Stantec

Flood Risk Assessment and Surface Water Drainage Strategy

One Horton Heath

The Holme and Homestal

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Executive Summary

Stantec UK ("Stantec") has been appointed by Eastleigh Borough Council (One Horton Heath Team) to prepare a Flood Risk Statement and Surface Water Drainage Strategy for a Reserved Matters Application (RMA) for the Holme and Homestal residential developments at the One Horton Heath site.

The Holme and Homestal parcels are situated towards the north and centre of the OPP site. Together, both sites form an L-shape, divided by Fir Tree Lane, with the Holme to the south and the Homestal to the north of the lane. The sites are comprised predominantly of open agricultural land.

To the north of the Homestal lies the Fair Oak Stream, which is a 'main river' and runs within the Quobleigh Woods. The Fair Oak stream flows in a south westerly direction and is a tributary of the River Itchen which is located 1.5km to the west of the site.

Immediately to the south of the Holme is an 'ordinary watercourse' known as the Foxwood Stream, which is a tributary of the Fair Oak Stream.

Development proposals for the parcels comprise the erection of a total of 357 dwellings with associated public open space, landscaping, and cycle and vehicular parking.

Both the Holme and Homestal development area lies within Flood Zone 1, defined by the NPPF as land with a low probability of flooding from rivers or the sea, specifically, it has less than a 1 in 1,000 annual probability of flooding (less than 0.1%) from rivers (Fluvial Flood Risk).

Similarly, Environment Agency online mapping shows the site areas are not a risk of surface water flooding, and the British Geological Survey (BGS) Groundwater Susceptibility mapping shows the sites have limited potential for groundwater flooding.

The drainage proposals have been prepared in accordance with the Flood Risk Assessment (Ref: G277-DOC01 FRA, May 2021 and addendum report June 2022) provided within the Outline Planning Permission (OPP), and relevant local and national design guidance and standards.

Therefore, the risk to the proposed development from all sources of flooding is considered to be very low.

Geotechnical investigation and infiltration testing has shown that infiltration drainage is not viable and therefore, in accordance with the OPP Flood Risk Assessment, the proposed surface water strategy replicates greenfield discharge rates. The development run-off will be restricted to the greenfield Q_{MED} rate, which is equivalent to a 2 year return period, for all events up to an including the 100 year return period + climate change. As such the proposed development will reduce the flood risk for all higher order events, compared to existing greenfield rates.

The surface water drainage system will utilise SuDS treatment trains in line with the strategy established in the OPP, to manage water quality and quantity, using Prevention Measures, Source Control and Site Control Techniques, and Regional Control Features.

The proposed development will be safe from surface water flooding and the development will not increase flood risk elsewhere. The RMA SuDS drainage design will maintain water quality standards and has been prepared in accordance with the strategy developed for the OPP, the National Planning Policy Framework (NPPF), Planning practice Guidance (PPG) and the and the LLFA requirements.

1 Introduction

1.1.1 Stantec UK ("Stantec") has been appointed by Eastleigh Borough Council (One Horton Heath Team) to prepare a Flood Risk Statement and Surface Water Drainage Strategy to support a Reserved Matters Application (RMA) for the residential development on the Holme and Homestal parcels of the One Horton Heath development.

1.1.2 This report has been prepared in accordance with the following documents:

- Outline Planning Permission (LPA ref no. O/20/89498) granted in October 2025.
- One Horton Heath, Flood Risk Assessment (FRA), (ref: G277-DOC FRA), May 2021.
- Flood Risk Addendum - Ref: G277-FN14-FRA ADDENDUM (O-20-89498), June 2022.
- Eastleigh Borough Council Policy DM10: Water and Wastewater (see others in FRA report)
- One Horton Heath, Utilities and Foul Water Statement Report (ref: 26114-RP-IE-002)
- Hampshire County Council Level 1 Strategic Flood Risk Assessment (SFRA), 2024
- National Planning Policy Framework (NPPF), revised December 2024 and updated February 2025.
- National Planning Practice Guidance (NPPG), Flood Risk and Coastal Change, updated September 2025.
- Non-statutory Technical Standards for Sustainable Drainage Systems - Defra, March 2015. *(noting that these standards were superseded by the National Standards for Sustainable Drainage Systems, June 2025 which was part way through the design process)*, and
- Flood Risk Assessments: Climate Change Allowances - Environment Agency, May 2022.

2 Site Information

2.1 Site Location and Plan

2.1.1 The Holme and Homestal development parcels cover a total area of 11.48 ha in size and are situated on land west of Burnetts Lane, Eastleigh, SO30 2HH, which is part of the One Horton Heath major mixed-use development.

