.231	Open Manhole	1800	1.014	18.330	450	1.013	18.330	450	
								12.002	18.330	300	
S2	23.791	1.350	Open Manhole	1350	13.000	22.441	150				
S3	22.170	1.449	Open Manhole	1350	13.001	20.721	150	13.000	20.721	150	
S4	21.069	1.618	Open Manhole	1350	13.002	19.451	225	13.001	19.451	150	
S5	20.104	1.444	Open Manhole	1350	13.003	18.660	225	13.002	18.660	225	
S32	19.200	0.640	Open Manhole	1350	13.004	18.560	225	13.003	18.560	225	
S34	19.200	0.650	Open Manhole	1350	13.005	18.550	300	13.004	18.550	225	
S6	20.004	1.526	Open Manhole	1350	13.006	18.478	300	13.005	18.478	300	
S33	19.824	1.469	Open Manhole	1500	13.007	18.355	300	13.006	18.355	300	
S21	19.200	0.900	Open Manhole	1800	1.015	18.310	450	1.014	18.300	450	

Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
S69	19.200	0.900	Open Manhole	1350	1.016	18.300	300	13.007	18.300	300	
-	19.100	0.808	Junction		1.017	18.292	300	1.015	18.300	450	
S9	19.100	0.829	Open Manhole	0		OUTFALL		1.016	18.292	300	
								1.017	18.271	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S56	455813.695	108192.657	455813.695	108192.657	Required	
S55	455833.291	108189.462	455833.291	108189.462	Required	
S54	455838.745	108192.188	455838.745	108192.188	Required	
S53	455856.521	108216.642	455856.521	108216.642	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S67	455858.910	108186.638	455858.910	108186.638	Required	
S68	455868.839	108208.324	455868.839	108208.324	Required	
S69	455870.950	108216.654	455870.950	108216.654	Required	
S52	455861.758	108221.395	455861.758	108221.395	Required	
S70	455845.545	108290.807	455845.545	108290.807	Required	
S71	455870.575	108274.608	455870.575	108274.608	Required	
S51	455883.204	108271.506	455883.204	108271.506	Required	
S50	455889.753	108286.779	455889.753	108286.779	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S60	456019.785	108249.394	456019.785	108249.394	Required	
S61	456007.228	108252.166	456007.228	108252.166	Required	
S62	455970.097	108265.399	455970.097	108265.399	Required	
S31	455962.678	108275.477	455962.678	108275.477	Required	
S66	455918.901	108227.889	455918.901	108227.889	Required	
S65	455941.497	108234.239	455941.497	108234.239	Required	
-	455941.020	108244.993			No Entry	
S76	455940.450	108242.881	455940.450	108242.881	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S64	455946.010	108241.400	455946.010	108241.400	Required	
S63	455954.056	108270.814	455954.056	108270.814	Required	
S30	455946.883	108285.869	455946.883	108285.869	Required	
S28	455912.899	108293.161	455912.899	108293.161	Required	
S27	455896.051	108295.227	455896.051	108295.227	Required	
S26	455895.281	108307.805	455895.281	108307.805	Required	
S25	455883.483	108315.704	455883.483	108315.704	Required	
S75	455872.587	108317.722	455872.587	108317.722	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S24	455859.187	108330.763	455859.187	108330.763	Required	
S11	455706.077	108229.938	455706.077	108229.938	Required	
S12	455700.538	108256.514	455700.538	108256.514	Required	
S14	455725.154	108262.167	455725.154	108262.167	Required	
S22	455754.404	108262.265	455754.404	108262.265	Required	
S15	455760.271	108265.037	455760.271	108265.037	Required	
S16	455780.313	108303.035	455780.313	108303.035	Required	
S44	455784.392	108201.272	455784.392	108201.272	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S43	455764.349	108213.021	455764.349	108213.021	Required	
S42	455762.157	108222.820	455762.157	108222.820	Required	
S72	455758.180	108238.269	455758.180	108238.269	Required	
S73	455749.624	108237.959	455749.624	108237.959	Required	
S48	455752.915	108249.841	455752.915	108249.841	Required	
S74	455764.867	108255.716	455764.867	108255.716	Required	
S45	455783.721	108292.024	455783.721	108292.024	Required	
S41	455771.529	108240.940	455771.529	108240.940	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S40	455781.515	108265.794	455781.515	108265.794	Required	
S57	455858.906	108211.029	455858.906	108211.029	Required	
S77	455856.306	108223.705	455856.306	108223.705	Required	
S59	455824.222	108237.830	455824.222	108237.830	Required	
S58	455809.351	108251.588	455809.351	108251.588	Required	
S39	455799.678	108275.783	455799.678	108275.783	Required	
S38	455792.100	108293.790	455792.100	108293.790	Required	
S17	455798.341	108317.827	455798.341	108317.827	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S18	455819.498	108340.912	455819.498	108340.912	Required	
S49	455821.498	108346.688	455821.498	108346.688	Required	
S19	455823.522	108352.536	455823.522	108352.536	Required	
S20	455752.354	108393.955	455752.354	108393.955	Required	
S37	455750.428	108320.983	455750.428	108320.983	Required	
S36	455716.014	108340.991	455716.014	108340.991	Required	
S35	455745.183	108390.360	455745.183	108390.360	Required	
S23	455742.602	108395.771	455742.602	108395.771	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S2	455696.283	108276.022	455696.283	108276.022	Required	
S3	455688.665	108312.617	455688.665	108312.617	Required	
S4	455686.169	108340.084	455686.169	108340.084	Required	
S5	455676.525	108393.335	455676.525	108393.335	Required	
S32	455671.323	108398.735	455671.323	108398.735	Required	
S34	455673.660	108401.731	455673.660	108401.731	Required	
S6	455689.781	108400.389	455689.781	108400.389	Required	
S33	455716.652	108405.498	455716.652	108405.498	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S21	455728.902	108405.224	455728.902	108405.224	Required	
S69	455732.284	108411.289	455732.283	108411.293	Required	
-	455732.733	108412.111			No Entry	
S9	455733.976	108414.381			No Entry	

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	S56	26.694	25.344	1.200	Open Manhole	1350
1.001	o	150	S55	25.970	24.582	1.237	Open Manhole	1350
1.002	o	150	S54	25.699	24.349	1.200	Open Manhole	1350
1.003	o	225	S53	24.196	22.968	1.003	Open Manhole	1350
2.000	o	150	S67	27.194	25.844	1.200	Open Manhole	1350
2.001	o	150	S68	25.278	23.928	1.200	Open Manhole	1350
2.002	o	150	S69	24.611	23.261	1.200	Open Manhole	1350
1.004	o	225	S52	24.089	22.663	1.201	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	19.855	26.1	S55	25.970	24.582	1.237	Open Manhole	1350
1.001	6.097	26.1	S54	25.699	24.349	1.200	Open Manhole	1350
1.002	30.232	23.2	S53	24.196	23.043	1.003	Open Manhole	1350
1.003	7.072	23.2	S52	24.089	22.663	1.201	Open Manhole	1350
2.000	23.851	12.5	S68	25.278	23.928	1.200	Open Manhole	1350
2.001	8.593	12.9	S69	24.611	23.261	1.200	Open Manhole	1350
2.002	10.343	19.8	S52	24.089	22.739	1.200	Open Manhole	1350
1.004	54.507	17.9	S51	21.372	19.614	1.533	Open Manhole	1350

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.000	o	225	S70	21.123	19.973	0.925	Open Manhole	1350
3.001	o	225	S71	21.400	19.828	1.347	Open Manhole	1350
1.005	o	300	S51	21.372	19.690	1.382	Open Manhole	1350
1.006	o	300	S50	20.590	19.180	1.110	Open Manhole	1350
4.000	o	150	S60	23.383	22.033	1.200	Open Manhole	1350
4.001	o	225	S61	23.297	21.947	1.125	Open Manhole	1350
4.002	o	225	S62	22.038	20.688	1.125	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.000	29.815	205.0	S71	21.400	19.828	1.347	Open Manhole	1350
3.001	13.005	205.0	S51	21.372	19.765	1.382	Open Manhole	1350
1.005	16.618	32.6	S50	20.590	19.180	1.110	Open Manhole	1350
1.006	10.538	100.4	S27	20.412	19.075	1.037	Open Manhole	1350
4.000	12.859	149.6	S61	23.297	21.947	1.200	Open Manhole	1350
4.001	39.419	31.3	S62	22.038	20.688	1.125	Open Manhole	1350
4.002	12.514	55.9	S31	21.787	20.464	1.098	Open Manhole	1500

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Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.003	o	225	S31	21.787	19.500	2.062	Open Manhole	1500
5.000	o	150	S66	25.060	23.710	1.200	Open Manhole	1350
5.001	o	150	S65	24.010	22.568	1.292	Open Manhole	1350
6.000	o	150	-	23.850	22.080	1.620	Junction	
6.001	o	150	S76	23.850	22.071	1.629	Open Manhole	1500
5.002	o	225	S64	23.374	21.958	1.191	Open Manhole	1350
5.003	o	225	S63	21.271	19.446	1.600	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.003	18.907	63.0	S30	19.800	19.200	0.375	Open Manhole	1350
5.000	23.471	20.6	S65	24.010	22.568	1.292	Open Manhole	1350
5.001	8.464	15.8	S64	23.374	22.033	1.191	Open Manhole	1350
6.000	2.188	150.0	S76	23.850	22.065	1.635	Open Manhole	1500
6.001	5.754	150.0	S64	23.374	22.033	1.191	Open Manhole	1350
5.002	30.495	12.1	S63	21.271	19.446	1.600	Open Manhole	1350
5.003	16.676	29.2	S30	19.800	18.875	0.700	Open Manhole	1350

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.004	-_/		S30	19.800	19.200	-0.003	Open Manhole	1350
4.005	o	300	S28	19.800	19.200	0.300	Open Manhole	1500
1.007	o	375	S27	20.412	19.000	1.037	Open Manhole	1350
1.008	-_/		S26	19.565	18.900	0.000	Open Manhole	1500
1.009	o	300	S25	19.565	18.900	0.365	Open Manhole	1500
1.010	o	300	S75	20.008	18.733	0.975	Open Manhole	1350
1.011	o	600	S24	19.304	18.450	0.254	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.004	34.757	11585.6	S28	19.800	19.197	0.000	Open Manhole	1500
4.005	16.974	135.8	S27	20.412	19.075	1.037	Open Manhole	1350
1.007	12.601	126.0	S26	19.565	18.900	0.290	Open Manhole	1500
1.008	14.198	14197.9	S25	19.565	18.899	0.001	Open Manhole	1500
1.009	11.081	49.2	S75	20.008	18.675	1.033	Open Manhole	1350
1.010	18.698	66.1	S24	19.304	18.450	0.554	Open Manhole	1500
1.011	41.786	418.0	S19	19.304	18.350	0.354	Open Manhole	1800

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Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.000	o	150	S11	26.876	25.526	1.200	Open Manhole	1350
7.001	o	150	S12	25.069	23.719	1.200	Open Manhole	1350
7.002	o	225	S14	24.299	22.913	1.160	Open Manhole	1350
7.003	o	225	S22	23.419	21.980	1.214	Open Manhole	1350
7.004	o	225	S15	23.234	21.774	1.235	Open Manhole	1350
7.005	o	225	S16	21.753	20.404	1.125	Open Manhole	1350
8.000	o	150	S44	26.653	25.303	1.200	Open Manhole	1350
8.001	o	150	S43	25.752	24.383	1.219	Open Manhole	1350
8.002	o	150	S42	25.335	23.985	1.200	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.000	27.148	15.0	S12	25.069	23.719	1.200	Open Manhole	1350
7.001	25.257	31.4	S14	24.299	22.913	1.235	Open Manhole	1350
7.002	29.250	31.4	S22	23.419	21.980	1.214	Open Manhole	1350
7.003	6.489	31.4	S15	23.234	21.774	1.235	Open Manhole	1350
7.004	42.960	31.4	S16	21.753	20.404	1.125	Open Manhole	1350
7.005	23.320	12.9	S17	20.000	18.600	1.175	Open Manhole	1800
8.000	23.233	25.2	S43	25.752	24.383	1.219	Open Manhole	1350
8.001	10.041	25.2	S42	25.335	23.985	1.200	Open Manhole	1350
8.002	15.953	38.9	S72	23.800	23.575	0.075	Open Manhole	1350

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Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
8.003	o	300	S72	23.800	23.425	0.075	Open Manhole	1350
9.000	o	150	S73	24.624	23.574	0.900	Open Manhole	1350
9.001	o	150	S48	24.007	22.957	0.900	Open Manhole	1350
8.004	→_/←		S74	23.100	22.900	-0.139	Open Manhole	1350
8.005	o	375	S45	21.839	21.464	0.000	Open Manhole	1350
10.000	o	150	S41	24.415	23.065	1.200	Open Manhole	1350
10.001	o	150	S40	23.200	21.889	1.161	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
8.003	18.684	26.7	S74	23.100	22.725	0.075	Open Manhole	1350
9.000	12.329	20.0	S48	24.007	22.957	0.900	Open Manhole	1350
9.001	13.318	233.7	S74	23.100	22.900	0.050	Open Manhole	1350
8.004	40.911	29.2	S45	21.839	21.500	0.000	Open Manhole	1350
8.005	29.657	11.7	S17	20.000	18.939	0.686	Open Manhole	1800
10.000	26.786	22.8	S40	23.200	21.889	1.161	Open Manhole	1350
10.001	20.729	27.3	S39	22.380	21.129	1.101	Open Manhole	1350

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	o	300	S57	24.323	23.300	0.723	Open Manhole	1350
11.001	o	300	S77	23.850	22.250	1.300	Open Manhole	1350
11.002	o	300	S59	23.158	21.808	1.050	Open Manhole	1350
11.003	o	300	S58	22.881	21.531	1.050	Open Manhole	1350
10.002	o	300	S39	22.380	20.979	1.101	Open Manhole	1350
10.003	o	300	S38	21.915	20.565	1.050	Open Manhole	1350
7.006	→_/		S17	20.000	18.600	-0.003	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	12.940	12.3	S77	23.850	22.250	1.300	Open Manhole	1350
11.001	35.056	79.3	S59	23.158	21.808	1.050	Open Manhole	1350
11.002	20.259	73.1	S58	22.881	21.531	1.050	Open Manhole	1350
11.003	26.057	47.2	S39	22.380	20.979	1.101	Open Manhole	1350
10.002	19.537	47.2	S38	21.915	20.565	1.050	Open Manhole	1350
10.003	24.834	14.9	S17	20.000	18.900	0.800	Open Manhole	1800
7.006	31.313	10437.7	S18	20.000	18.597	0.000	Open Manhole	1800

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Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.007	o		S18	20.000	18.600	0.800	Open Manhole	1800
7.008	o	300	S49	20.235	18.476	1.459	Open Manhole	1800
1.012	→_/		S19	19.304	18.350	-0.008	Open Manhole	1800
1.013	o	450	S20	19.304	18.350	0.504	Open Manhole	1800
12.000	o	225	S37	21.350	20.000	1.125	Open Manhole	1350
12.001	o	300	S36	20.972	19.622	1.050	Open Manhole	1350
12.002	o	300	S35	19.659	18.659	0.700	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.007	6.113	49.3	S49	20.235	18.476	1.159	Open Manhole	1800
7.008	6.188	49.1	S19	19.304	18.350	0.654	Open Manhole	1800
1.012	82.344	10293.0	S20	19.304	18.342	0.000	Open Manhole	1800
1.013	9.919	496.0	S23	19.561	18.330	0.781	Open Manhole	1800
12.000	39.807	105.5	S36	20.972	19.622	1.125	Open Manhole	1350
12.001	57.342	59.5	S35	19.659	18.659	0.700	Open Manhole	1350
12.002	5.995	18.2	S23	19.561	18.330	0.931	Open Manhole	1800

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.014	o	450	S23	19.561	18.330	0.781	Open Manhole	1800
13.000	o	150	S2	23.791	22.441	1.200	Open Manhole	1350
13.001	o	150	S3	22.170	20.721	1.299	Open Manhole	1350
13.002	o	225	S4	21.069	19.451	1.393	Open Manhole	1350
13.003	o	225	S5	20.104	18.660	1.219	Open Manhole	1350
13.004	o	225	S32	19.200	18.560	0.415	Open Manhole	1350
13.005	o	300	S34	19.200	18.550	0.350	Open Manhole	1350
13.006	o	300	S6	20.004	18.478	1.226	Open Manhole	1350
13.007	o	300	S33	19.824	18.355	1.169	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.014	16.645	554.8	S21	19.200	18.300	0.450	Open Manhole	1800
13.000	37.379	21.7	S3	22.170	20.721	1.299	Open Manhole	1350
13.001	27.580	21.7	S4	21.069	19.451	1.468	Open Manhole	1350
13.002	54.117	68.4	S5	20.104	18.660	1.219	Open Manhole	1350
13.003	7.498	75.0	S32	19.200	18.560	0.415	Open Manhole	1350
13.004	3.800	380.0	S34	19.200	18.550	0.425	Open Manhole	1350
13.005	16.176	224.7	S6	20.004	18.478	1.226	Open Manhole	1350
13.006	27.352	223.1	S33	19.824	18.355	1.169	Open Manhole	1500
13.007	12.254	222.8	S21	19.200	18.300	0.600	Open Manhole	1800

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.015	o	450	S21	19.200	18.310	0.440	Open Manhole	1800
1.016	o	300	S69	19.200	18.300	0.600	Open Manhole	1350
1.017	o	300	-	19.100	18.292	0.508	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.015	6.944	694.4	S69	19.200	18.300	0.450	Open Manhole	1350
1.016	0.937	117.1	-	19.100	18.292	0.508	Junction	
1.017	2.588	123.2	S9	19.100	18.271	0.529	Open Manhole	0

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.049	0.049	0.049
	User	-	100	0.013	0.013	0.062
	User	-	100	0.006	0.006	0.068
1.001	User	-	100	0.006	0.006	0.006
1.002	User	-	100	0.021	0.021	0.021
	User	-	100	0.010	0.010	0.032
1.003	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.012	0.012	0.012
	User	-	100	0.011	0.011	0.023
	User	-	100	0.034	0.034	0.057
	User	-	100	0.004	0.004	0.061
2.001	User	-	100	0.012	0.012	0.012
2.002	User	-	100	0.036	0.036	0.036
1.004	User	-	100	0.040	0.040	0.040
	User	-	100	0.030	0.030	0.070
	User	-	100	0.010	0.010	0.080
	User	-	100	0.010	0.010	0.090
3.000	User	-	100	0.044	0.044	0.044
	User	-	100	0.014	0.014	0.058
	User	-	100	0.011	0.011	0.069
3.001	User	-	100	0.009	0.009	0.009
	User	-	100	0.006	0.006	0.015
1.005	User	-	100	0.014	0.014	0.014
1.006	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.015	0.015	0.015
	User	-	100	0.005	0.005	0.019
4.001	User	-	100	0.028	0.028	0.028
	User	-	100	0.014	0.014	0.042