Figure 2.1 - Site Location Plan

2.1.2 The Holme and Homestal parcels are situated towards the north and centre of the OPP site. Together, both sites form an L-shape, divided by Fir Tree Lane, with the Holme to the south and the Homestal to the north of the lane. The Folds is located adjacent to the east of the Homestal, and to the north east of the Holme. The Quobleigh Breach RM parcel is adjacent to both sites along the western boundary. The sites are comprised predominantly of open agricultural land.

2.1.3 The Homestal is bound by dense woodland of Quobleigh Woods to the north which visually and physically separates the Site from the built form of the new residential development to the north-west along Allington Lane. An established hedgerow runs along the entirety of the Site's eastern boundary, separating the two sites from the Folds, and another established hedgerow exists on the western boundary, beyond which is the Quobleigh Breach RM parcel and the spine road that has been recently constructed and open to traffic, known as 'The Avenue'.

2.1.4 To the north of the Homestal lies the Fair Oak Stream, which is a 'main river' and runs within the Quobleigh Woods. The Fair Oak stream flows in a south westerly direction and is a tributary of the River Itchen which is located 1.5km to the west of the site.

2.1.5 Immediately to the south of the Holme is an 'ordinary watercourse' known as the Foxwood Stream, which is a tributary of the Fair Oak Stream.

2.1.6 The topography of the Homestal development area lies at an elevation of between 29.50m AOD (Above Ordnance Datum) at its high point in the southeastern corner of the site, falling to 22.00m AOD in the northwestern corner of the site.

2.1.7 The topography of the Holme development area lies at an elevation of between 26.50m AOD at its high point along the northern boundary with Fir Lane, falling to 19.00m AOD in the southwestern corner of the site.

2.2 Development Proposals

2.2.1 Submission of Reserved Matters relating to Layout, Scale, Appearance, and Landscaping pursuant to Condition 4 (RM Requirements) of Outline Planning Permission O/20/89498 for the erection of 357 dwellings within Phases 12A and 14 (The Holme and Homestal), with associated public open space, landscaping, and cycle and vehicular parking, to include details relevant to the following Outline Planning Permission conditions:

- Condition 16 (Arb Assessment)
- Condition 21 (Design Code)
- Condition 25 (Refuse)
- Condition 31 (Higher Access Standards)
- Condition 35 (Built Heritage)
- Condition 45 (Noise Assessments)
- Condition 58 (Flood Mitigation)
- Condition 59 (Foul Drainage)
- Condition 61 (SUDs)
- Condition 64 (EMMP)
- Condition 67 (Landscaping)
- Condition 71 (BNG)
- Condition 76 (Nutrient Neutrality)

2.2.2 This report seeks to address the requirements of conditions 58 Flood Mitigation, 59 Foul Drainage, and 61 SuDS.

2.2.3 Condition 58 Flood Mitigation, requires demonstration that the development will not be built within flood zone 2 or 3, ensuring development is directed away from watercourses and any watercourse crossings do not exacerbate flood risk. Section 3 of this report details the scheme's response to these requirements.

2.2.4 Condition 59 Foul Drainage, requires details of the foul the means of foul drainage, in accordance with the Utilities and Foul Water Statement Report (ref: 26114-RP-IE-002), to be submitted and approved prior to commencement of the drainage system. Section 3.1.10 of this report details the scheme's response to these requirements.

2.2.5 Condition 61 SuDS, requires details of the surface water drainage scheme including SuDS, in accordance with the FRA (ref: G277-DOC FRA) and addendum (ref: G277-FN14-FRA ADDENDUM), to be to be submitted and approved prior to commencement of the drainage system. Sections 5 and 6 of this report details the scheme's response to these requirements.

2.2.6 More information on the development proposals can be found in the Design and Access Statement (DAS) and the Planning Statement documents.

2.2.7 A copy of the proposed Landscape General Arrangement drawings (Ref: 332612639_STA-13-ZZ-DR-L-2003 and 332612639_STA-14-ZZ-DR-L-2002) are contained in **Appendix A**.

3 Flood Risk Statement

3.1.1 The development proposals have been prepared in accordance with the Flood Risk Assessment (Ref: G277-DOC01 FRA, May 2021 and addendum report June 2022) provided within the Outline Planning Permission (OPP).

3.1.2 The Holme and Homestal development areas are situated within Flood Zone 1, defined by the NPPF as land with a low probability of flooding from rivers or the sea, specifically, they have less than a 1 in 1,000 annual probability of flooding (less than 0.1%) from rivers (Fluvial Flood Risk).