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.068	0.068	0.109
4.002	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.035	0.035	0.035
	User	-	100	0.010	0.010	0.045
	User	-	100	0.020	0.020	0.065
5.001	User	-	100	0.007	0.007	0.007
	User	-	100	0.018	0.018	0.025
6.000	-	-	100	0.000	0.000	0.000
6.001	User	-	100	0.067	0.067	0.067
	User	-	100	0.007	0.007	0.075
	User	-	100	0.015	0.015	0.090
5.002	User	-	100	0.011	0.011	0.011
	User	-	100	0.020	0.020	0.031
	User	-	100	0.020	0.020	0.050
	User	-	100	0.004	0.004	0.055
5.003	User	-	100	0.017	0.017	0.017
4.004	-	-	100	0.000	0.000	0.000
4.005	-	-	100	0.000	0.000	0.000
1.007	User	-	100	0.029	0.029	0.029
	User	-	100	0.007	0.007	0.036
1.008	-	-	100	0.000	0.000	0.000
1.009	User	-	100	0.036	0.036	0.036
	User	-	100	0.011	0.011	0.047
	User	-	100	0.006	0.006	0.053
1.010	-	-	100	0.000	0.000	0.000
1.011	User	-	100	0.011	0.011	0.011
7.000	User	-	100	0.019	0.019	0.019

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.016	0.016	0.035
	User	-	100	0.013	0.013	0.048
	User	-	100	0.012	0.012	0.060
	User	-	100	0.002	0.002	0.062
7.001	User	-	100	0.015	0.015	0.015
	User	-	100	0.012	0.012	0.026
	User	-	100	0.006	0.006	0.032
7.002	User	-	100	0.036	0.036	0.036
	User	-	100	0.011	0.011	0.047
7.003	-	-	100	0.000	0.000	0.000
7.004	User	-	100	0.023	0.023	0.023
	User	-	100	0.011	0.011	0.034
	User	-	100	0.011	0.011	0.044
7.005	User	-	100	0.030	0.030	0.030
	User	-	100	0.011	0.011	0.040
8.000	User	-	100	0.041	0.041	0.041
	User	-	100	0.011	0.011	0.052
8.001	User	-	100	0.008	0.008	0.008
	User	-	100	0.007	0.007	0.014
8.002	-	-	100	0.000	0.000	0.000
8.003	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.021	0.021	0.021
	User	-	100	0.007	0.007	0.028
	User	-	100	0.007	0.007	0.035
9.001	-	-	100	0.000	0.000	0.000
8.004	-	-	100	0.000	0.000	0.000
8.005	-	-	100	0.000	0.000	0.000
10.000	User	-	100	0.023	0.023	0.023

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.010	0.010	0.033
	User	-	100	0.013	0.013	0.046
	User	-	100	0.006	0.006	0.051
10.001	User	-	100	0.008	0.008	0.008
11.000	-	-	100	0.000	0.000	0.000
11.001	-	-	100	0.000	0.000	0.000
11.002	User	-	100	0.060	0.060	0.060
	User	-	100	0.026	0.026	0.085
	User	-	100	0.010	0.010	0.095
	User	-	100	0.009	0.009	0.104
	User	-	100	0.011	0.011	0.116
	User	-	100	0.010	0.010	0.126
11.003	User	-	100	0.050	0.050	0.050
	User	-	100	0.010	0.010	0.060
10.002	User	-	100	0.010	0.010	0.010
	User	-	100	0.007	0.007	0.017
10.003	User	-	100	0.028	0.028	0.028
	User	-	100	0.012	0.012	0.040
7.006	User	-	100	0.006	0.006	0.006
7.007	-	-	100	0.000	0.000	0.000
7.008	-	-	100	0.000	0.000	0.000
1.012	User	-	100	0.046	0.046	0.046
	User	-	100	0.015	0.015	0.061
	User	-	100	0.010	0.010	0.071
	User	-	100	0.010	0.010	0.081
	User	-	100	0.010	0.010	0.091
1.013	-	-	100	0.000	0.000	0.000
12.000	User	-	100	0.107	0.107	0.107

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.010	0.010	0.117
	User	-	100	0.014	0.014	0.131
	User	-	100	0.014	0.014	0.145
	User	-	100	0.010	0.010	0.156
	User	-	100	0.010	0.010	0.165
12.001	User	-	100	0.034	0.034	0.034
	User	-	100	0.026	0.026	0.060
	User	-	100	0.045	0.045	0.104
	User	-	100	0.017	0.017	0.121
	User	-	100	0.011	0.011	0.131
	User	-	100	0.010	0.010	0.141
	User	-	100	0.006	0.006	0.147
	User	-	100	0.011	0.011	0.159
	User	-	100	0.011	0.011	0.170
12.002	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
13.000	User	-	100	0.046	0.046	0.046
	User	-	100	0.010	0.010	0.056
	User	-	100	0.010	0.010	0.066
13.001	User	-	100	0.019	0.019	0.019
	User	-	100	0.010	0.010	0.030
13.002	User	-	100	0.044	0.044	0.044
	User	-	100	0.006	0.006	0.050
	User	-	100	0.006	0.006	0.056
	User	-	100	0.010	0.010	0.065
13.003	User	-	100	0.011	0.011	0.011
13.004	-	-	100	0.000	0.000	0.000
13.005	User	-	100	0.006	0.006	0.006

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
13.006	User	-	100	0.029	0.029	0.029
	User	-	100	0.006	0.006	0.034
	User	-	100	0.011	0.011	0.046
	User	-	100	0.006	0.006	0.051
13.007	User	-	100	0.017	0.017	0.017
1.015	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
1.017	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.188	2.188	2.188

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Network Classifications for Surface Network 1

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	S56	150	1.200	1.237	Unclassified	1350	0	1.200	Unclassified
1.001	S55	150	1.200	1.237	Unclassified	1350	0	1.237	Unclassified
1.002	S54	150	1.003	1.200	Unclassified	1350	0	1.200	Unclassified
1.003	S53	225	1.003	1.201	Unclassified	1350	0	1.003	Unclassified
2.000	S67	150	1.200	1.200	Unclassified	1350	0	1.200	Unclassified
2.001	S68	150	1.200	1.200	Unclassified	1350	0	1.200	Unclassified
2.002	S69	150	1.200	1.200	Unclassified	1350	0	1.200	Unclassified
1.004	S52	225	1.201	1.533	Unclassified	1350	0	1.201	Unclassified
3.000	S70	225	0.925	1.347	Unclassified	1350	0	0.925	Unclassified
3.001	S71	225	1.347	1.382	Unclassified	1350	0	1.347	Unclassified
1.005	S51	300	1.110	1.382	Unclassified	1350	0	1.382	Unclassified
1.006	S50	300	1.037	1.110	Unclassified	1350	0	1.110	Unclassified
4.000	S60	150	1.200	1.200	Unclassified	1350	0	1.200	Unclassified
4.001	S61	225	1.125	1.125	Unclassified	1350	0	1.125	Unclassified
4.002	S62	225	1.098	1.125	Unclassified	1350	0	1.125	Unclassified
4.003	S31	225	0.375	2.062	Unclassified	1500	0	2.062	Unclassified
5.000	S66	150	1.200	1.292	Unclassified	1350	0	1.200	Unclassified
5.001	S65	150	1.191	1.292	Unclassified	1350	0	1.292	Unclassified
6.000	-	150	1.620	1.635	Unclassified				Junction
6.001	S76	150	1.191	1.629	Unclassified	1500	0	1.629	Unclassified
5.002	S64	225	1.191	1.600	Unclassified	1350	0	1.191	Unclassified
5.003	S63	225	0.700	1.600	Unclassified	1350	0	1.600	Unclassified
4.004	S30				Pond/Tank	1350	0	-0.003	Unclassified
4.005	S28	300	0.300	1.037	Unclassified	1500	0	0.300	Unclassified
1.007	S27	375	0.290	1.037	Unclassified	1350	0	1.037	Unclassified
1.008	S26				Pond/Tank	1500	0	0.000	Unclassified

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Network Classifications for Surface Network 1

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.009	S25	300	0.365	1.033	Unclassified	1500	0	0.365	Unclassified
1.010	S75	300	0.554	0.975	Unclassified	1350	0	0.975	Unclassified
1.011	S24	600	0.254	0.354	Unclassified	1500	0	0.254	Unclassified
7.000	S11	150	1.200	1.200	Unclassified	1350	0	1.200	Unclassified
7.001	S12	150	1.200	1.235	Unclassified	1350	0	1.200	Unclassified
7.002	S14	225	1.160	1.214	Unclassified	1350	0	1.160	Unclassified
7.003	S22	225	1.214	1.235	Unclassified	1350	0	1.214	Unclassified
7.004	S15	225	1.125	1.235	Unclassified	1350	0	1.235	Unclassified
7.005	S16	225	1.125	1.175	Unclassified	1350	0	1.125	Unclassified
8.000	S44	150	1.200	1.219	Unclassified	1350	0	1.200	Unclassified
8.001	S43	150	1.200	1.219	Unclassified	1350	0	1.219	Unclassified
8.002	S42	150	0.075	1.200	Unclassified	1350	0	1.200	Unclassified
8.003	S72	300	0.075	0.075	Unclassified	1350	0	0.075	Unclassified
9.000	S73	150	0.900	0.900	Unclassified	1350	0	0.900	Unclassified
9.001	S48	150	0.050	0.900	Unclassified	1350	0	0.900	Unclassified
8.004	S74				Swale	1350	0	-0.139	Unclassified
8.005	S45	375	0.000	0.686	Unclassified	1350	0	0.000	Unclassified
10.000	S41	150	1.161	1.200	Unclassified	1350	0	1.200	Unclassified
10.001	S40	150	1.101	1.161	Unclassified	1350	0	1.161	Unclassified
11.000	S57	300	0.723	1.300	Unclassified	1350	0	0.723	Unclassified
11.001	S77	300	1.050	1.300	Unclassified	1350	0	1.300	Unclassified
11.002	S59	300	1.050	1.050	Unclassified	1350	0	1.050	Unclassified
11.003	S58	300	1.050	1.101	Unclassified	1350	0	1.050	Unclassified
10.002	S39	300	1.050	1.101	Unclassified	1350	0	1.101	Unclassified
10.003	S38	300	0.800	1.050	Unclassified	1350	0	1.050	Unclassified
7.006	S17				Pond/Tank	1800	0	-0.003	Unclassified


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Network Classifications for Surface Network 1

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
7.007	S18	600	0.800	1.159	Unclassified	1800	0	0.800	Unclassified
7.008	S49	300	0.654	1.459	Unclassified	1800	0	1.459	Unclassified
1.012	S19				Pond/Tank	1800	0	-0.008	Unclassified
1.013	S20	450	0.504	0.781	Unclassified	1800	0	0.504	Unclassified
12.000	S37	225	1.125	1.125	Unclassified	1350	0	1.125	Unclassified
12.001	S36	300	0.700	1.050	Unclassified	1350	0	1.050	Unclassified
12.002	S35	300	0.700	0.931	Unclassified	1350	0	0.700	Unclassified
1.014	S23	450	0.450	0.781	Unclassified	1800	0	0.781	Unclassified
13.000	S2	150	1.200	1.299	Unclassified	1350	0	1.200	Unclassified
13.001	S3	150	1.299	1.468	Unclassified	1350	0	1.299	Unclassified
13.002	S4	225	1.219	1.393	Unclassified	1350	0	1.393	Unclassified
13.003	S5	225	0.415	1.219	Unclassified	1350	0	1.219	Unclassified
13.004	S32	225	0.415	0.425	Unclassified	1350	0	0.415	Unclassified
13.005	S34	300	0.350	1.226	Unclassified	1350	0	0.350	Unclassified
13.006	S6	300	1.169	1.226	Unclassified	1350	0	1.226	Unclassified
13.007	S33	300	0.600	1.169	Unclassified	1500	0	1.169	Unclassified
1.015	S21	450	0.440	0.450	Unclassified	1800	0	0.440	Unclassified
1.016	S69	300	0.508	0.600	Unclassified	1350	0	0.600	Unclassified
1.017	-	300	0.508	0.529	Unclassified				Junction

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.017	S9	19.100	18.271	0.000	0	0


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Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coefficient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m ³ /ha Storage	2.000	Output Interval (mins)	1
Number of Input Hydrographs		0	Number of Offline Controls		1
Number of Online Controls		7	Number of Storage Structures		36
			Number of Time/Area Diagrams		0
			Number of Real Time Controls		0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 455750 108500 SU 55750 08500	Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	30

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Online Controls for Surface Network 1


Hydro-Brake® Optimum Manhole: S31, DS/PN: 4.003, Volume (m³): 4.5

Unit Reference	MD-SHE-0122-9300-2287-9300	Sump Available	Yes
Design Head (m)	2.287	Diameter (mm)	122
Design Flow (l/s)	9.3	Invert Level (m)	19.500
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.287	9.3	Kick-Flo®	1.092	6.6
Flush-Flo™	0.532	8.3	Mean Flow over Head Range	-	7.6

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	0.600	8.3	1.600	7.8	2.600	9.9	5.000	13.5	7.500	16.3
0.200	7.1	0.800	8.0	1.800	8.3	3.000	10.6	5.500	14.1	8.000	16.8
0.300	7.9	1.000	7.2	2.000	8.7	3.500	11.4	6.000	14.7	8.500	17.3
0.400	8.2	1.200	6.9	2.200	9.1	4.000	12.1	6.500	15.3	9.000	17.8
0.500	8.3	1.400	7.4	2.400	9.5	4.500	12.8	7.000	15.8	9.500	18.3

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Hydro-Brake® Optimum Manhole: S76, DS/PN: 6.001, Volume (m³): 3.2

Unit Reference	MD-SHE-0062-2000-1379-2000	Sump Available	Yes
Design Head (m)	1.379	Diameter (mm)	62
Design Flow (l/s)	2.0	Invert Level (m)	22.071
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	75
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		


Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.379	2.0	Kick-Flo®	0.553	1.3
Flush-Flo™	0.271	1.6	Mean Flow over Head Range	-	1.6

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.4	0.600	1.4	1.600	2.1	2.600	2.7	5.000	3.6	7.500	4.4
0.200	1.6	0.800	1.6	1.800	2.3	3.000	2.9	5.500	3.8	8.000	4.5
0.300	1.6	1.000	1.7	2.000	2.4	3.500	3.1	6.000	3.9	8.500	4.6
0.400	1.6	1.200	1.9	2.200	2.5	4.000	3.3	6.500	4.1	9.000	4.8
0.500	1.5	1.400	2.0	2.400	2.6	4.500	3.4	7.000	4.2	9.500	4.9

Hydro-Brake® Optimum Manhole: S28, DS/PN: 4.005, Volume (m³): 123.9

Unit Reference	MD-SHE-0146-9300-0600-9300	Objective	Minimise upstream storage
Design Head (m)	0.600	Application	Surface
Design Flow (l/s)	9.3	Sump Available	Yes
Flush-Flo™	Calculated	Diameter (mm)	146

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Hydro-Brake® Optimum Manhole: S28, DS/PN: 4.005, Volume (m³): 123.9

Invert Level (m) 19.200 Suggested Manhole Diameter (mm) 1200
Minimum Outlet Pipe Diameter (mm) 225


Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	9.3	Kick-Flo®	0.452	8.1
Flush-Flo™	0.229	9.3	Mean Flow over Head Range	-	7.6

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.3	0.600	9.3	1.600	14.8	2.600	18.6	5.000	25.5	7.500	31.0
0.200	9.3	0.800	10.6	1.800	15.6	3.000	20.0	5.500	26.7	8.000	32.0
0.300	9.2	1.000	11.8	2.000	16.4	3.500	21.5	6.000	27.8	8.500	33.0
0.400	8.7	1.200	12.9	2.200	17.2	4.000	22.9	6.500	28.8	9.000	34.0
0.500	8.5	1.400	13.9	2.400	17.9	4.500	24.2	7.000	29.9	9.500	34.9

Hydro-Brake® Optimum Manhole: S49, DS/PN: 7.008, Volume (m³): 5.7

Unit Reference	MD-SHE-0067-2000-1000-2000	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	67
Design Flow (l/s)	2.0	Invert Level (m)	18.476
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	100
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

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Hydro-Brake® Optimum Manhole: S49, DS/PN: 7.008, Volume (m³): 5.7

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.0	Kick-Flo®	0.599	1.6
Flush-Flo™	0.296	1.9	Mean Flow over Head Range	-	1.7


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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.6	0.600	1.6	1.600	2.5	2.600	3.1	5.000	4.2	7.500	5.1
0.200	1.9	0.800	1.8	1.800	2.6	3.000	3.3	5.500	4.4	8.000	5.2
0.300	1.9	1.000	2.0	2.000	2.7	3.500	3.5	6.000	4.6	8.500	5.4
0.400	1.9	1.200	2.2	2.200	2.9	4.000	3.8	6.500	4.7	9.000	5.5
0.500	1.8	1.400	2.3	2.400	3.0	4.500	4.0	7.000	4.9	9.500	5.7

Hydro-Brake® Optimum Manhole: S23, DS/PN: 1.014, Volume (m³): 4.7

Unit Reference	MD-SHE-0165-1310-1000-1310	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	165
Design Flow (l/s)	13.1	Invert Level (m)	18.330
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	225
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	13.1	Kick-Flo®	0.694	11.0
Flush-Flo™	0.315	13.1	Mean Flow over Head Range	-	11.2

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Hydro-Brake® Optimum Manhole: S23, DS/PN: 1.014, Volume (m³): 4.7

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.9	0.600	12.2	1.600	16.4	2.600	20.6	5.000	28.2	7.500	34.3
0.200	12.7	0.800	11.8	1.800	17.3	3.000	22.1	5.500	29.6	8.000	35.4
0.300	13.1	1.000	13.1	2.000	18.2	3.500	23.8	6.000	30.8	8.500	36.5
0.400	13.0	1.200	14.3	2.200	19.0	4.000	25.4	6.500	32.0	9.000	37.5
0.500	12.7	1.400	15.4	2.400	19.9	4.500	26.8	7.000	33.2	9.500	38.5

Hydro-Brake® Optimum Manhole: S33, DS/PN: 13.007, Volume (m³): 4.4

Unit Reference	MD-SHE-0089-3500-1000-3500	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	89
Design Flow (l/s)	3.5	Invert Level (m)	18.355
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	3.5	Kick-Flo®	0.632	2.8
Flush-Flo™	0.300	3.5	Mean Flow over Head Range	-	3.1

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

Hydro-Brake® Optimum Manhole: S33, DS/PN: 13.007, Volume (m³): 4.4

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	0.600	3.0	1.600	4.3	2.600	5.4	5.000	7.4	7.500	9.0
0.200	3.4	0.800	3.1	1.800	4.6	3.000	5.8	5.500	7.7	8.000	9.2
0.300	3.5	1.000	3.5	2.000	4.8	3.500	6.2	6.000	8.1	8.500	9.5
0.400	3.4	1.200	3.8	2.200	5.0	4.000	6.7	6.500	8.4	9.000	9.8
0.500	3.3	1.400	4.1	2.400	5.2	4.500	7.0	7.000	8.7	9.500	10.0


Hydro-Brake® Optimum Manhole: S69, DS/PN: 1.016, Volume (m³): 2.1

Unit Reference MD-SHE-0142-9300-0900-9300	Sump Available	Yes
Design Head (m)	0.900	Diameter (mm) 142
Design Flow (l/s)	9.3	Invert Level (m) 18.300
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm) 225
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm) 1200
Application	Surface	

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	9.3	Kick-Flo®	0.617	7.8
Flush-Flo™	0.279	9.2	Mean Flow over Head Range	-	7.9


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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	0.300	9.2	0.500	8.8	0.800	8.8	1.200	10.6	1.600	12.2
0.200	9.1	0.400	9.1	0.600	8.0	1.000	9.8	1.400	11.4	1.800	12.9

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Hydro-Brake® Optimum Manhole: S69, DS/PN: 1.016, Volume (m³): 2.1


Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
2.000	13.6	2.600	15.4	4.000	18.9	5.500	22.0	7.000	24.7	8.500	27.1
2.200	14.2	3.000	16.4	4.500	20.0	6.000	22.9	7.500	25.5	9.000	27.9
2.400	14.8	3.500	17.7	5.000	21.0	6.500	23.8	8.000	26.3	9.500	28.5

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Offline Controls for Surface Network 1

Pipe Manhole: S49, DS/PN: 7.008, Loop to PN: 1.017

Diameter (m)	0.150	Length (m)	114.269	Coefficient of Contraction	0.600
Section Type	Pipe/Conduit	Roughness k (mm)	0.600	Upstream Invert Level (m)	19.700
Slope (1:X)	91.0	Entry Loss Coefficient	0.500		

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Storage Structures for Surface Network 1

Complex Manhole: S56, DS/PN: 1.000

Porous Car Park


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	32.0
Max Percolation (l/s)	42.7	Slope (1:X)	26.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.264	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	26.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.264	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	26.264
Max Percolation (l/s)	10.4	Width (m)	5.0
Safety Factor	2.0	Length (m)	7.5

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Porous Car Park

Slope (1:X) 26.0 Evaporation (mm/day) 3
Depression Storage (mm) 5 Membrane Depth (mm) 130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	26.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.264	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	26.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.264	Membrane Depth (mm)	130

Complex Manhole: S54, DS/PN: 1.002

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	38.7
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

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Porous Car Park

Porosity	0.30	Slope (1:X)	20.0
Invert Level (m)	25.269	Depression Storage (mm)	5
Width (m)	4.8	Evaporation (mm/day)	3
Length (m)	29.0	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	25.269	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	25.269	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	25.269
Max Percolation (l/s)	6.9	Width (m)	5.0
Safety Factor	2.0	Length (m)	5.0

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Porous Car Park

Slope (1:X) 20.0 Evaporation (mm/day) 3
Depression Storage (mm) 5 Membrane Depth (mm) 130

Complex Manhole: S67, DS/PN: 2.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	37.0
Max Percolation (l/s)	42.1	Slope (1:X)	13.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.764	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	13.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.764	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	13.9
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

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Porous Car Park

Porosity	0.30	Slope (1:X)	13.0
Invert Level (m)	26.764	Depression Storage (mm)	5
Width (m)	5.0	Evaporation (mm/day)	3
Length (m)	10.0	Membrane Depth (mm)	130

Complex Manhole: S52, DS/PN: 1.004

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	39.5
Max Percolation (l/s)	52.7	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.659	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.659	Membrane Depth (mm)	130

84 North Street
Guildford
Surrey GU1 4AU



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Designed by Chris Gray

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Causeway

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Complex Manhole: S70, DS/PN: 3.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	41.0
Max Percolation (l/s)	46.7	Slope (1:X)	151.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.693	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	151.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.693	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	151.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.693	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	151.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.693	Membrane Depth (mm)	130

Porous Car Park


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	151.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.693	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	151.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.693	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	6.9
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

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Porous Car Park

Porosity	0.30	Slope (1:X)	151.0
Invert Level (m)	20.693	Depression Storage (mm)	5
Width (m)	5.0	Evaporation (mm/day)	3
Length (m)	5.0	Membrane Depth (mm)	130

Porous Car Park Manhole: S71, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	18.0
Max Percolation (l/s)	20.5	Slope (1:X)	151.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.867	Membrane Depth (mm)	130

Porous Car Park Manhole: S51, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	24.0
Max Percolation (l/s)	32.0	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.942	Membrane Depth (mm)	130

Complex Manhole: S61, DS/PN: 4.001

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	34.0
Max Percolation (l/s)	45.3	Slope (1:X)	10.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	26.0
Max Percolation (l/s)	34.7	Slope (1:X)	146.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	47.0
Max Percolation (l/s)	62.7	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	10.4
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

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Porous Car Park

Porosity	0.30	Slope (1:X)	10.0
Invert Level (m)	22.867	Depression Storage (mm)	5
Width (m)	5.0	Evaporation (mm/day)	3
Length (m)	7.5	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	10.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	146.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	22.867
Max Percolation (l/s)	13.9	Width (m)	5.0
Safety Factor	2.0	Length (m)	10.0

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Porous Car Park

Slope (1:X) 146.0 Evaporation (mm/day) 3
Depression Storage (mm) 5 Membrane Depth (mm) 130

Porous Car Park


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	10.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	10.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	10.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	10.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.867	Membrane Depth (mm)	130

Tank or Pond Manhole: S31, DS/PN: 4.003

Invert Level (m) 21.200


Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	0.200	15.3	0.400	40.4	0.587	72.4
0.100	6.3	0.300	26.7	0.500	56.5		

Complex Manhole: S76, DS/PN: 6.001

Cellular Storage

Invert Level (m)	22.071	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	150.0	150.0	0.800	150.0	206.0	0.801	0.0	206.0

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	30.0
Max Percolation (l/s)	41.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.420	Membrane Depth (mm)	130

Tank or Pond Pipe: 4.004

Manning's N 0.010 Invert Level (m) 19.200


Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	143.2	0.200	189.1	0.400	237.3	0.512	265.2
0.100	165.7	0.300	212.9	0.500	262.1		

Porous Car Park Manhole: S27, DS/PN: 1.007

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	44.5
Membrane Percolation (mm/hr)	1000	Length (m)	4.1
Max Percolation (l/s)	50.7	Slope (1:X)	149.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.582	Membrane Depth (mm)	149

Tank or Pond Pipe: 1.008

Manning's N 0.010 Invert Level (m) 18.900

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Tank or Pond Pipe: 1.008

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	19.6	0.200	38.9	0.400	60.6	0.600	84.6
0.100	28.9	0.300	49.5	0.500	72.3	0.665	92.9


Complex Manhole: S25, DS/PN: 1.009

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	33.0
Membrane Percolation (mm/hr)	1000	Length (m)	4.1
Max Percolation (l/s)	37.6	Slope (1:X)	149.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.135	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.5
Membrane Percolation (mm/hr)	1000	Length (m)	8.5
Max Percolation (l/s)	15.3	Slope (1:X)	149.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.535	Membrane Depth (mm)	130

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Complex Manhole: S11, DS/PN: 7.000

Porous Car Park


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	16.0
Max Percolation (l/s)	18.2	Slope (1:X)	15.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.446	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	27.0
Max Percolation (l/s)	36.0	Slope (1:X)	15.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.446	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	15.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.446	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	15.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.446	Membrane Depth (mm)	130

Complex Manhole: S12, DS/PN: 7.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	12.0
Max Percolation (l/s)	16.0	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	24.639	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	14.0
Max Percolation (l/s)	18.7	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	24.639	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	24.639	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	24.639	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	24.639	Membrane Depth (mm)	130

Complex Manhole: S14, DS/PN: 7.002

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	36.0
Max Percolation (l/s)	48.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.869	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.5
Max Percolation (l/s)	10.4	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.869	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.869	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	7.6
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

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Porous Car Park

Porosity	0.30	Slope (1:X)	33.0
Invert Level (m)	23.869	Depression Storage (mm)	5
Width (m)	2.5	Evaporation (mm/day)	3
Length (m)	11.0	Membrane Depth (mm)	130


Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.869	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.869	Membrane Depth (mm)	130

Complex Manhole: S15, DS/PN: 7.004

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	30.5
Max Percolation (l/s)	40.7	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.804	Membrane Depth (mm)	130


Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	22.804	Membrane Depth (mm)	130

Complex Manhole: S44, DS/PN: 8.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	36.0
Max Percolation (l/s)	48.0	Slope (1:X)	30.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.223	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	16.0
Max Percolation (l/s)	11.1	Slope (1:X)	30.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	26.223	Membrane Depth (mm)	130

Porous Car Park Manhole: S43, DS/PN: 8.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	12.0
Max Percolation (l/s)	13.7	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	25.322	Membrane Depth (mm)	130

Porous Car Park Manhole: S73, DS/PN: 9.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	24.5
Max Percolation (l/s)	27.9	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	24.194	Membrane Depth (mm)	130

Swale Pipe: 8.004

Manning's N	0.010	Infiltration Coefficient Side (m/hr)	0.00000
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0

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Swale Pipe: 8.004

Porosity	1.00	Side Slope (1:X)	3.0
Invert Level (m)	22.900	Slope (1:X)	29.2
Base Width (m)	2.0	Cap Volume Depth (m)	0.000
Length (m)	40.9	Cap Infiltration Depth (m)	0.000


Complex Manhole: S41, DS/PN: 10.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	17.0
Max Percolation (l/s)	19.4	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.985	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	24.5
Max Percolation (l/s)	27.9	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.985	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	9.5
Max Percolation (l/s)	10.8	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.985	Membrane Depth (mm)	130

Tank or Pond Manhole: S57, DS/PN: 11.000

Invert Level (m) 23.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	0.100	6.2	0.200	15.3	0.300	26.3	0.400	39.1	0.403	39.6

Tank or Pond Pipe: 7.006

Manning's N 0.010 Invert Level (m) 18.600

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	316.6	0.300	387.0	0.600	463.0	0.900	544.0	1.200	630.1
0.100	339.2	0.400	411.8	0.700	489.4	1.000	572.1	1.300	659.9
0.200	362.8	0.500	437.1	0.800	516.4	1.100	600.8	1.325	667.5

Complex Manhole: S19, DS/PN: 1.012

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	39.0
Membrane Percolation (mm/hr)	1000	Length (m)	4.1
Max Percolation (l/s)	44.4	Slope (1:X)	147.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	18.474	Membrane Depth (mm)	130

Porous Car Park


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	4.1
Max Percolation (l/s)	22.8	Slope (1:X)	147.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	18.474	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.5
Membrane Percolation (mm/hr)	1000	Length (m)	10.5
Max Percolation (l/s)	19.0	Slope (1:X)	147.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	18.874	Membrane Depth (mm)	130

Tank or Pond Pipe: 1.012

Manning's N 0.010 Invert Level (m) 18.350

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Tank or Pond Pipe: 1.012

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	2.2	0.200	504.1	0.400	657.0	0.600	812.0	0.800	969.4	0.954	1092.4
0.100	367.3	0.300	580.3	0.500	734.2	0.700	890.4	0.900	1048.9		

Complex Manhole: S36, DS/PN: 12.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	27.0
Membrane Percolation (mm/hr)	1000	Length (m)	4.8
Max Percolation (l/s)	36.0	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.142	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	42.0
Max Percolation (l/s)	56.0	Slope (1:X)	42.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.542	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	42.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.542	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	42.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.542	Membrane Depth (mm)	130

Porous Car Park Manhole: S2, DS/PN: 13.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	40.5
Max Percolation (l/s)	54.0	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	23.361	Membrane Depth (mm)	130

Complex Manhole: S3, DS/PN: 13.001

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	26.7	Slope (1:X)	25.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.740	Membrane Depth (mm)	130


Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	25.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.740	Membrane Depth (mm)	130

Complex Manhole: S4, DS/PN: 13.002

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	38.0
Max Percolation (l/s)	50.7	Slope (1:X)	75.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.639	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	75.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.639	Membrane Depth (mm)	130

Porous Car Park


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	11.0
Max Percolation (l/s)	7.6	Slope (1:X)	75.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.639	Membrane Depth (mm)	130

Porous Car Park Manhole: S5, DS/PN: 13.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	6.5
Max Percolation (l/s)	8.7	Slope (1:X)	75.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.674	Membrane Depth (mm)	130

Tank or Pond Manhole: S34, DS/PN: 13.005

Invert Level (m) 18.550

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Tank or Pond Manhole: S34, DS/PN: 13.005

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	53.3	0.200	70.7	0.400	90.5	0.571	109.2
0.100	61.6	0.300	80.3	0.500	101.2		


Complex Manhole: S6, DS/PN: 13.006

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	27.5
Max Percolation (l/s)	36.7	Slope (1:X)	146.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.574	Membrane Depth (mm)	130

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	146.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.574	Membrane Depth (mm)	130

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Complex Manhole: S33, DS/PN: 13.007

Cellular Storage

Invert Level (m) 18.355 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	43.8	43.8	0.800	43.8	75.8	0.801	0.0	75.8


Cellular Storage

Invert Level (m) 18.355 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	67.5	67.5	0.400	67.5	91.1	0.401	0.0	91.1

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	24.5
Membrane Percolation (mm/hr)	1000	Length (m)	4.8
Max Percolation (l/s)	32.7	Slope (1:X)	146.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.394	Membrane Depth (mm)	130

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.0
Max Percolation (l/s)	4.2	Slope (1:X)	146.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	19.394	Membrane Depth (mm)	130

Tank or Pond Manhole: S69, DS/PN: 1.016

Invert Level (m) 18.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	112.0	0.200	142.8	0.400	176.3	0.600	212.0
0.100	127.0	0.300	159.3	0.500	193.9	0.674	225.8

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Manhole Headloss for Surface Network 1

PN	US/MH Name	US/MH Headloss
1.000	S56	0.500
1.001	S55	0.500
1.002	S54	0.500
1.003	S53	0.500
2.000	S67	0.500
2.001	S68	0.500
2.002	S69	0.500
1.004	S52	0.500
3.000	S70	0.500
3.001	S71	0.500
1.005	S51	0.500
1.006	S50	0.500
4.000	S60	0.500
4.001	S61	0.500
4.002	S62	0.500
4.003	S31	0.500
5.000	S66	0.500
5.001	S65	0.500
6.000	-	0.000
6.001	S76	0.500
5.002	S64	0.500
5.003	S63	0.500
4.004	S30	0.500
4.005	S28	0.500
1.007	S27	0.500
1.008	S26	0.500
1.009	S25	0.500
1.010	S75	0.500

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Manhole Headloss for Surface Network 1

PN	US/MH Name	US/MH Headloss
1.011	S24	0.500
7.000	S11	0.500
7.001	S12	0.500
7.002	S14	0.500
7.003	S22	0.500
7.004	S15	0.500
7.005	S16	0.500
8.000	S44	0.500
8.001	S43	0.500
8.002	S42	0.500
8.003	S72	0.500
9.000	S73	0.500
9.001	S48	0.500
8.004	S74	0.500
8.005	S45	0.500
10.000	S41	0.500
10.001	S40	0.500
11.000	S57	0.500
11.001	S77	0.500
11.002	S59	0.500
11.003	S58	0.500
10.002	S39	0.500
10.003	S38	0.500
7.006	S17	0.500
7.007	S18	0.500
7.008	S49	0.500
1.012	S19	0.500
1.013	S20	0.500

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Manhole Headloss for Surface Network 1

PN	US/MH Name	US/MH Headloss
12.000	S37	0.500
12.001	S36	0.500
12.002	S35	0.500
1.014	S23	0.500
13.000	S2	0.500
13.001	S3	0.500
13.002	S4	0.500
13.003	S5	0.500
13.004	S32	0.500
13.005	S34	0.500
13.006	S6	0.500
13.007	S33	0.500
1.015	S21	0.500
1.016	S69	0.500
1.017	-	0.000

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	S56	1.932	0.351	14.658	16.941
1.001	S55	1.986	0.108	0.000	2.093
1.002	S54	1.932	0.534	7.609	10.076
1.003	S53	1.758	0.281	0.000	2.039
2.000	S67	1.932	0.421	4.607	6.961
2.001	S68	1.932	0.152	0.000	2.084
2.002	S69	1.932	0.183	0.000	2.115
1.004	S52	2.041	2.167	3.552	7.761
3.000	S70	1.646	1.185	26.769	29.601
3.001	S71	2.250	0.517	8.922	11.690
1.005	S51	2.408	1.175	2.419	6.001
1.006	S50	2.018	0.745	0.000	2.763
4.000	S60	1.932	0.227	0.000	2.160
4.001	S61	1.932	1.567	31.189	34.689
4.002	S62	1.932	0.498	0.000	2.430
4.003	S31	4.041	0.752	17.092	21.886
5.000	S66	1.932	0.415	0.000	2.347
5.001	S65	2.064	0.150	0.000	2.214
6.000	-	0.000	0.039	0.000	0.039
6.001	S76	3.144	0.102	127.548	130.793
5.002	S64	2.027	1.213	0.000	3.239
5.003	S63	2.612	0.663	0.000	3.275
4.004	S30	0.859	128.057	0.000	128.916
4.005	S28	1.060	1.200	0.000	2.260
1.007	S27	2.021	1.392	37.275	40.687

Volume Summary (Static)

Pipe Number	USMH Name	Manhole Volume (m ³)	Pipe Volume (m ³)	Storage Structure Volume (m ³)	Total Volume (m ³)
1.008	S26	1.175	36.085	0.000	37.260
1.009	S25	1.175	0.783	12.177	14.135
1.010	S75	1.825	1.322	0.000	3.147
1.011	S24	1.509	11.815	0.000	13.324
7.000	S11	1.932	0.480	7.129	9.541
7.001	S12	1.932	0.446	13.641	16.019
7.002	S14	1.983	1.163	27.351	30.498
7.003	S22	2.059	0.258	0.000	2.317
7.004	S15	2.090	1.708	5.300	9.098
7.005	S16	1.932	0.927	0.000	2.860
8.000	S44	1.932	0.411	5.530	7.873
8.001	S43	1.960	0.177	2.071	4.209
8.002	S42	1.932	0.282	0.000	2.214
8.003	S72	0.537	1.321	0.000	1.857
9.000	S73	1.503	0.218	2.068	3.789
9.001	S48	1.503	0.235	0.000	1.738
8.004	S74	0.286	41.842	0.000	42.129
8.005	S45	0.537	3.276	0.000	3.812
10.000	S41	1.932	0.473	6.208	8.614
10.001	S40	1.877	0.366	0.000	2.243
11.000	S57	1.464	0.915	11.422	13.801
11.001	S77	2.290	2.478	0.000	4.768
11.002	S59	1.932	1.432	0.000	3.364
11.003	S58	1.932	1.842	0.000	3.774
10.002	S39	2.005	1.381	0.000	3.386
10.003	S38	1.932	1.755	0.000	3.688
7.006	S17	3.563	692.840	0.000	696.403

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Volume Summary (Static)