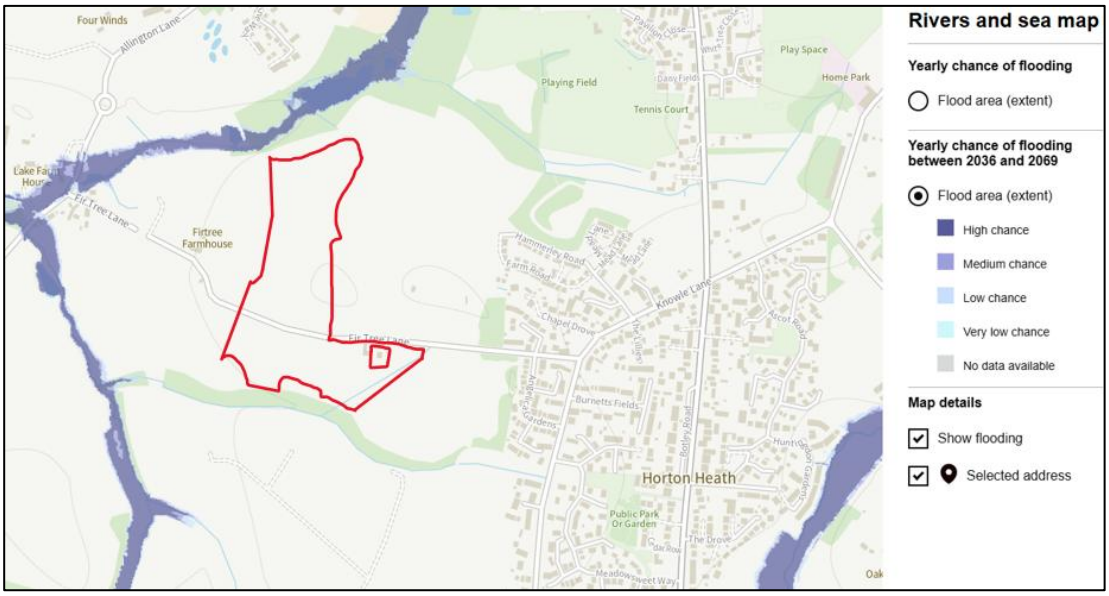

Figure 3.1 – EA Online Long-Term Flood Risk Mapping – Rivers and Sea Map Extract

3.1.3 The development proposals also include raising the development platform areas as part of the One Horton Heath site wide earthworks strategy. This will provide further protection to the housing against extreme flooding events.

3.1.4 The Surface Water Flood map similarly shows the site areas are not at risk of surface water flooding except for a small gully line crossing the Homestal site which is shown as having a Low chance of flooding, and the existing ditches along Fir Lane are highlighted because by virtue of their construction they are low channels where water could collect.

3.1.5 Implementation of the earthworks strategy as part of the development proposals will remove the minor gully line crossing Homestal, however, its function will be replaced by the proposed surface water drainage system which will collect and manage this rainfall run-off in the future. The proposed surface water drainage strategy is explained further in further explained in Section 5.

Figure 3.2 – EA Online Long-Term Flood Risk Mapping – Surface Water Map Extract

3.1.6 The Environment Agency's Groundwater Source Protection Zone mapping, available on Defra's MAGIC map website, show the site areas are not located within a groundwater source protection zone.

3.1.7 The Hampshire County Council Level 1 Strategic Flood Risk Assessment (SFRA) 2024, Figure 4-B shows areas susceptible to groundwater flooding, and identifies the Folds development area as having a less than 25% probability of occurrence.

3.1.8 The British Geological Survey (BGS) Susceptibility to Groundwater Flooding mapping shows the Folds development area as limited potential for groundwater flooding. Refer to Figure 3.2 below.