Pipe Number	USMH Name	Manhole Volume (m ³)	Pipe Volume (m ³)	Storage Structure Volume (m ³)	Total Volume (m ³)
7.007	S18	3.563	1.728	0.000	5.291
7.008	S49	4.476	0.437	0.000	4.914
1.012	S19	2.428	670.571	56.942	729.941
1.013	S20	2.428	1.578	0.000	4.005
12.000	S37	1.932	1.583	0.000	3.515
12.001	S36	1.932	4.053	34.991	40.977
12.002	S35	1.431	0.424	0.000	1.855
1.014	S23	3.133	2.647	0.000	5.780
13.000	S2	1.932	0.661	2.421	5.014
13.001	S3	2.074	0.487	4.257	6.819
13.002	S4	2.316	2.152	12.907	17.375
13.003	S5	2.067	0.298	2.808	5.173
13.004	S32	0.916	0.151	0.000	1.067
13.005	S34	0.930	1.143	54.107	56.180
13.006	S6	2.185	1.933	12.868	16.986
13.007	S33	2.596	0.866	70.869	74.331
1.015	S21	2.265	1.105	0.000	3.370
1.016	S69	1.288	0.058	163.313	164.659
1.017	-	0.000	0.205	0.000	0.205
Total		135.952	1642.405	790.021	2568.378

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	S56	1.932	0.327	14.658	16.917
1.001	S55	1.986	0.084	0.000	2.069
1.002	S54	1.932	0.510	7.609	10.052
1.003	S53	1.758	0.228	0.000	1.985
2.000	S67	1.932	0.398	4.607	6.937
2.001	S68	1.932	0.128	0.000	2.060
2.002	S69	1.932	0.159	0.000	2.091
1.004	S52	2.041	2.114	3.552	7.707
3.000	S70	1.646	1.132	26.769	29.547
3.001	S71	2.250	0.463	8.922	11.636
1.005	S51	2.408	1.079	2.419	5.906
1.006	S50	2.018	0.649	0.000	2.668
4.000	S60	1.932	0.203	0.000	2.136
4.001	S61	1.932	1.514	31.189	34.635
4.002	S62	1.932	0.441	0.000	2.373
4.003	S31	4.041	0.695	17.092	21.829
5.000	S66	1.932	0.391	0.000	2.323
5.001	S65	2.064	0.126	0.000	2.190
6.000	-	0.000	0.025	0.000	0.025
6.001	S76	3.144	0.076	127.548	130.768
5.002	S64	2.027	1.159	0.000	3.186
5.003	S63	2.612	0.609	0.000	3.222
4.004	S30	0.859	122.807	0.000	123.665
4.005	S28	1.060	1.099	0.000	2.159
1.007	S27	2.021	1.234	37.275	40.530

Motion

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84 North Street
Guildford
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File 100Y 45CC FEH 1912032 24052024.MDX

Checked by Jason Morgans

Causeway

Network 2020.1.3

Volume Summary (Static)

Pipe Number	USMH Name	Manhole Volume (m ³)	Pipe Volume (m ³)	Storage Structure Volume (m ³)	Total Volume (m ³)
1.008	S26	1.175	32.272	0.000	33.448
1.009	S25	1.175	0.683	12.177	14.035
1.010	S75	1.825	1.221	0.000	3.046
1.011	S24	1.509	11.348	0.000	12.857
7.000	S11	1.932	0.456	7.129	9.517
7.001	S12	1.932	0.422	13.641	15.996
7.002	S14	1.983	1.109	27.351	30.444
7.003	S22	2.059	0.204	0.000	2.264
7.004	S15	2.090	1.654	5.300	9.044
7.005	S16	1.932	0.865	0.000	2.797
8.000	S44	1.932	0.387	5.530	7.849
8.001	S43	1.960	0.154	2.071	4.185
8.002	S42	1.932	0.258	0.000	2.190
8.003	S72	0.537	1.225	0.000	1.762
9.000	S73	1.503	0.194	2.068	3.765
9.001	S48	1.503	0.211	0.000	1.714
8.004	S74	0.286	40.462	0.000	40.748
8.005	S45	0.537	3.102	0.000	3.638
10.000	S41	1.932	0.449	6.208	8.590
10.001	S40	1.877	0.342	0.000	2.219
11.000	S57	1.464	0.819	11.422	13.706
11.001	S77	2.290	2.383	0.000	4.673
11.002	S59	1.932	1.337	0.000	3.269
11.003	S58	1.932	1.746	0.000	3.679
10.002	S39	2.005	1.286	0.000	3.291
10.003	S38	1.932	1.644	0.000	3.576
7.006	S17	3.563	653.013	0.000	656.576

84 North Street
 Guildford
 Surrey GU1 4AU



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Causeway

Network 2020.1.3


Volume Summary (Static)

Pipe Number	USMH Name	Manhole Volume (m ³)	Pipe Volume (m ³)	Storage Structure Volume (m ³)	Total Volume (m ³)
7.007	S18	3.563	1.219	0.000	4.782
7.008	S49	4.476	0.310	0.000	4.786
1.012	S19	2.428	655.913	56.942	715.282
1.013	S20	2.428	1.291	0.000	3.719
12.000	S37	1.932	1.529	0.000	3.461
12.001	S36	1.932	3.958	34.991	40.881
12.002	S35	1.431	0.312	0.000	1.744
1.014	S23	3.133	2.361	0.000	5.493
13.000	S2	1.932	0.637	2.421	4.990
13.001	S3	2.074	0.464	4.257	6.795
13.002	S4	2.316	2.098	12.907	17.321
13.003	S5	2.067	0.244	2.808	5.119
13.004	S32	0.916	0.097	0.000	1.014
13.005	S34	0.930	1.048	54.107	56.085
13.006	S6	2.185	1.833	12.868	16.885
13.007	S33	2.596	0.750	70.869	74.215
1.015	S21	2.265	0.854	0.000	3.119
1.016	S69	1.288	0.000	163.313	164.601
1.017	-	0.000	0.000	0.000	0.000
Total		135.952	1571.816	790.021	2497.789

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Causeway		Network 2020.1.3


Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	Water Surcharged Flooded							Maximum Discharge		Maximum Velocity (m/s)
			US/CL (m)	Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)		
1.000	S56	30 minute 2 year Winter Q+40%	26.694	25.395	-0.099	0.000	0.25			0.066	7.328	1.6
1.001	S55	30 minute 2 year Winter Q+40%	25.970	24.639	-0.093	0.000	0.31			0.082	8.132	1.5
1.002	S54	30 minute 2 year Winter Q+40%	25.699	24.414	-0.084	0.000	0.38			0.094	11.099	1.9
1.003	S53	30 minute 2 year Winter Q+40%	24.196	23.033	-0.160	0.000	0.18			0.086	11.099	1.5
2.000	S67	30 minute 2 year Winter Q+40%	27.194	25.883	-0.111	0.000	0.15			0.049	6.653	2.0
2.001	S68	15 minute 2 year Winter Q+40%	25.278	23.975	-0.103	0.000	0.20			0.063	5.775	1.9
2.002	S69	30 minute 2 year Summer Q+40%	24.611	23.329	-0.082	0.000	0.40			0.094	11.662	1.9
1.004	S52	30 minute 2 year Winter Q+40%	24.089	22.756	-0.132	0.000	0.35			0.138	35.420	2.8
3.000	S70	30 minute 2 year Winter Q+40%	21.123	20.049	-0.149	0.000	0.25			0.102	7.406	0.7
3.001	S71	30 minute 2 year Winter Q+40%	21.400	19.917	-0.136	0.000	0.33			0.239	8.955	0.7
1.005	S51	30 minute 2 year Winter Q+40%	21.372	19.807	-0.183	0.000	0.32			0.347	45.403	2.1
1.006	S50	30 minute 2 year Winter Q+40%	20.590	19.359	-0.121	0.000	0.66			0.353	45.403	1.2
4.000	S60	30 minute 2 year Winter Q+40%	23.383	22.076	-0.107	0.000	0.18			0.054	2.687	0.6
4.001	S61	15 minute 2 year Winter Q+40%	23.297	22.023	-0.149	0.000	0.23			0.153	7.505	1.8
4.002	S62	30 minute 2 year Winter Q+40%	22.038	21.224	0.311	0.000	0.33			1.264	11.983	1.4
4.003	S31	30 minute 2 year Winter Q+40%	21.787	21.211	1.486	0.000	0.14			3.457	11.983	0.3
5.000	S66	30 minute 2 year Winter Q+40%	25.060	23.756	-0.103	0.000	0.21			0.060	9.026	1.7
5.001	S65	30 minute 2 year Winter Q+40%	24.010	22.623	-0.095	0.000	0.29			0.077	12.457	1.9
6.000	-	240 minute 2 year Winter Q+40%	23.850	22.176	-0.054	0.000	0.00			0.091	-0.009	0.1
6.001	S76	240 minute 2 year Winter Q+40%	23.850	22.176	-0.045	0.000	0.12			15.139	20.954	0.5
5.002	S64	15 minute 2 year Winter Q+40%	23.374	22.017	-0.166	0.000	0.15			0.078	17.126	2.6
5.003	S63	15 minute 2 year Winter Q+40%	21.271	19.528	-0.143	0.000	0.28			0.117	18.877	1.9
4.004	S30	120 minute 2 year Winter Q+40%	19.800	19.413	-0.387	0.000	0.01			1.438	71.901	0.1
4.005	S28	120 minute 2 year Winter Q+40%	19.800	19.407	-0.093	0.000	0.11			33.104	65.239	0.9
1.007	S27	30 minute 2 year Winter Q+40%	20.412	19.188	-0.187	0.000	0.50			0.520	67.668	1.1
1.008	S26	30 minute 2 year Winter Q+40%	19.565	19.067	-0.498	0.000	0.05			0.613	67.388	0.2

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Causeway	Network 2020.1.3	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain	Pipe	Status
		Time (mins)	Flow (l/s)	
1.000	S56	13	8.4	OK
1.001	S55		9.0	OK
1.002	S54	15	13.7	OK
1.003	S53		13.6	OK
2.000	S67	13	7.4	OK
2.001	S68		8.5	OK
2.002	S69		14.2	OK
1.004	S52	14	42.1	OK
3.000	S70	12	8.5	OK
3.001	S71	14	10.3	OK
1.005	S51	19	53.9	OK
1.006	S50		53.7	OK
4.000	S60		2.4	OK
4.001	S61	8	19.9	OK
4.002	S62		19.9	SURCHARGED
4.003	S31		8.2	SURCHARGED
5.000	S66		8.0	OK
5.001	S65		11.4	OK
6.000	-		0.0	OK*
6.001	S76	149	1.4	OK
5.002	S64		21.3	OK
5.003	S63		24.5	OK
4.004	S30		21.1	OK
4.005	S28		9.2	OK
1.007	S27	12	62.0	OK


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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

	Half Drain Pipe			
	US/MH	Time	Flow	
PN	Name	(mins)	(l/s)	
			Status	
1.008	S26		61.0	OK


Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)
1.009	S25	30 minute	19.565	19.062	-0.138	0.000	0.56		4.237	72.170	1.7
1.010	S75	30 minute	20.008	18.895	-0.138	0.000	0.57		0.534	71.931	1.7
1.011	S24	960 minute	19.304	18.848	-0.202	0.000	0.05		1.673	349.242	0.3
7.000	S11	30 minute	26.876	25.567	-0.108	0.000	0.17		0.052	6.706	1.9
7.001	S12	30 minute	25.069	23.786	-0.083	0.000	0.39		0.094	8.404	1.6
7.002	S14	30 minute	24.299	22.986	-0.152	0.000	0.23		0.108	14.148	1.8
7.003	S22	30 minute	23.419	22.067	-0.138	0.000	0.31		0.135	14.148	1.4
7.004	S15	30 minute	23.234	21.858	-0.141	0.000	0.30		0.128	19.166	2.0
7.005	S16	30 minute	21.753	20.479	-0.149	0.000	0.25		0.117	24.779	2.8
8.000	S44	30 minute	26.653	25.347	-0.106	0.000	0.19		0.056	5.770	1.5
8.001	S43	15 minute	25.752	24.436	-0.097	0.000	0.25		0.075	5.065	1.5
8.002	S42	30 minute	25.335	24.043	-0.092	0.000	0.29		0.082	6.386	1.3
8.003	S72	15 minute	23.800	23.542	-0.183	0.000	0.32		0.162	36.692	2.4
9.000	S73	30 minute	24.624	23.608	-0.116	0.000	0.12		0.042	4.152	1.4
9.001	S48	30 minute	24.007	23.023	-0.084	0.000	0.41		0.094	4.151	0.6
8.004	S74	15 minute	23.100	22.922	-0.178	0.000	0.01		0.380	39.297	1.4
8.005	S45	15 minute	21.839	21.546	-0.293	0.000	0.11		0.261	39.297	3.4
10.000	S41	30 minute	24.415	23.107	-0.108	0.000	0.18		0.053	5.659	1.5
10.001	S40	15 minute	23.200	21.938	-0.101	0.000	0.21		0.069	4.723	1.5
11.000	S57	30 minute	24.323	23.377	-0.223	0.000	0.15		0.103	43.317	2.7
11.001	S77	30 minute	23.850	22.369	-0.181	0.000	0.33		0.178	43.316	1.5
11.002	S59	30 minute	23.158	21.956	-0.152	0.000	0.48		0.387	60.759	1.6
11.003	S58	15 minute	22.881	21.671	-0.160	0.000	0.44		0.337	51.765	2.0
10.002	S39	30 minute	22.380	21.133	-0.146	0.000	0.52		0.331	78.157	2.0
10.003	S38	30 minute	21.915	20.679	-0.186	0.000	0.31		0.208	83.641	3.2
7.006	S17	1440 minute	20.000	19.615	-0.385	0.000	0.00		4.146	578.974	0.0

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Causeway	Network 2020.1.3	


Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Pipe		Status
		Time (mins)	Flow (l/s)	
1.009	S25	14	66.7	OK
1.010	S75		66.9	OK
1.011	S24		15.1	OK
7.000	S11	13	7.6	OK
7.001	S12	14	11.8	OK
7.002	S14	14	19.7	OK
7.003	S22		19.8	OK
7.004	S15	14	26.5	OK
7.005	S16		32.9	OK
8.000	S44	13	6.4	OK
8.001	S43	12	7.9	OK
8.002	S42		7.8	OK
8.003	S72		59.8	FLOOD RISK
9.000	S73	12	4.3	OK
9.001	S48		4.3	OK
8.004	S74		60.9	FLOOD RISK
8.005	S45		61.2	FLOOD RISK
10.000	S41	13	6.3	OK
10.001	S40		6.9	OK
11.000	S57		38.2	OK
11.001	S77		38.2	OK
11.002	S59		54.9	OK
11.003	S58		64.0	OK
10.002	S39		73.8	OK
10.003	S38		79.8	OK

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Causeway	Network 2020.1.3	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.006	S17		17.2	OK


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Causeway		Network 2020.1.3

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)	
			US/CL (m)	Level (m)	Depth (m)						Volume (m ³)
7.007	S18	1440 minute 2 year Winter Q+40%	20.000	19.615	0.415	0.000	0.02	423.902	320.065	0.3	
7.008	S49	1440 minute 2 year Winter Q+40%	20.235	19.640	0.864	0.000	0.02	0.0	4.170	316.776	0.0
1.012	S19	960 minute 2 year Winter Q+40%	19.304	18.846	-0.458	0.000	0.00	36.207	562.953	0.1	
1.013	S20	960 minute 2 year Winter Q+40%	19.304	18.843	0.043	0.000	0.10	240.231	547.737	0.2	
12.000	S37	30 minute 2 year Winter Q+40%	21.350	20.101	-0.123	0.000	0.42	0.138	22.919	1.2	
12.001	S36	15 minute 2 year Winter Q+40%	20.972	19.744	-0.178	0.000	0.34	0.289	32.305	1.8	
12.002	S35	960 minute 2 year Winter Q+40%	19.659	18.842	-0.117	0.000	0.04	0.465	138.678	1.1	
1.014	S23	960 minute 2 year Winter Q+40%	19.561	18.841	0.061	0.000	0.12	2.863	685.494	0.3	
13.000	S2	30 minute 2 year Winter Q+40%	23.791	22.488	-0.103	0.000	0.22	0.060	7.760	1.7	
13.001	S3	30 minute 2 year Winter Q+40%	22.170	20.780	-0.090	0.000	0.33	0.085	11.089	1.9	
13.002	S4	15 minute 2 year Winter Q+40%	21.069	19.549	-0.128	0.000	0.36	0.143	13.002	1.4	
13.003	S5	15 minute 2 year Winter Q+40%	20.104	18.779	-0.106	0.000	0.54	0.237	13.930	1.1	
13.004	S32	960 minute 2 year Winter Q+40%	19.200	18.733	-0.052	0.000	0.12	0.372	68.473	0.4	
13.005	S34	960 minute 2 year Winter Q+40%	19.200	18.733	-0.117	0.000	0.04	11.498	70.940	0.5	
13.006	S6	960 minute 2 year Winter Q+40%	20.004	18.733	-0.045	0.000	0.05	1.133	91.597	0.5	
13.007	S33	960 minute 2 year Winter Q+40%	19.824	18.732	0.077	0.000	0.03	42.203	88.260	0.0	
1.015	S21	960 minute 2 year Winter Q+40%	19.200	18.697	-0.063	0.000	0.11	3.682	772.860	0.3	
1.016	S69	960 minute 2 year Winter Q+40%	19.200	18.693	0.093	0.000	0.16	57.356	756.443	0.7	
1.017	-	960 minute 2 year Winter Q+40%	19.100	18.369	-0.223	0.000	0.15	0.075	756.330	0.6	


Half Drain Pipe

PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.007	S18		7.3	SURCHARGED

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Causeway		Network 2020.1.3

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

		Half Drain Pipe		
	US/MH	Time	Flow	
PN	Name	(mins)	(l/s)	Status
7.008	S49		2.0	SURCHARGED
1.012	S19	638	8.8	OK
1.013	S20		7.5	SURCHARGED
12.000	S37		20.2	OK
12.001	S36	11	46.6	OK
12.002	S35		6.2	OK
1.014	S23		10.1	SURCHARGED
13.000	S2	13	8.1	OK
13.001	S3	14	12.2	OK
13.002	S4	11	22.0	OK
13.003	S5	9	24.0	OK
13.004	S32		3.2	OK
13.005	S34		2.7	OK
13.006	S6	463	3.5	OK
13.007	S33	706	1.7	SURCHARGED
1.015	S21		11.5	OK
1.016	S69		9.2	SURCHARGED
1.017	-		9.2	OK*

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Causeway	Network 2020.1.3	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	1	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	36	Number of Real Time Controls	0


Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
Return Period (years)	30	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 455750 108500 SU 55750 08500		

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, 1440
Sensitivity flows(s) (%)	0, +40

WARNING: Half Drain Time has not been calculated as the structure is too full.

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Causeway	Network 2020.1.3	


Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

US/MH PN Name	Event	US/CL (m)	Water		Volume (m ³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
			Level (m)	Depth (m)									

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	Water Level		Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)
			US/CL (m)	Level (m)						
1.000	S56	30 minute 30 year Winter Q+40%	26.694	25.422	-0.071	0.000	0.54	0.105	18.022	1.9
1.001	S55	30 minute 30 year Winter Q+40%	25.970	24.671	-0.062	0.000	0.65	0.130	19.734	1.8
1.002	S54	15 minute 30 year Winter Q+40%	25.699	24.465	-0.034	0.000	0.88	0.174	19.694	2.3
1.003	S53	15 minute 30 year Winter Q+40%	24.196	23.072	-0.121	0.000	0.41	0.143	19.695	1.9
2.000	S67	30 minute 30 year Winter Q+40%	27.194	25.903	-0.091	0.000	0.33	0.077	16.172	2.5
2.001	S68	30 minute 30 year Winter Q+40%	25.278	23.996	-0.081	0.000	0.43	0.095	19.674	2.4
2.002	S69	15 minute 30 year Winter Q+40%	24.611	23.403	-0.008	0.000	0.97	0.208	22.088	2.3
1.004	S52	15 minute 30 year Winter Q+40%	24.089	22.834	-0.054	0.000	0.89	0.296	60.151	3.4
3.000	S70	30 minute 30 year Winter Q+40%	21.123	20.090	-0.108	0.000	0.54	0.161	18.305	0.9
3.001	S71	30 minute 30 year Winter Q+40%	21.400	19.965	-0.088	0.000	0.68	0.497	22.191	0.8
1.005	S51	15 minute 30 year Winter Q+40%	21.372	19.928	-0.062	0.000	0.75	0.841	78.141	2.5
1.006	S50	30 minute 30 year Summer Q+40%	20.590	19.636	0.156	0.000	1.55	1.284	95.806	1.8
4.000	S60	15 minute 30 year Winter Q+40%	23.383	22.100	-0.083	0.000	0.36	0.088	4.262	0.7
4.001	S61	15 minute 30 year Winter Q+40%	23.297	22.086	-0.086	0.000	0.66	0.307	22.455	2.4
4.002	S62	60 minute 30 year Winter Q+40%	22.038	21.780	0.867	0.000	0.51	2.726	42.763	1.3
4.003	S31	60 minute 30 year Winter Q+40%	21.787	21.764	2.039	0.000	0.16	19.940	42.687	0.3
5.000	S66	30 minute 30 year Winter Q+40%	25.060	23.780	-0.079	0.000	0.45	0.094	19.231	2.1
5.001	S65	15 minute 30 year Winter Q+40%	24.010	22.657	-0.061	0.000	0.63	0.129	19.757	2.4
6.000	-	360 minute 30 year Summer Q+40%	23.850	22.230	0.000	0.000	0.00	0.170	-0.009	0.0
6.001	S76	180 minute 30 year Winter Q+40%	23.850	22.287	0.066	0.000	0.13	31.174	27.503	0.5
5.002	S64	15 minute 30 year Winter Q+40%	23.374	22.055	-0.128	0.000	0.38	0.134	36.167	3.3
5.003	S63	180 minute 30 year Winter Q+40%	21.271	19.653	-0.018	0.000	0.23	0.330	105.456	1.8
4.004	S30	180 minute 30 year Winter Q+40%	19.800	19.643	-0.157	0.000	0.01	2.347	160.887	0.1
4.005	S28	180 minute 30 year Winter Q+40%	19.800	19.629	0.129	0.000	0.11	79.885	150.043	0.9
1.007	S27	30 minute 30 year Summer Q+40%	20.412	19.384	0.009	0.000	1.10	2.010	124.715	1.3
1.008	S26	30 minute 30 year Winter Q+40%	19.565	19.236	-0.329	0.000	0.09	1.552	138.197	0.2

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Causeway	Network 2020.1.3	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S56	13	17.8	OK
1.001	S55		18.9	OK
1.002	S54	12	31.2	OK
1.003	S53		31.6	OK
2.000	S67	12	15.8	OK
2.001	S68		18.6	OK
2.002	S69		34.8	OK
1.004	S52	7	106.4	OK
3.000	S70	12	18.1	OK
3.001	S71	12	21.3	OK
1.005	S51	5	124.4	OK
1.006	S50		125.6	SURCHARGED
4.000	S60		4.7	OK
4.001	S61	5	58.5	OK
4.002	S62		30.4	FLOOD RISK
4.003	S31		9.2	FLOOD RISK
5.000	S66		17.0	OK
5.001	S65		24.8	OK
6.000	-		0.0	SURCHARGED*
6.001	S76	180	1.6	SURCHARGED
5.002	S64		53.1	OK
5.003	S63		19.3	OK
4.004	S30		27.4	FLOOD RISK
4.005	S28		9.3	FLOOD RISK
1.007	S27	6	136.6	SURCHARGED


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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
1.008	S26		126.1	OK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)
1.009	S25	30 minute	30	19.565	19.230	0.030	0.000	0.99	14.464	150.994	1.8
1.010	S75	960 minute	30	20.008	19.119	0.086	0.000	0.20	1.273	575.053	1.3
1.011	S24	960 minute	30	19.304	19.114	0.064	0.000	0.08	2.386	581.131	0.3
7.000	S11	30 minute	30	26.876	25.588	-0.087	0.000	0.37	0.083	16.433	2.3
7.001	S12	15 minute	30	25.069	23.835	-0.034	0.000	0.90	0.169	17.453	2.0
7.002	S14	15 minute	30	24.299	23.041	-0.097	0.000	0.56	0.204	25.633	2.3
7.003	S22	15 minute	30	23.419	22.139	-0.067	0.000	0.78	0.285	25.633	1.8
7.004	S15	15 minute	30	23.234	21.930	-0.069	0.000	0.79	0.270	34.260	2.5
7.005	S16	15 minute	30	21.753	20.539	-0.090	0.000	0.66	0.234	43.164	3.6
8.000	S44	30 minute	30	26.653	25.370	-0.084	0.000	0.41	0.088	13.983	1.8
8.001	S43	15 minute	30	25.752	24.463	-0.070	0.000	0.54	0.117	12.774	1.8
8.002	S42	15 minute	30	25.335	24.076	-0.059	0.000	0.62	0.134	11.209	1.6
8.003	S72	15 minute	30	23.800	23.649	-0.076	0.000	0.88	0.326	79.711	3.0
9.000	S73	30 minute	30	24.624	23.625	-0.099	0.000	0.25	0.066	9.642	1.7
9.001	S48	30 minute	30	24.007	23.065	-0.042	0.000	0.86	0.158	9.642	0.7
8.004	S74	15 minute	30	23.100	22.942	-0.158	0.000	0.04	0.450	86.379	2.0
8.005	S45	15 minute	30	21.839	21.604	-0.235	0.000	0.30	0.707	86.379	4.5
10.000	S41	30 minute	30	24.415	23.129	-0.087	0.000	0.38	0.084	13.716	1.9
10.001	S40	30 minute	30	23.200	21.962	-0.077	0.000	0.47	0.105	16.132	1.8
11.000	S57	30 minute	30	24.323	23.416	-0.184	0.000	0.32	0.158	92.291	3.2
11.001	S77	30 minute	30	23.850	22.437	-0.113	0.000	0.71	0.302	92.291	1.8
11.002	S59	15 minute	30	23.158	22.153	0.045	0.000	1.01	1.513	96.371	1.8
11.003	S58	15 minute	30	22.881	21.867	0.036	0.000	0.94	1.315	109.550	2.3
10.002	S39	15 minute	30	22.380	21.371	0.092	0.000	1.12	1.378	124.827	2.2
10.003	S38	15 minute	30	21.915	20.746	-0.119	0.000	0.67	0.408	133.525	3.9
7.006	S17	600 minute	30	20.000	19.847	-0.153	0.000	0.00	5.361	760.814	0.1

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Pipe		Status
		Time (mins)	Flow (l/s)	
1.009	S25	9	117.3	SURCHARGED
1.010	S75		23.6	SURCHARGED
1.011	S24		23.8	FLOOD RISK
7.000	S11	12	16.2	OK
7.001	S12	13	27.5	OK
7.002	S14	8	49.0	OK
7.003	S22		50.3	OK
7.004	S15	6	70.5	OK
7.005	S16		88.2	OK
8.000	S44	12	13.7	OK
8.001	S43	14	17.2	OK
8.002	S42		16.5	OK
8.003	S72		163.5	FLOOD RISK
9.000	S73	12	9.1	OK
9.001	S48		9.1	OK
8.004	S74		170.7	FLOOD RISK
8.005	S45		172.0	FLOOD RISK
10.000	S41	12	13.4	OK
10.001	S40		15.2	OK
11.000	S57		81.5	OK
11.001	S77		81.5	OK
11.002	S59		114.4	SURCHARGED
11.003	S58		136.7	SURCHARGED
10.002	S39		157.4	SURCHARGED
10.003	S38		173.0	OK

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Causeway

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.006	S17		53.8	FLOOD RISK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1


PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)				
												Year	Return Period	Flow %	Level (m)
7.007	S18	600 minute	30	year	Winter	Q+40%	20.000	19.829	0.629	0.000	0.06	548.260	331.362	0.3	
7.008	S49	480 minute	30	year	Winter	Q+40%	20.235	19.831	1.055	0.000	0.02	17.7	4.654	101.362	0.0
1.012	S19	960 minute	30	year	Winter	Q+40%	19.304	19.113	-0.191	0.000	0.00		63.134	674.912	0.1
1.013	S20	960 minute	30	year	Winter	Q+40%	19.304	19.110	0.310	0.000	0.10		460.074	605.773	0.1
12.000	S37	30 minute	30	year	Winter	Q+40%	21.350	20.166	-0.059	0.000	0.90		0.231	48.829	1.4
12.001	S36	15 minute	30	year	Winter	Q+40%	20.972	19.836	-0.086	0.000	0.82		0.692	71.203	2.2
12.002	S35	960 minute	30	year	Winter	Q+40%	19.659	19.109	0.150	0.000	0.07		1.850	227.105	1.2
1.014	S23	960 minute	30	year	Winter	Q+40%	19.561	19.112	0.332	0.000	0.15		3.581	830.112	0.3
13.000	S2	30 minute	30	year	Winter	Q+40%	23.791	22.513	-0.078	0.000	0.46		0.095	18.076	2.1
13.001	S3	15 minute	30	year	Winter	Q+40%	22.170	20.820	-0.051	0.000	0.74		0.146	18.846	2.3
13.002	S4	15 minute	30	year	Winter	Q+40%	21.069	19.768	0.091	0.000	0.91		0.532	31.673	1.6
13.003	S5	15 minute	30	year	Winter	Q+40%	20.104	19.116	0.231	0.000	1.32		1.545	33.879	1.5
13.004	S32	960 minute	30	year	Winter	Q+40%	19.200	19.014	0.229	0.000	0.20		0.887	113.561	0.5
13.005	S34	960 minute	30	year	Winter	Q+40%	19.200	19.014	0.164	0.000	0.05		35.155	107.654	0.5
13.006	S6	960 minute	30	year	Winter	Q+40%	20.004	19.013	0.235	0.000	0.07		1.807	140.730	0.5
13.007	S33	960 minute	30	year	Winter	Q+40%	19.824	19.012	0.357	0.000	0.04		55.957	111.790	0.0
1.015	S21	960 minute	30	year	Winter	Q+40%	19.200	18.973	0.213	0.000	0.15		4.811	938.470	0.3
1.016	S69	960 minute	30	year	Winter	Q+40%	19.200	18.972	0.372	0.000	0.16		113.533	886.611	0.7
1.017	-	600 minute	30	year	Winter	Q+40%	19.100	18.431	-0.161	0.000	0.44		0.140	745.105	0.8

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.007	S18		19.7	FLOOD RISK

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Pipe		Status
		Time (mins)	Flow (l/s)	
7.008	S49		1.9	SURCHARGED
1.012	S19	989	10.5	FLOOD RISK
1.013	S20		7.7	FLOOD RISK
12.000	S37		43.0	OK
12.001	S36	7	111.7	OK
12.002	S35		10.0	SURCHARGED
1.014	S23		12.3	SURCHARGED
13.000	S2	12	17.2	OK
13.001	S3	13	27.2	OK
13.002	S4	4	55.1	SURCHARGED
13.003	S5	5	58.7	SURCHARGED
13.004	S32		5.1	FLOOD RISK
13.005	S34		3.3	FLOOD RISK
13.006	S6		4.6	SURCHARGED
13.007	S33		2.6	SURCHARGED
1.015	S21		14.7	FLOOD RISK
1.016	S69		9.2	FLOOD RISK
1.017	-		27.1	OK*

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m ³ /ha	Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coefficient	0.800	
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000	

Number of Input Hydrographs	0	Number of Offline Controls	1	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	36	Number of Real Time Controls	0


Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 455750 108500 SU 55750 08500		

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, 1440
Sensitivity flows(s) (%)	0, +45

WARNING: Half Drain Time has not been calculated as the structure is too full.

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

US/MH	US/CL	Water Level	Surcharged Depth	Flooded Volume	Flow / Overflow Cap.	Maximum Discharge	Half Drain Time	Pipe Flow	Status	
PN Name	Event	(m)	(m)	(m ³)	(l/s)	Vol (m ³)	Vol (m ³)	(m/s)	(mins)	(l/s)

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)
1.000	S56	30 minute	26.694	25.437	-0.057	0.000	0.71		0.127	24.156	2.0
1.001	S55	15 minute	25.970	24.764	0.032	0.000	0.82		0.297	18.856	1.8
1.002	S54	15 minute	25.699	24.638	0.139	0.000	1.04		0.479	26.403	2.2
1.003	S53	15 minute	24.196	23.236	0.043	0.000	0.52		0.420	26.403	1.8
2.000	S67	30 minute	27.194	25.912	-0.081	0.000	0.43		0.091	21.636	2.6
2.001	S68	30 minute	25.278	24.008	-0.069	0.000	0.56		0.113	26.217	2.5
2.002	S69	15 minute	24.611	23.797	0.385	0.000	1.12		0.847	29.039	2.3
1.004	S52	15 minute	24.089	23.150	0.262	0.000	1.00		1.013	79.571	3.4
3.000	S70	30 minute	21.123	20.301	0.103	0.000	0.79		0.463	24.555	0.9
3.001	S71	30 minute	21.400	20.236	0.183	0.000	1.10		1.709	29.781	0.9
1.005	S51	30 minute	21.372	20.163	0.173	0.000	0.86		1.541	144.863	2.5
1.006	S50	30 minute	20.590	19.792	0.312	0.000	1.75		1.808	144.863	2.0
4.000	S60	15 minute	23.383	22.402	0.219	0.000	0.72		0.521	5.515	0.7
4.001	S61	15 minute	23.297	22.388	0.216	0.000	0.77		0.828	30.572	2.4
4.002	S62	60 minute	22.038	21.946	1.033	0.000	0.67		3.151	57.127	1.3
4.003	S31	60 minute	21.787	21.931	2.206	10.432	0.16		31.998	53.865	0.3
5.000	S66	30 minute	25.060	23.793	-0.067	0.000	0.59		0.112	25.158	2.2
5.001	S65	15 minute	24.010	22.674	-0.044	0.000	0.82		0.156	25.566	2.5
6.000	-	1440 minute	23.850	22.230	0.000	0.000	0.00		0.155	0.001	0.2
6.001	S76	180 minute	23.850	22.364	0.143	0.000	0.14		42.294	29.090	0.5
5.002	S64	15 minute	23.374	22.071	-0.112	0.000	0.49		0.162	45.847	3.5
5.003	S63	15 minute	21.271	19.807	0.136	0.000	0.90		0.622	50.540	2.2
4.004	S30	240 minute	19.800	19.778	-0.022	0.000	0.01		2.590	221.357	0.1
4.005	S28	180 minute	19.800	19.741	0.241	0.000	0.11		107.215	162.773	0.9
1.007	S27	30 minute	20.412	19.482	0.107	0.000	1.24		2.397	173.728	1.4
1.008	S26	30 minute	19.565	19.378	-0.187	0.000	0.11		2.055	173.376	0.2

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Causeway

Network 2020.1.3

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S56	13	23.3	OK
1.001	S55		24.1	SURCHARGED
1.002	S54	4	37.2	SURCHARGED
1.003	S53		40.1	SURCHARGED
2.000	S67	12	20.7	OK
2.001	S68		24.4	OK
2.002	S69		40.0	SURCHARGED
1.004	S52	3	118.6	SURCHARGED
3.000	S70	5	26.6	SURCHARGED
3.001	S71	6	34.3	SURCHARGED
1.005	S51	5	143.4	SURCHARGED
1.006	S50		142.0	SURCHARGED
4.000	S60		9.5	SURCHARGED
4.001	S61	4	67.9	SURCHARGED
4.002	S62		40.1	FLOOD RISK
4.003	S31		9.3	FLOOD
5.000	S66		22.2	OK
5.001	S65		32.1	OK
6.000	-		0.0	SURCHARGED*
6.001	S76		1.6	SURCHARGED
5.002	S64		68.5	OK
5.003	S63		77.2	SURCHARGED
4.004	S30		27.9	FLOOD RISK
4.005	S28		9.3	FLOOD RISK
1.007	S27	18	153.6	SURCHARGED

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Causeway


Network 2020.1.3

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
1.008	S26		150.8	FLOOD RISK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)
1.009	S25	30 minute 100 year Winter Q+45%	19.565	19.371	0.171	0.000	1.07	28.021	190.945	1.9
1.010	S75	960 minute 100 year Winter Q+45%	20.008	19.299	0.266	0.000	0.23	1.568	722.725	1.3
1.011	S24	960 minute 100 year Winter Q+45%	19.304	19.294	0.244	0.000	0.10	2.703	729.778	0.4
7.000	S11	30 minute 100 year Winter Q+45%	26.876	25.599	-0.077	0.000	0.48	0.098	22.013	2.5
7.001	S12	15 minute 100 year Winter Q+45%	25.069	24.084	0.215	0.000	1.12	0.587	23.421	1.9
7.002	S14	15 minute 100 year Winter Q+45%	24.299	23.057	-0.081	0.000	0.71	0.234	34.572	2.4
7.003	S22	15 minute 100 year Winter Q+45%	23.419	22.167	-0.038	0.000	0.96	0.350	34.572	1.8
7.004	S15	15 minute 100 year Winter Q+45%	23.234	21.976	-0.022	0.000	1.00	0.368	46.020	2.5
7.005	S16	15 minute 100 year Winter Q+45%	21.753	20.565	-0.063	0.000	0.84	0.294	57.542	3.8
8.000	S44	30 minute 100 year Winter Q+45%	26.653	25.381	-0.072	0.000	0.53	0.104	18.699	1.9
8.001	S43	15 minute 100 year Winter Q+45%	25.752	24.478	-0.055	0.000	0.71	0.141	17.003	1.9
8.002	S42	15 minute 100 year Winter Q+45%	25.335	24.093	-0.042	0.000	0.85	0.161	17.003	1.7
8.003	S72	30 minute 100 year Winter Q+45%	23.800	23.494	-0.231	0.000	0.12	0.092	23.770	1.8
9.000	S73	30 minute 100 year Winter Q+45%	24.624	23.633	-0.091	0.000	0.33	0.077	12.806	1.8
9.001	S48	30 minute 100 year Winter Q+45%	24.007	23.115	0.008	0.000	1.13	0.245	12.806	0.7
8.004	S74	30 minute 100 year Winter Q+45%	23.100	22.915	-0.185	0.000	0.01	0.364	36.247	1.1
8.005	S45	30 minute 100 year Winter Q+45%	21.839	21.523	-0.316	0.000	0.06	0.178	36.247	3.1
10.000	S41	30 minute 100 year Winter Q+45%	24.415	23.139	-0.076	0.000	0.49	0.099	18.342	2.0
10.001	S40	30 minute 100 year Winter Q+45%	23.200	21.975	-0.064	0.000	0.62	0.126	21.503	1.9
11.000	S57	15 minute 100 year Summer Q+0%	24.323	23.300	-0.300	0.000	0.00	0.000	0.000	0.0
11.001	S77	15 minute 100 year Summer Q+0%	23.850	22.250	-0.300	0.000	0.00	0.000	0.000	0.0
11.002	S59	15 minute 100 year Summer Q+45%	23.158	21.998	-0.110	0.000	0.72	0.560	31.962	1.7
11.003	S58	15 minute 100 year Summer Q+45%	22.881	21.743	-0.088	0.000	0.84	0.624	47.189	2.3
10.002	S39	15 minute 100 year Winter Q+45%	22.380	21.324	0.045	0.000	1.05	1.140	72.998	2.2
10.003	S38	15 minute 100 year Winter Q+45%	21.915	20.746	-0.119	0.000	0.66	0.408	84.254	3.9
7.006	S17	960 minute 100 year Winter Q+45%	20.000	19.625	-0.375	0.000	0.00	4.197	533.959	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

		Half Drain Pipe		
	US/MH	Time	Flow	
PN	Name	(mins)	(l/s)	Status
1.009	S25	16	126.9	FLOOD RISK
1.010	S75		26.9	SURCHARGED
1.011	S24		27.4	FLOOD RISK
7.000	S11	12	21.2	OK
7.001	S12	3	33.9	SURCHARGED
7.002	S14	8	61.8	OK
7.003	S22		61.6	OK
7.004	S15	5	88.4	OK
7.005	S16		111.9	OK
8.000	S44	12	17.9	OK
8.001	S43	14	22.3	OK
8.002	S42		22.4	OK
8.003	S72		22.6	OK
9.000	S73	12	12.0	OK
9.001	S48		11.9	SURCHARGED
8.004	S74		33.8	FLOOD RISK
8.005	S45		33.9	OK
10.000	S41	12	17.5	OK
10.001	S40		19.9	OK
11.000	S57		0.0	OK
11.001	S77		0.0	OK
11.002	S59		82.2	OK
11.003	S58		121.5	OK
10.002	S39		147.8	SURCHARGED
10.003	S38		171.2	OK

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
	US/MH	Time	Flow	
PN	Name	(mins)	(l/s)	Status
7.006	S17		23.8	OK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1


PN	US/MH Name	Event	Water Surcharged Flooded				Maximum				
			US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)
7.007	S18	960 minute 100 year Winter Q+45%	20.000	19.624	0.424	0.000	0.02		429.479	215.993	0.3
7.008	S49	1440 minute 100 year Winter Q+45%	20.235	19.645	0.869	0.000	0.02	0.0	4.183	314.327	0.0
1.012	S19	960 minute 100 year Winter Q+45%	19.304	19.292	-0.012	0.000	0.00		70.985	703.203	0.1
1.013	S20	960 minute 100 year Winter Q+45%	19.304	19.271	0.471	0.000	0.11		608.432	573.606	0.1
12.000	S37	30 minute 100 year Winter Q+45%	21.350	20.351	0.127	0.000	1.17		0.496	63.876	1.4
12.001	S36	15 minute 100 year Winter Q+45%	20.972	20.052	0.130	0.000	0.98		1.843	92.780	2.2
12.002	S35	960 minute 100 year Winter Q+45%	19.659	19.270	0.311	0.000	0.09		2.742	284.934	1.2
1.014	S23	960 minute 100 year Winter Q+45%	19.561	19.273	0.493	0.000	0.15		3.990	855.003	0.3
13.000	S2	30 minute 100 year Winter Q+45%	23.791	22.525	-0.066	0.000	0.61		0.114	24.018	2.2
13.001	S3	15 minute 100 year Winter Q+45%	22.170	21.106	0.235	0.000	0.90		0.657	24.939	2.2
13.002	S4	15 minute 100 year Winter Q+45%	21.069	20.179	0.502	0.000	1.08		1.270	41.943	1.7
13.003	S5	15 minute 100 year Winter Q+45%	20.104	19.251	0.366	0.000	1.56		2.095	44.724	1.7
13.004	S32	240 minute 100 year Winter Q+45%	19.200	19.198	0.413	0.000	0.74		1.150	106.246	0.7
13.005	S34	240 minute 100 year Winter Q+45%	19.200	19.197	0.347	0.000	0.20		54.762	74.449	0.7
13.006	S6	240 minute 100 year Winter Q+45%	20.004	19.206	0.428	0.000	0.26		2.083	104.799	0.7
13.007	S33	240 minute 100 year Winter Q+45%	19.824	19.225	0.570	0.000	0.06		62.296	58.843	0.0
1.015	S21	960 minute 100 year Winter Q+45%	19.200	19.129	0.369	0.000	0.16		5.207	972.640	0.3
1.016	S69	960 minute 100 year Winter Q+45%	19.200	19.127	0.527	0.000	0.16		148.828	874.436	0.7
1.017	-	360 minute 100 year Summer Q+0%	19.100	18.369	-0.223	0.000	0.15		0.075	319.016	0.6

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.007	S18		6.2	SURCHARGED

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Pipe		Status
		Time (mins)	Flow (l/s)	
7.008	S49		1.9	SURCHARGED
1.012	S19		10.5	FLOOD RISK
1.013	S20		8.2	FLOOD RISK
12.000	S37		56.0	SURCHARGED
12.001	S36	4	133.6	SURCHARGED
12.002	S35		12.6	SURCHARGED
1.014	S23		12.7	FLOOD RISK
13.000	S2	12	22.5	OK
13.001	S3	4	32.9	SURCHARGED
13.002	S4	4	65.1	SURCHARGED
13.003	S5	6	69.5	SURCHARGED
13.004	S32		18.9	FLOOD RISK
13.005	S34		12.5	FLOOD RISK
13.006	S6		17.4	SURCHARGED
13.007	S33		3.5	SURCHARGED
1.015	S21		15.7	FLOOD RISK
1.016	S69		9.2	FLOOD RISK
1.017	-		9.2	OK*

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Number of Input Hydrographs	0	Number of Offline Controls	1	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	36	Number of Real Time Controls	0


Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 455750 108500 SU 55750 08500		

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, 1440
Sensitivity flows(s) (%)	0, +45

WARNING: Half Drain Time has not been calculated as the structure is too full.

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

US/MH PN Name	Event	US/CL (m)	Water		Volume (m ³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
			Level (m)	Depth (m)									

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)
1.000	S56	30 minute 100 year Winter Q+45%	26.694	25.437	-0.057	0.000	0.71	0.127	24.156	2.0
1.001	S55	15 minute 100 year Winter Q+45%	25.970	24.764	0.032	0.000	0.82	0.297	18.856	1.8
1.002	S54	15 minute 100 year Winter Q+45%	25.699	24.638	0.139	0.000	1.04	0.479	26.403	2.2
1.003	S53	15 minute 100 year Winter Q+45%	24.196	23.236	0.043	0.000	0.52	0.420	26.403	1.8
2.000	S67	30 minute 100 year Winter Q+45%	27.194	25.912	-0.081	0.000	0.43	0.091	21.636	2.6
2.001	S68	30 minute 100 year Winter Q+45%	25.278	24.008	-0.069	0.000	0.56	0.113	26.217	2.5
2.002	S69	15 minute 100 year Winter Q+45%	24.611	23.797	0.385	0.000	1.12	0.847	29.039	2.3
1.004	S52	15 minute 100 year Winter Q+45%	24.089	23.150	0.262	0.000	1.00	1.013	79.571	3.4
3.000	S70	30 minute 100 year Winter Q+45%	21.123	20.301	0.103	0.000	0.79	0.463	24.555	0.9
3.001	S71	30 minute 100 year Winter Q+45%	21.400	20.236	0.183	0.000	1.10	1.709	29.781	0.9
1.005	S51	30 minute 100 year Winter Q+45%	21.372	20.163	0.173	0.000	0.86	1.541	144.863	2.5
1.006	S50	30 minute 100 year Winter Q+45%	20.590	19.792	0.312	0.000	1.75	1.808	144.863	2.0
4.000	S60	15 minute 100 year Winter Q+45%	23.383	22.402	0.219	0.000	0.72	0.521	5.515	0.7
4.001	S61	15 minute 100 year Winter Q+45%	23.297	22.388	0.216	0.000	0.77	0.828	30.572	2.4
4.002	S62	60 minute 100 year Winter Q+45%	22.038	21.946	1.033	0.000	0.67	3.151	57.127	1.3
4.003	S31	60 minute 100 year Winter Q+45%	21.787	21.931	2.206	10.432	0.16	31.998	53.865	0.3
5.000	S66	30 minute 100 year Winter Q+45%	25.060	23.793	-0.067	0.000	0.59	0.112	25.158	2.2
5.001	S65	15 minute 100 year Winter Q+45%	24.010	22.674	-0.044	0.000	0.82	0.156	25.566	2.5
6.000	-	1440 minute 100 year Summer Q+45%	23.850	22.230	0.000	0.000	0.00	0.155	0.000	0.0
6.001	S76	180 minute 100 year Winter Q+45%	23.850	22.364	0.143	0.000	0.14	42.279	29.086	0.5
5.002	S64	15 minute 100 year Winter Q+45%	23.374	22.071	-0.112	0.000	0.49	0.162	45.847	3.5
5.003	S63	15 minute 100 year Winter Q+45%	21.271	19.807	0.136	0.000	0.90	0.622	50.540	2.2
4.004	S30	240 minute 100 year Winter Q+45%	19.800	19.778	-0.022	0.000	0.01	2.590	221.371	0.1
4.005	S28	180 minute 100 year Winter Q+45%	19.800	19.741	0.241	0.000	0.11	107.233	162.758	0.9
1.007	S27	30 minute 100 year Winter Q+45%	20.412	19.482	0.107	0.000	1.24	2.397	173.728	1.4
1.008	S26	30 minute 100 year Winter Q+45%	19.565	19.378	-0.187	0.000	0.11	2.055	173.375	0.2

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S56	13	23.3	OK
1.001	S55		24.1	SURCHARGED
1.002	S54	4	37.2	SURCHARGED
1.003	S53		40.1	SURCHARGED
2.000	S67	12	20.7	OK
2.001	S68		24.4	OK
2.002	S69		40.0	SURCHARGED
1.004	S52	3	118.6	SURCHARGED
3.000	S70	5	26.6	SURCHARGED
3.001	S71	6	34.3	SURCHARGED
1.005	S51	5	143.4	SURCHARGED
1.006	S50		142.0	SURCHARGED
4.000	S60		9.5	SURCHARGED
4.001	S61	4	67.9	SURCHARGED
4.002	S62		40.1	FLOOD RISK
4.003	S31		9.3	FLOOD
5.000	S66		22.2	OK
5.001	S65		32.1	OK
6.000	-		0.0	SURCHARGED*
6.001	S76		1.6	SURCHARGED
5.002	S64		68.5	OK
5.003	S63		77.2	SURCHARGED
4.004	S30		27.9	FLOOD RISK
4.005	S28		9.3	FLOOD RISK
1.007	S27	18	153.6	SURCHARGED


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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
1.008	S26		150.8	FLOOD RISK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)
1.009	S25	30 minute 100 year Winter Q+45%	19.565	19.371	0.171	0.000	1.07	28.022	190.944	1.9
1.010	S75	960 minute 100 year Winter Q+45%	20.008	19.300	0.267	0.000	0.23	1.571	722.860	1.3
1.011	S24	960 minute 100 year Winter Q+45%	19.304	19.295	0.245	0.000	0.10	2.706	729.954	0.3
7.000	S11	30 minute 100 year Winter Q+45%	26.876	25.599	-0.077	0.000	0.48	0.098	22.013	2.5
7.001	S12	15 minute 100 year Winter Q+45%	25.069	24.084	0.215	0.000	1.12	0.587	23.421	1.9
7.002	S14	15 minute 100 year Winter Q+45%	24.299	23.057	-0.081	0.000	0.71	0.234	34.572	2.4
7.003	S22	15 minute 100 year Winter Q+45%	23.419	22.167	-0.038	0.000	0.96	0.350	34.572	1.8
7.004	S15	15 minute 100 year Winter Q+45%	23.234	21.976	-0.022	0.000	1.00	0.368	46.020	2.5
7.005	S16	15 minute 100 year Winter Q+45%	21.753	20.565	-0.063	0.000	0.84	0.294	57.542	3.8
8.000	S44	30 minute 100 year Winter Q+45%	26.653	25.381	-0.072	0.000	0.53	0.104	18.699	1.9
8.001	S43	15 minute 100 year Winter Q+45%	25.752	24.478	-0.055	0.000	0.71	0.141	17.003	1.9
8.002	S42	15 minute 100 year Winter Q+45%	25.335	24.095	-0.040	0.000	0.85	0.164	17.003	1.7
8.003	S72	15 minute 100 year Winter Q+45%	23.800	23.795	0.070	0.000	1.06	0.611	103.619	3.0
9.000	S73	30 minute 100 year Winter Q+45%	24.624	23.633	-0.091	0.000	0.33	0.077	12.806	1.8
9.001	S48	30 minute 100 year Winter Q+45%	24.007	23.115	0.008	0.000	1.13	0.245	12.806	0.7
8.004	S74	15 minute 100 year Winter Q+45%	23.100	22.946	-0.154	0.000	0.05	0.469	112.528	2.1
8.005	S45	15 minute 100 year Winter Q+45%	21.839	21.620	-0.219	0.000	0.36	0.860	112.527	4.8
10.000	S41	30 minute 100 year Winter Q+45%	24.415	23.139	-0.076	0.000	0.49	0.099	18.342	2.0
10.001	S40	30 minute 100 year Winter Q+45%	23.200	21.975	-0.064	0.000	0.62	0.126	21.503	1.9
11.000	S57	30 minute 100 year Winter Q+45%	24.323	23.434	-0.166	0.000	0.42	0.185	120.732	3.5
11.001	S77	30 minute 100 year Winter Q+45%	23.850	23.086	0.536	0.000	0.96	1.720	120.732	1.8
11.002	S59	30 minute 100 year Winter Q+45%	23.158	22.721	0.613	0.000	1.26	3.682	169.347	2.0
11.003	S58	15 minute 100 year Winter Q+45%	22.881	22.287	0.456	0.000	1.12	2.412	141.756	2.3
10.002	S39	15 minute 100 year Winter Q+45%	22.380	21.586	0.307	0.000	1.32	2.452	161.903	2.6
10.003	S38	15 minute 100 year Winter Q+45%	21.915	20.768	-0.097	0.000	0.78	0.473	173.158	4.0
7.006	S17	480 minute 100 year Winter Q+45%	20.000	20.006	0.006	5.909	0.00	12.118	923.556	0.1

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

		Half Drain Pipe		
	US/MH	Time	Flow	
PN	Name	(mins)	(l/s)	Status
1.009	S25	16	126.9	FLOOD RISK
1.010	S75		26.9	SURCHARGED
1.011	S24		27.4	FLOOD RISK
7.000	S11	12	21.2	OK
7.001	S12	3	33.9	SURCHARGED
7.002	S14	8	61.8	OK
7.003	S22		61.6	OK
7.004	S15	5	88.4	OK
7.005	S16		111.9	OK
8.000	S44	12	17.9	OK
8.001	S43	14	22.3	OK
8.002	S42		22.4	OK
8.003	S72		196.8	FLOOD RISK
9.000	S73	12	12.0	OK
9.001	S48		11.9	SURCHARGED
8.004	S74		204.9	FLOOD RISK
8.005	S45		205.9	FLOOD RISK
10.000	S41	12	17.5	OK
10.001	S40		19.9	OK
11.000	S57		106.6	OK
11.001	S77		109.9	SURCHARGED
11.002	S59		143.0	SURCHARGED
11.003	S58		162.6	SURCHARGED
10.002	S39		186.3	SURCHARGED
10.003	S38		202.2	OK

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.006	S17		81.1	FLOOD

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1


PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum
											Velocity (m/s)
7.007	S18	480 minute 100 year Winter Q+45%	20.000	20.006	0.806	6.017	0.07		658.513	473.838	0.3
7.008	S49	480 minute 100 year Winter Q+45%	20.235	20.012	1.236	0.000	0.02	20.0	5.115	105.667	0.0
1.012	S19	960 minute 100 year Winter Q+45%	19.304	19.294	-0.010	0.000	0.00		70.989	704.916	0.1
1.013	S20	960 minute 100 year Winter Q+45%	19.304	19.272	0.472	0.000	0.10		609.285	575.361	0.1
12.000	S37	30 minute 100 year Winter Q+45%	21.350	20.351	0.127	0.000	1.17		0.496	63.876	1.4
12.001	S36	15 minute 100 year Winter Q+45%	20.972	20.052	0.130	0.000	0.98		1.843	92.780	2.2
12.002	S35	960 minute 100 year Winter Q+45%	19.659	19.271	0.312	0.000	0.09		2.750	284.934	1.2
1.014	S23	960 minute 100 year Winter Q+45%	19.561	19.275	0.495	0.000	0.15		3.995	856.753	0.4
13.000	S2	30 minute 100 year Winter Q+45%	23.791	22.525	-0.066	0.000	0.61		0.114	24.018	2.2
13.001	S3	15 minute 100 year Winter Q+45%	22.170	21.106	0.235	0.000	0.90		0.657	24.939	2.2
13.002	S4	15 minute 100 year Winter Q+45%	21.069	20.179	0.502	0.000	1.08		1.270	41.943	1.7
13.003	S5	15 minute 100 year Winter Q+45%	20.104	19.251	0.366	0.000	1.56		2.095	44.724	1.7
13.004	S32	240 minute 100 year Winter Q+45%	19.200	19.198	0.413	0.000	0.74		1.150	106.264	0.7
13.005	S34	240 minute 100 year Winter Q+45%	19.200	19.197	0.347	0.000	0.20		54.765	74.685	0.7
13.006	S6	180 minute 100 year Winter Q+45%	20.004	19.209	0.432	0.000	0.30		2.088	98.159	0.8
13.007	S33	240 minute 100 year Winter Q+45%	19.824	19.225	0.570	0.000	0.06		62.296	59.146	0.0
1.015	S21	1440 minute 100 year Winter Q+45%	19.200	19.132	0.372	0.000	0.15		5.216	1406.168	0.3
1.016	S69	1440 minute 100 year Winter Q+45%	19.200	19.130	0.530	0.000	0.16		149.621	1345.471	0.7
1.017	-	360 minute 100 year Winter Q+45%	19.100	18.438	-0.154	0.000	0.48		0.147	643.412	0.9

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.007	S18		24.2	FLOOD

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Pipe		Status
		Time (mins)	Flow (l/s)	
7.008	S49		1.9	FLOOD RISK
1.012	S19		10.5	FLOOD RISK
1.013	S20		8.1	FLOOD RISK
12.000	S37		56.0	SURCHARGED
12.001	S36	4	133.6	SURCHARGED
12.002	S35		12.6	SURCHARGED
1.014	S23		12.7	FLOOD RISK
13.000	S2	12	22.5	OK
13.001	S3	4	32.9	SURCHARGED
13.002	S4	4	65.1	SURCHARGED
13.003	S5	6	69.5	SURCHARGED
13.004	S32		18.9	FLOOD RISK
13.005	S34		12.5	FLOOD RISK
13.006	S6		20.1	SURCHARGED
13.007	S33		3.5	SURCHARGED
1.015	S21		14.6	FLOOD RISK
1.016	S69		9.2	FLOOD RISK
1.017	-		29.2	OK*

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.081	0.081	0.081
1.001	User	-	100	0.006	0.006	0.006
1.002	-	-	100	0.035	0.035	0.035
1.003	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.066	0.066	0.066
2.001	-	-	100	0.013	0.013	0.013
2.002	User	-	100	0.036	0.036	0.036
1.004	-	-	100	0.103	0.103	0.103
3.000	-	-	100	0.072	0.072	0.072
3.001	-	-	100	0.017	0.017	0.017
1.005	User	-	100	0.014	0.014	0.014
1.006	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.015	0.015	0.015
	User	-	100	0.005	0.005	0.019
4.001	-	-	100	0.124	0.124	0.124
4.002	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.073	0.073	0.073
5.001	-	-	100	0.033	0.033	0.033
6.000	-	-	100	0.000	0.000	0.000
6.001	-	-	100	0.097	0.097	0.097
5.002	User	-	100	0.011	0.011	0.011
	User	-	100	0.020	0.020	0.031
	User	-	100	0.020	0.020	0.050
	User	-	100	0.004	0.004	0.055
5.003	-	-	100	0.023	0.023	0.023
4.004	-	-	100	0.000	0.000	0.000
4.005	-	-	100	0.000	0.000	0.000

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.007	-	-	100	0.039	0.039	0.039
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.060	0.060	0.060
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.012	0.012	0.012
7.000	-	-	100	0.067	0.067	0.067
7.001	-	-	100	0.039	0.039	0.039
7.002	-	-	100	0.049	0.049	0.049
7.003	-	-	100	0.000	0.000	0.000
7.004	-	-	100	0.050	0.050	0.050
7.005	-	-	100	0.042	0.042	0.042
8.000	User	-	100	0.041	0.041	0.041
	User	-	100	0.011	0.011	0.052
8.001	-	-	100	0.022	0.022	0.022
8.002	-	-	100	0.000	0.000	0.000
8.003	-	-	100	0.304	0.304	0.304
9.000	-	-	100	0.037	0.037	0.037
9.001	-	-	100	0.000	0.000	0.000
8.004	-	-	100	0.000	0.000	0.000
8.005	-	-	100	0.000	0.000	0.000
10.000	-	-	100	0.052	0.052	0.052
10.001	-	-	100	0.014	0.014	0.014
11.000	-	-	100	0.312	0.312	0.312
11.001	-	-	100	0.000	0.000	0.000
11.002	-	-	100	0.128	0.128	0.128
11.003	-	-	100	0.064	0.064	0.064
10.002	User	-	100	0.010	0.010	0.010
	User	-	100	0.007	0.007	0.017

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
10.003	-	-	100	0.044	0.044	0.044
7.006	User	-	100	0.006	0.006	0.006
7.007	-	-	100	0.000	0.000	0.000
7.008	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.106	0.106	0.106
1.013	-	-	100	0.000	0.000	0.000
12.000	-	-	100	0.179	0.179	0.179
12.001	-	-	100	0.190	0.190	0.190
12.002	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
13.000	-	-	100	0.072	0.072	0.072
13.001	User	-	100	0.019	0.019	0.019
	User	-	100	0.010	0.010	0.030
13.002	-	-	100	0.072	0.072	0.072
13.003	-	-	100	0.012	0.012	0.012
13.004	-	-	100	0.000	0.000	0.000
13.005	-	-	100	0.007	0.007	0.007
13.006	-	-	100	0.057	0.057	0.057
13.007	-	-	100	0.019	0.019	0.019
1.015	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
1.017	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.020	3.020	3.020

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m ³ /ha	Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coefficient	0.800	
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000	

Number of Input Hydrographs	0	Number of Offline Controls	1	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	36	Number of Real Time Controls	0


Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 455750 108500 SU 55750 08500		

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, 1440
Sensitivity flows(s) (%)	0, +45

WARNING: Half Drain Time has not been calculated as the structure is too full.

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

US/MH PN Name	Event	US/CL (m)	Water			Flow / Cap.	Overflow (l/s)	Maximum Vol (m ³)	Discharge Vol (m ³)	Maximum Velocity (m/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
			Level (m)	Depth (m)	Volume (m ³)								

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)
1.000	S56	30 minute 100 year Winter Q+45%	26.694	25.527	0.033	0.000	0.88	0.255	29.136	2.0
1.001	S55	15 minute 100 year Winter Q+45%	25.970	25.045	0.313	0.000	1.02	0.820	22.522	1.8
1.002	S54	15 minute 100 year Winter Q+45%	25.699	24.874	0.375	0.000	1.08	0.828	31.011	2.2
1.003	S53	15 minute 100 year Winter Q+45%	24.196	23.452	0.259	0.000	0.57	0.813	31.011	1.9
2.000	S67	30 minute 100 year Winter Q+45%	27.194	25.916	-0.078	0.000	0.47	0.096	23.709	2.7
2.001	S68	15 minute 100 year Winter Q+45%	25.278	24.159	0.081	0.000	0.59	0.355	20.681	2.5
2.002	S69	15 minute 100 year Winter Q+45%	24.611	23.959	0.548	0.000	1.13	1.110	30.898	2.3
1.004	S52	15 minute 100 year Winter Q+45%	24.089	23.376	0.488	0.000	1.02	1.398	89.765	3.3
3.000	S70	30 minute 100 year Winter Q+45%	21.123	20.409	0.211	0.000	0.85	0.616	25.548	0.9
3.001	S71	30 minute 100 year Winter Q+45%	21.400	20.333	0.280	0.000	1.14	1.847	31.594	0.9
1.005	S51	30 minute 100 year Winter Q+45%	21.372	20.258	0.268	0.000	0.89	1.744	160.506	2.5
1.006	S50	30 minute 100 year Winter Q+45%	20.590	19.874	0.394	0.000	1.80	2.020	160.506	2.1
4.000	S60	15 minute 100 year Winter Q+45%	23.383	22.602	0.419	0.000	0.84	0.808	5.515	0.7
4.001	S61	15 minute 100 year Winter Q+45%	23.297	22.591	0.419	0.000	0.77	1.119	34.747	2.5
4.002	S62	60 minute 100 year Winter Q+45%	22.038	22.027	1.114	0.000	0.71	3.344	63.236	1.3
4.003	S31	60 minute 100 year Winter Q+45%	21.787	22.012	2.287	16.312	0.16	37.878	54.792	0.3
5.000	S66	30 minute 100 year Winter Q+45%	25.060	23.800	-0.060	0.000	0.67	0.121	28.246	2.3
5.001	S65	15 minute 100 year Winter Q+45%	24.010	22.711	-0.007	0.000	1.00	0.220	30.201	2.6
6.000	-	1440 minute 100 year Summer Q+45%	23.850	22.230	0.000	0.000	0.00	0.176	0.000	0.0
6.001	S76	180 minute 100 year Winter Q+45%	23.850	22.394	0.173	0.000	0.14	46.564	29.386	0.5
5.002	S64	15 minute 100 year Winter Q+45%	23.374	22.076	-0.107	0.000	0.54	0.174	50.565	3.6
5.003	S63	15 minute 100 year Winter Q+45%	21.271	19.959	0.288	0.000	1.02	0.910	56.897	2.2
4.004	S30	240 minute 100 year Winter Q+45%	19.800	19.803	0.003	2.977	0.01	5.621	245.847	0.1
4.005	S28	240 minute 100 year Winter Q+45%	19.800	19.800	0.300	0.000	0.11	122.182	222.198	0.9
1.007	S27	30 minute 100 year Winter Q+45%	20.412	19.555	0.180	0.000	1.27	2.536	188.683	1.4
1.008	S26	30 minute 100 year Winter Q+45%	19.565	19.437	-0.128	0.000	0.12	2.174	188.206	0.2

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S56	6	28.8	SURCHARGED
1.001	S55		29.7	SURCHARGED
1.002	S54	5	38.6	SURCHARGED
1.003	S53		44.1	SURCHARGED
2.000	S67	12	22.5	OK
2.001	S68		25.6	SURCHARGED
2.002	S69		40.6	SURCHARGED
1.004	S52	4	121.5	SURCHARGED
3.000	S70	5	28.5	SURCHARGED
3.001	S71	7	35.6	SURCHARGED
1.005	S51	6	147.3	SURCHARGED
1.006	S50		146.3	SURCHARGED
4.000	S60		11.1	SURCHARGED
4.001	S61	4	68.3	SURCHARGED
4.002	S62		42.3	FLOOD RISK
4.003	S31		9.3	FLOOD
5.000	S66		24.9	OK
5.001	S65		39.3	OK
6.000	-		0.0	SURCHARGED*
6.001	S76		1.6	SURCHARGED
5.002	S64		75.5	OK
5.003	S63		87.7	SURCHARGED
4.004	S30		30.5	FLOOD
4.005	S28		9.3	FLOOD RISK
1.007	S27	20	157.4	SURCHARGED

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
1.008	S26		155.2	FLOOD RISK

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Causeway

Network 2020.1.3


Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum
											Velocity (m/s)
1.009	S25	30 minute 100 year Winter Q+45%	19.565	19.428	0.228	0.000	1.09		34.040	207.366	1.8
1.010	S75	1440 minute 100 year Winter Q+45%	20.008	19.332	0.299	0.000	0.20		1.616	884.566	1.2
1.011	S24	1440 minute 100 year Winter Q+45%	19.304	19.328	0.278	23.877	0.09		26.597	893.466	0.3
7.000	S11	30 minute 100 year Winter Q+45%	26.876	25.603	-0.073	0.000	0.52		0.103	23.961	2.5
7.001	S12	15 minute 100 year Winter Q+45%	25.069	24.324	0.455	0.000	1.24		0.991	26.843	2.1
7.002	S14	15 minute 100 year Winter Q+45%	24.299	23.063	-0.075	0.000	0.75		0.246	38.529	2.4
7.003	S22	15 minute 100 year Winter Q+45%	23.419	22.272	0.067	0.000	1.00		0.619	38.531	1.8
7.004	S15	15 minute 100 year Winter Q+45%	23.234	22.069	0.070	0.000	1.02		0.577	51.604	2.5
7.005	S16	15 minute 100 year Winter Q+45%	21.753	20.568	-0.061	0.000	0.87		0.299	63.572	3.8
8.000	S44	30 minute 100 year Winter Q+45%	26.653	25.381	-0.072	0.000	0.53		0.104	18.699	1.9
8.001	S43	15 minute 100 year Winter Q+45%	25.752	24.496	-0.037	0.000	0.86		0.170	19.275	2.0
8.002	S42	15 minute 100 year Winter Q+45%	25.335	24.212	0.077	0.000	1.02		0.375	19.275	1.7
8.003	S72	15 minute 100 year Winter Q+45%	23.800	23.796	0.071	0.000	1.06		0.613	105.890	3.0
9.000	S73	30 minute 100 year Winter Q+45%	24.624	23.635	-0.089	0.000	0.35		0.080	13.587	1.9
9.001	S48	30 minute 100 year Winter Q+45%	24.007	23.124	0.017	0.000	1.20		0.260	13.587	0.7
8.004	S74	15 minute 100 year Winter Q+45%	23.100	22.946	-0.154	0.000	0.05		0.470	115.374	2.1
8.005	S45	15 minute 100 year Winter Q+45%	21.839	21.620	-0.219	0.000	0.36		0.863	115.373	4.8
10.000	S41	30 minute 100 year Winter Q+45%	24.415	23.140	-0.075	0.000	0.50		0.100	18.601	2.0
10.001	S40	30 minute 100 year Winter Q+45%	23.200	21.986	-0.053	0.000	0.70		0.142	24.018	2.0
11.000	S57	30 minute 100 year Winter Q+45%	24.323	23.434	-0.166	0.000	0.42		0.185	120.732	3.5
11.001	S77	30 minute 100 year Winter Q+45%	23.850	23.150	0.600	0.000	0.96		1.863	120.732	1.8
11.002	S59	30 minute 100 year Winter Q+45%	23.158	22.787	0.679	0.000	1.27		3.777	170.260	2.0
11.003	S58	15 minute 100 year Winter Q+45%	22.881	22.354	0.523	0.000	1.13		2.507	143.612	2.3
10.002	S39	15 minute 100 year Winter Q+45%	22.380	21.627	0.348	0.000	1.36		2.624	165.610	2.7
10.003	S38	15 minute 100 year Winter Q+45%	21.915	20.774	-0.091	0.000	0.81		0.496	178.146	4.1
7.006	S17	360 minute 100 year Winter Q+45%	20.000	20.019	0.019	19.176	0.01		25.404	911.771	0.1

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Pipe		Status
		Time (mins)	Flow (l/s)	
1.009	S25	18	129.9	FLOOD RISK
1.010	S75		24.2	SURCHARGED
1.011	S24		24.5	FLOOD
7.000	S11	12	22.9	OK
7.001	S12	4	37.7	SURCHARGED
7.002	S14	8	65.3	OK
7.003	S22		64.4	SURCHARGED
7.004	S15	3	90.8	SURCHARGED
7.005	S16		115.7	OK
8.000	S44	12	17.9	OK
8.001	S43	13	27.3	OK
8.002	S42		27.0	SURCHARGED
8.003	S72		197.2	FLOOD RISK
9.000	S73	12	12.6	OK
9.001	S48		12.6	SURCHARGED
8.004	S74		207.0	FLOOD RISK
8.005	S45		207.4	FLOOD RISK
10.000	S41	12	17.8	OK
10.001	S40		22.5	OK
11.000	S57		106.6	OK
11.001	S77		110.3	SURCHARGED
11.002	S59		144.0	SURCHARGED
11.003	S58		164.9	SURCHARGED
10.002	S39		192.0	SURCHARGED
10.003	S38		210.1	OK

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Half Drain Pipe		Status
		Time (mins)	Flow (l/s)	
7.006	S17		105.9	FLOOD

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum
											Velocity (m/s)
7.007	S18	360 minute 100 year Winter Q+45%	20.000	20.019	0.819	19.279	0.07		671.805	443.540	0.4
7.008	S49	480 minute 100 year Winter Q+45%	20.235	20.025	1.249	0.000	0.02	20.1	5.149	106.458	0.0
1.012	S19	1440 minute 100 year Winter Q+45%	19.304	19.327	0.023	68.908	0.00		94.014	1081.425	0.1
1.013	S20	1440 minute 100 year Winter Q+45%	19.304	19.327	0.527	23.048	0.11		695.976	954.413	0.1
12.000	S37	15 minute 100 year Winter Q+45%	21.350	20.548	0.323	0.000	1.26		0.778	51.001	1.5
12.001	S36	15 minute 100 year Winter Q+45%	20.972	20.170	0.248	0.000	1.02		2.721	102.505	2.1
12.002	S35	1440 minute 100 year Winter Q+45%	19.659	19.326	0.367	0.000	0.07		3.053	344.460	1.1
1.014	S23	1440 minute 100 year Winter Q+45%	19.561	19.330	0.550	0.000	0.15		4.135	1295.331	0.3
13.000	S2	30 minute 100 year Winter Q+45%	23.791	22.530	-0.061	0.000	0.66		0.121	26.447	2.2
13.001	S3	15 minute 100 year Winter Q+45%	22.170	21.266	0.395	0.000	0.94		0.945	26.724	2.2
13.002	S4	15 minute 100 year Winter Q+45%	21.069	20.308	0.632	0.000	1.12		1.503	45.602	1.7
13.003	S5	15 minute 100 year Winter Q+45%	20.104	19.295	0.410	0.000	1.63		2.278	48.593	1.8
13.004	S32	1440 minute 100 year Winter Q+45%	19.200	19.215	0.430	15.116	0.19		16.262	169.561	0.4
13.005	S34	1440 minute 100 year Winter Q+45%	19.200	19.218	0.368	1.930	0.19		57.053	149.220	0.5
13.006	S6	240 minute 100 year Winter Q+45%	20.004	19.258	0.480	0.000	0.27		2.157	111.696	0.7
13.007	S33	240 minute 100 year Winter Q+45%	19.824	19.291	0.636	0.000	0.06		62.413	64.192	0.0
1.015	S21	1440 minute 100 year Winter Q+45%	19.200	19.183	0.423	0.000	0.15		5.344	1455.211	0.3
1.016	S69	1440 minute 100 year Winter Q+45%	19.200	19.181	0.581	0.000	0.16		161.076	1359.011	0.7
1.017	-	360 minute 100 year Winter Q+45%	19.100	18.438	-0.154	0.000	0.48		0.147	682.531	0.9

Half Drain Pipe				
PN	US/MH Name	Time (mins)	Flow (l/s)	Status
7.007	S18		25.4	FLOOD

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

	Half Drain		Pipe	
	US/MH	Time	Flow	
PN	Name	(mins)	(l/s)	Status
7.008	S49		1.9	FLOOD RISK
1.012	S19		14.1	FLOOD
1.013	S20		8.7	FLOOD
12.000	S37		60.4	SURCHARGED
12.001	S36	3	140.0	SURCHARGED
12.002	S35		10.1	SURCHARGED
1.014	S23		12.5	FLOOD RISK
13.000	S2	12	24.6	OK
13.001	S3	3	34.6	SURCHARGED
13.002	S4	4	67.8	SURCHARGED
13.003	S5	6	72.4	SURCHARGED
13.004	S32		5.0	FLOOD
13.005	S34		11.8	FLOOD
13.006	S6		18.0	SURCHARGED
13.007	S33		3.5	SURCHARGED
1.015	S21		15.0	FLOOD RISK
1.016	S69		9.2	FLOOD RISK
1.017	-		29.3	OK*

Appendix E

Drainage Management and Maintenance Plan



Land South of Funtley Road,
Funtley

Drainage Management & Maintenance Plan

For

Reside Developments Limited

Document Control Sheet

Land South of Funtley Road,
Funtley

Reside Developments Limited

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
17 th November 2023	Final	Chris Gray	Jason Morgans



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3.0	The Surface Water Drainage System.....	4
4.0	General Maintenance Principles	5
5.0	Inspection and Maintenance Frequency of Components	7

1.0 Introduction

- 1.1 This document sets out the principles for the long-term management and maintenance of the proposed surface water drainage system on the Land South of Funtley Road site in Funtley.
- 1.2 The purpose of this document is to ensure that the site management company or their agents have a robust inspection and maintenance plan going forwards. This ensures the optimum operation of the surface water drainage system and that it will be continually maintained for the lifetime of the development. This will contribute to reducing the risk of surface water flooding both on- and off-site.
- 1.3 All those responsible for maintenance should follow relevant health and safety legislation for all activities listed within this report (including lone working, if relevant). Method statements and risk assessments should always be undertaken and made available, if requested.
- 1.4 This document has been produced by Motion on behalf of their client, Reside Developments Limited. This document describes the typical management and maintenance tasks that are known at the outline design stage (maintenance frequencies and typical tasks, for example). These have been drawn from industry guidance such as CIRIA C753 - The SuDS Manual – and manufacturer’s own guidance.
- 1.5 Maintenance is considered as a construction activity under the CDM Regulations 2015. Under the CDM Regulations, it is a requirement that a competent person be appointed to carry out a required role. CDM defines a competent person as an individual with sufficient knowledge of the specific tasks to be undertaken, as well as sufficient experience and ability to carry out their duties in relation to the task in a way that secures health and safety on site.
- 1.6 In recognition of the requirements of the CDM Regulations 2015, this surface water management and maintenance plan expects that the maintenance work will be carried out by a competent person who must have prior knowledge of the drainage components and SuDS systems on site.
- 1.7 There are limitations on what this document can prescribe at this time. At this stage this document cannot name the specific individuals who will carry out the maintenance and what equipment is to be used. Related to this, this document is unable to provide method statements for exactly how maintenance practices will be carried out. These can only be determined at the time of the maintenance being carried out and the exact maintenance need. Therefore, this is to be the responsibility of the site management company and/or the individuals carrying out the work. We urge those who are carrying out the maintenance to record this information and make it available to the Local Planning Authority (LPA), if required to do so. This drainage management and maintenance plan needs to be a living document that is owned and maintained by the adopting site management company.

2.0 Maintenance Categories

2.1 There are three categories of maintenance activities referred to in this report. These are:

Regular maintenance (including inspections and monitoring)

- ▶ Regular maintenance consists of basic tasks done on a frequent and predictable schedule, including inspections, vegetation management, and litter, silt and debris removal.

Occasional maintenance

- ▶ Occasional maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).

Remedial maintenance

- ▶ Remedial maintenance comprises of intermittent tasks that may be required to rectify faults associated with the system. The likelihood of faults can be minimised by correct installation, regular inspection and timely maintenance. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events and, as such, timings are difficult to predict.
- ▶ This document should be read in conjunction with the design drawings of the drainage system, so that the location and type of each feature can be recognised and understood.

3.0 The Surface Water Drainage System

- 3.1 The proposed surface water drainage system is made up of a number of components. These include:
- ▶ Permeable paving
 - ▶ Geocellular attenuation storage
 - ▶ Swales
 - ▶ Attenuation Basins
 - ▶ Catchpit manholes/silt traps
 - ▶ Hydrobrake/Flow Control
 - ▶ Water Butts
 - ▶ Manholes
 - ▶ Pipes.
- 3.2 All components should be installed in accordance with the manufacturer's instructions and to the levels/arrangement as defined on the designer's drawings. Not doing so will invalidate any warranty provided by the manufacturer.
- 3.3 All maintenance and cleaning must be carried out in accordance with manufacturer's recommendations and by competent and suitably qualified staff, as defined in the CDM regulations 2015.

4.0 General Maintenance Principles

- 4.1 All surface water drainage systems, whether piped gravity systems, Sustainable Drainage Systems (SuDS), or flow control devices and pumps, require regular maintenance to keep them working at optimum efficiency and capacity. The maintenance of the surface water drainage system on the Wolves Hill Capel development should be carried out alongside other regular maintenance tasks on site.
- 4.2 Timely and adequate maintenance will increase the lifespan of all the drainage components. Inadequate maintenance will do the reverse. Therefore, the projected lifespan and anticipated replacement date of each drainage component cannot be forecast at the time of this document being produced.
- 4.3 The site management company and/or their agents are responsible for the maintenance of the surface water drainage system.
- 4.4 Construction activities can create and discharge significant quantities of sediment that will quickly clog the surface water drainage system. Therefore, construction-stage sediment removal is required immediately post-construction. This may require several cleans of the system during the first year after installation. The construction site manager should assess this and carry out cleaning as necessary.
- 4.5 Catchpit manholes/silt traps will be specified upstream of the permeable paving. They will remove gross solids and the majority of silts. It is important that any debris build-up in the catchpit manholes/silt traps is removed at regular intervals. This will reduce the risk of the permeable paving becoming silted up. It will maintain its design capacity and function.
- 4.6 Cleaning should also take place after large storms when there have been increased surface water flows and visible entrainment and deposition of debris.
- 4.7 An increased frequency of inspection and maintenance should be programmed into the autumn and winter months in acknowledgement that:
 - ▶ Leaf fall from deciduous trees in autumn will result in an increased amount of leaf litter and an elevated blockage risk of drainage infrastructure.
 - ▶ Increased rainfall during winter months will result in greater quantities of water moving through the drainage system and a greater input of silt and other debris.
- 4.8 Table 4.1, below, gives an overview of typical maintenance tasks and the frequency with which they need to be undertaken. Section 5 – Inspection and Maintenance Frequency of Components – will assign typical maintenance frequencies and tasks to the specific components used within the surface water drainage system used on the Land South of Funtley Road development.

Table 4.1: Typical maintenance tasks and frequencies

Activity	Indicative Frequency	Typical Tasks
Routine/regular maintenance	Monthly to annually	<ul style="list-style-type: none"> ▶ Litter picking ▶ Silt removal ▶ Inspection of all inlets, outlets and control structures ▶ Weed removal and invasive plant control
Occasional maintenance	Annually up to 25 years	<ul style="list-style-type: none"> ▶ Silt control around components ▶ Vegetation management around components ▶ Sweeping of pavement areas to remove surface silt ▶ Silt removal from catchpits, cellular storage structures
Remedial maintenance	As required	<ul style="list-style-type: none"> ▶ Inlet/outlet repairs ▶ Erosion repairs ▶ Reinstatement of edgings ▶ Reinstatement following pollution ▶ Removal of silt build-up and leaf litter after storms ▶ Repair of vandalism ▶ Replacement of any blocked filter membranes/materials

5.0 Inspection and Maintenance Frequency of Components

- 5.1 Table 5.1 below lists each of the components used within the site’s surface water drainage system. It suggests an indicative maintenance frequency for each component and ascribes typical maintenance tasks to them.
- 5.2 This list is not exhaustive, nor is it prescriptive. As mentioned in Section 3, additional, unscheduled maintenance may be required following adverse weather conditions or after autumn leaf falls. Additional maintenance tasks may be required to adequately clean and maintain individual components.
- 5.3 The list of components should be cross-referenced with the designer’s drawings so that the location of each component can be identified.
- 5.4 It is the responsibility of the site management company and/or their agents to ensure that all necessary maintenance activities are carried out in a timely manner and that the design performance of each drainage component is preserved.
- 5.5 If there is any uncertainty regarding the correct and safe methods of cleaning, or what equipment should be used, the manufacturer should be consulted.

Table 5.1: Maintenance Frequency and Task for Drainage Components

Activity	Indicative Frequency	Anticipated Tasks
Pipes	As required	<ul style="list-style-type: none"> ▶ Identify any pipes that may not be operating properly and employ a competent, qualified contractor to inspect using CCTV. ▶ If the pipe is blocked with silt or debris, the pipe should be jetted clean from an upstream access point. All silt and debris should be captured and removed at a downstream access point. ▶ Inspect once clean. ▶ If any other defects are encountered (cracks, displaced joints, root ingress), appropriate solutions should be discussed with a competent and qualified contractor. These services are usually provided by the same companies that offer CCTV surveys and pipe jetting services.
Manholes	Annually	<ul style="list-style-type: none"> ▶ Inspect/identify any damage or areas that are not operating correctly ▶ Remove silt, litter, leaves and other detritus. ▶ Inspect once clean.
Catchpit Manholes/Silt Traps	Twice a year, before and after autumn/winter	<ul style="list-style-type: none"> ▶ Inspect/identify any damage or areas that are not operating correctly ▶ Remove silt, litter, leaves and other detritus. ▶ Inspect once clean.
Geocellular Crates	Every three months for the first year, then annually thereafter	<ul style="list-style-type: none"> ▶ Contact manufacturer for instruction on approved and safe inspection and maintenance practices ▶ Inspect/identify any areas that are not operating correctly ▶ Remove debris from catchment surface

		<ul style="list-style-type: none"> ▶ Remove sediment from pre-treatment structures ▶ Check for silt build-up and flush and remove as required (in accordance with manufacturer's instructions). ▶ Inspect once clean. ▶ See Table 21.3 of CIRIA C753 for more information. ▶ Most geocellular units have a 60 year creep limited life expectancy, so they should be planned for replacement by 2081 (approx.).
Hydrobrake chamber	Every three months for the first year, then annually thereafter	<ul style="list-style-type: none"> ▶ Contact manufacturer for instruction on approved and safe inspection and maintenance practices. ▶ Inspect Hydrobrake and check functionality. Remove any detritus as required. ▶ Inspect once clean.
Water Butts	Annually in Autumn to Winter	<ul style="list-style-type: none"> ▶ Remove falling leaves and seeds from guttering or those that have found their way into the water butt. ▶ Water may stagnate slightly. If so, use a water butt cleaning disc into the tank. ▶ In autumn and winter, drain water off every 10 days (or less) to make sure that water butts don't overflow and that water is kept moving. This will stop larvae and flies from using the water butt. ▶ Use safe products such as vinegar to clean the outside of the tank and the inside of the lid and be careful not to contaminate water with chemicals. ▶ At least once a year, completely empty the water butt and scrub it out with warm soapy water and then rinse thoroughly. This is best done at a time when the water butt is already nearly empty (end of summer) or when it can readily refill (winter).
Swale/Attenuation Basins	Monthly in Summer, as required in Winter	<ul style="list-style-type: none"> ▶ Responsibility should be with landscape contractors. ▶ Maintenance tasks are not that different from standard public open space. ▶ Adequate access needs to be provided to the area. ▶ Regular mowing should take place across maintenance access routes, amenity areas, across embankments and the main storage area. Remaining areas can remain as 'meadow'. Mowed grass lengths of 75 – 100mm are appropriate. ▶ Grass clippings should be disposed of off-site. ▶ Any dead growth should be cleared before the start of the growing season.

		<ul style="list-style-type: none"> ▶ Any permanently wet areas with emergent aquatic vegetation should be managed as ponds or wetlands. ▶ Remove any sediment build-up as required. ▶ Check any inlets and outlets for blockages and clear as required. ▶ Check any flow control devices, if present.
Permeable paving	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations.	<ul style="list-style-type: none"> ▶ Agitate surface by means of mechanical sweeping or vacuuming to ensure no vegetation or moss is allowed to establish and grow in the joints. ▶ Mechanical sweeping of pavements and refilling of joints with the correct aggregate need only be carried out at intervals of 5 years or so ▶ Remove weeds from the surface through the application of glyphosate-based weed killers ▶ Stabilise and mow contributing and adjacent areas. ▶ Inspect once clean. ▶ See Table 20.15 of CIRIA C753 for more information. ▶ Permeable paving has a nominal 25 year lifespan, if correctly and regularly maintained. ▶ When subjected to low level oil drips permeable pavements can continue to biodegrade hydrocarbons indefinitely. ▶ Major oil spills have the potential to contaminate the surface and the underlying crushed stone. In the event of a major oil spill, the area of block pavements and crushed stone that is affected should be removed, cleaned and reinstalled.

- 5.6 Upon completion of maintenance activities, a record should be kept of the work carried out. This should be retained and an annual maintenance report should be compiled, which should include the following:
- ▶ Observations resulting from inspections
 - ▶ Maintenance and operation activities undertaken during the year
 - ▶ Recommendations for inspections and maintenance programmes for the following year
- 5.7 On the next page is a table with suggested information should be recorded and included with the maintenance plan. As mentioned in the introduction to this document, this should be a living document and regularly updated, as required.
- 5.8 The Local Planning Authority Fareham Borough Council may request to check and sign off any maintenance activities. Therefore, it is the recommendation that the LPA is contacted prior to any scheduled routine maintenance. The table mentioned above and on the next page, as well as the annual maintenance report, should be offered to the LPA for their records and approval.

Date	Component requiring maintenance	Issues prompting maintenance	Scheduled maintenance (Y/N)	Maintenance carried out	Additional works required (Y/N). If yes, please detail	Next scheduled date of inspection and maintenance

Appendix F

Southern Water Pre Planning Enquiry Response



Chris Gray
84 North Street
Guildford
Surrey
GU1 4AU

Your ref

Our ref
12331

Date
06 November 2023

Contact
Tel 0330 303 0119

Dear Mr Gray,

Level 1 Capacity Check Enquiry: Land South of Funtley Road, Funtley, Fareham, Hampshire, PO15 6DW.

We have completed the capacity check for the above development site and the results are as follows:

Foul Water

There is currently inadequate capacity within the foul sewerage network to accommodate a foul flow of **1.14 l/s** for the above development at manhole reference **SU55089302**. The proposed development would increase flows to the public sewerage system which may increase the risk of flooding to existing properties and land. Additional off-site sewers or improvements to existing sewers will be required to provide sufficient capacity to service the development. Southern Water has a duty to provide Network capacity from the point of practical connection (point of equivalent or larger diameter pipe) funded by the New Infrastructure Charge.

Southern Water aim to provide this within 24 months following the date that planning has been granted for developments not identified as strategic sites in our current business plan. Strategic sites are larger developments and will often take longer than 24 months for a full solution to be provided.

Please note that the site will connect upstream of Roebuck Avenue Funtley WPS, which is not included in the model. Although the lack of historical incidents imply that this pump is likely to have capacity, further investigations should be undertaken, including a survey, to confirm that this pump can accommodate the flow without causing detriment. The modelling assessment has been undertaken from the location where Roebuck Avenue WPS discharges to the gravity network and identified capacity downstream of the pump.

Rights are not issued for a direct connection to Wastewater Treatment Works (WTW). Please note that connection to the WTW will have to be agreed by Southern Water Services before being carried out.

Southern Water, Southern House, Yeoman Road, Worthing, West Sussex, BN13 3NX
southernwater.co.uk

Southern Water Services Ltd, Registered Office: Southern House, Yeoman Road, Worthing, West Sussex, BN13 3NX Registered in England No. 2366670



New Infrastructure Charging

Please note as of 1st April 2018 we have moved to the “New Connections Services Charging Arrangements”. We understand that this may cause uncertainty for customers, particularly where they may have already committed to a development based on previous charging arrangements. We have worked with our stakeholders and Water UK to agree a set of principles by which we will base our charges. Please read through our new charging arrangement documents available at the following link: southernwater.co.uk/developing-building/connection-charging-arrangements

Alternatively, New Appointees and Variations (NAVs), also known as ‘inset’ companies, can provide new connection services or take ownership of the new water and wastewater connection infrastructure provided for a new development. NAVs are appointed by Ofwat and replace the regional water company. It is for the developer to choose whether to use a NAV or the regional water company to supply services for new sites, according to certain legal criteria.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: developerservices.southernwater.co.uk

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Please get in touch via the Get Connected customer dashboard if you have any queries.

Yours sincerely,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development



Chris Gray
84 North Street
Guildford
Surrey
GU1 4AU

Your ref

Our ref
12331

Date
06 November 2023

Contact
Tel 0330 303 0119

Dear Mr Gray,

Southern Water – Your build rates and occupation information
Site Name: Land South of Funtley Road, Funtley, Fareham, Hampshire, PO15 6DW.

We are contacting you to request information which is required by Southern Water in order to prepare for the connection of your development site (as listed above), to our public sewer network.

In April 2018, water companies in England published their new connection charges (part of the charges are also known as the infrastructure charge). A copy of the Southern Water New Connection Charging Document is available on our website: [new-connection-charging-arrangements-2023-24.pdf](#)

Under the new charging rules, our customers can connect to the closest point of connection, to a pipe of equivalent size or greater. If any reinforcement to the public sewer network is required to enable your connection, this will be provided through the new infrastructure charge. It will take time for us to provide any such network reinforcement. To enable us to plan for this, we require some information.

Action request:

Please provide the details of your anticipated occupation dates and build out rate for the site listed above. This information will support us in planning the required works across our region in readiness for your site to be occupied. If we do not receive this information about the site, we may not be able to progress with the work required to prepare for the connection of your site and your development program. Please note this does not constitute a discharge of any pre-commencement condition that may be attached to your planning consent.

Please provide the information in the form below and email this back to us as soon as possible, to the following address: SouthernWaterPlanning@southernwater.co.uk.



Build Rate & Occupation details

Please fill out the tables below in block capital letters and email this back to us as soon as possible. Please email the form to SouthernWaterPlanning@southernwater.co.uk

If the site is not proceeding please email the address above with the site references listed above and a brief description of why it is not going ahead. If you have queries about the information required, please call Developer Services on 0330 303 0119.

Your earliest reply would be much appreciated,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development

A. Contact Information in case of further queries:

Name of person completing form
Company
Phone number
Email address
Date form completed

B. Site references:

Proposal
Site Name (on letter)
Site Postcode/location
Planning Reference (on letter)
Planning Authority (on letter)
Our reference (on letter)

C. Site information:

Proposed start date	/ /
Proposed connection date	/ /
First occupation date	/ /
Forecast completion date	/ /
Proposed date of full occupancy	/ /
Proposed connecting manhole reference number	

Build out period (Per month for each year of development)												
Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
20												
20												
20												
20												
20												

If the site had previous use, please describe the type of previous use: e.g. greenfield/brownfield, block of flats, warehouse etc.

Chris Gray

From: Southern Water Planning <SouthernWaterPlanning@southernwater.co.uk>
Sent: 19 April 2024 11:18
To: Chris Gray
Subject: RE: Application ID: 12331

Good morning Chris,

Apologies for the length of time it has taken to provide a response on this. I have had to speak to numerous colleagues internally to gain an understanding.

The outcome is that we have capacity to provide for this development at the WPS.

Kind Regards

Emma Jn Pierre
Future Growth Planner
Developer Services

M. 07542 396016
southernwater.co.uk



My Working days are Tuesday – Friday

From: Chris Gray <cgray@motion.co.uk>
Sent: Monday, March 18, 2024 4:54 PM
To: Southern Water Planning <SouthernWaterPlanning@southernwater.co.uk>
Subject: RE: Application ID: 12331

Hi Emma,

When I made the capacity check application (pdf attached), it was based on a foul flow of **1.45 l/s**. This was derived from the attached SW Foul Flow Calc, plus what was added for 0.1 ha of commercial development land based on B3.1 2. a) of SSG Appendix C Approved Version 2.1 25 May 2021. **Would the output from the excel calculation - plus what was added for 0.1 ha of commercial development land - be taken by Southern Water to represent the peak flow?**

Alternatively, I note in Page 24 of 113 of the pdf attached, my predecessor came up with a calculated peak foul flow rate from the site of 5.75 l/s based on 4000 litres per dwelling per day, and this did not include the 0.06 litres per second for the 0.1 ha of commercial development land **i.e. 5.75 + 0.06 = 5.81 l/s.**

The next step in the attached response from Southern Water was investigation to confirm the Roebuck Avenue Funtley WPS pump can accommodate the flow without causing detriment.

Kind regards

Chris Gray | Principal Engineer

motion | 84 North Street, Guildford, GU1 4AU
t 01483 531300 | e cgray@motion.co.uk | w www.motion.co.uk