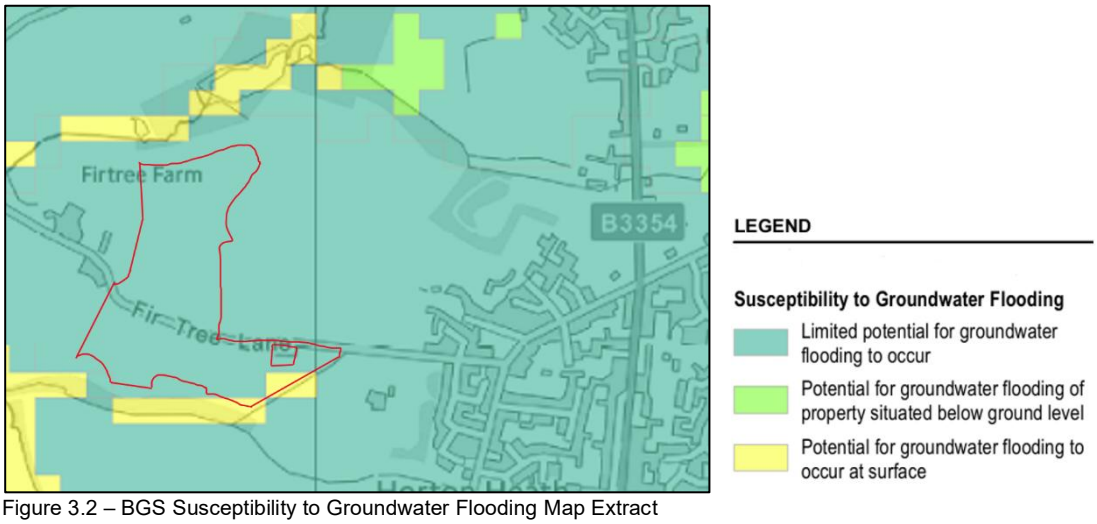

Figure 3.2 – BGS Susceptibility to Groundwater Flooding Map Extract

3.1.9 The GOV.UK flood risk map for reservoirs identifies that the site is not at risk from reservoir flooding.

3.1.10 The proposed foul water drainage layout for the Holme and Homestal development parcels follows the strategy set out in the Utilities and Foul Water Statement (report ref: 26114-RP-IE-002) from the OPP. The foul sewer layouts are designed to adoptable standards and discharge off the site by gravity in two locations. The Homestal parcel discharges to the northwest into the adjacent development parcel known as Quobleigh Breach, and the Holme parcel discharges to

the west along the Proposed Foxwood Road (SIDS Road). Refer to the drainage layout drawings in **Appendix B**. The foul water drainage networks continue by gravity flowing to the west and discharge to the new pumping station being constructed off the western end of Fir Tree Lane. From this pumping station flows are pumped to the Chrickenhall Farm Sewage Treatment works (STW) 2.1km of the site.

3.1.11 The surface water drainage strategy for the development is detailed in the following sections of this report. As a summary the drainage system will be designed to manage all rainfall events up to and including the 1 in 100 year design event, without surface flooding. All attenuation will be situated outside the floodplain and all water will be stored above the fluvial flood level. As such the Folds development will not be at risk from surface water flooding.

3.1.12 In summary the risk to the proposed development from all sources of flooding is considered to be very low, which accords with the One Horton Heath, Flood Risk Assessment (ref: G277-DOC FRA) May 2021, from the OPP.

4 Existing Surface Water Drainage Regime

4.1.1 The existing Homestal site area is laid to pasture and as such there is no known existing drainage system. Similarly, the Holme site area is predominantly existing arable farmland, with the eastern end laid to grassland around the Foxholes Farm Cottage buildings. In extreme events overland flow is intercepted on the site boundaries by a network of existing ditches and streams, and routed into nearby watercourses at the greenfield run-off rate.

4.1.2 Run-off from the Homestal development area discharges in an north-westerly direction into the Fair Oak Stream, and run-off from the Holme parcel discharges into the ordinary watercourse (known as Foxwood Stream) in the south-west corner of the site, which flows along the southern boundary, across the northern end of the Solar Farm.

4.1.3 Existing green-field run-off rates for the site have been calculated within the Flood Risk Assessment produced for the outline planning consent, using the Greenfield Runoff Tool developed by HR Wallingford available at the www.uksuds.com website. A summary of the rates in shown in the table below.

Return Period (years)	Calculated Greenfield Runoff Rate
1	7.8 l/s/ha
2 (Q_{Med})	8.1 l/s/ha
2.33 (Q_{bar})	9.2 l/s/ha
30	21.2 l/s/ha
100	29.4 l/s/ha

Table 4.1 – Greenfield Runoff Rates

5 Proposed Surface Water Drainage Strategy

5.1.1 The proposed surface water drainage scheme has been designed in accordance with the Defra Non-Statutory Technical Standards for Sustainable Drainage Systems, 2015. However, it is acknowledged that these standards have been superseded by the National Standards for Sustainable Drainage Systems (June 2025), although the release of these standards was part way through the design process and after the drainage strategy was fundamentally set by the earlier outline consent.

5.1.2 Hampshire County Council, as the Lead Local Flood Authority (LLFA) were consulted through the pre-application consultation process, and advised that a transitional period for the implementation of the new standards would be applicable and the older 2015 standards could be used. The proposed drainage strategy details and modelling criteria, which are described in the sections below, were also discussed with the LLFA and agreed to be in line with the OPP FRA.

5.2 Proposed Discharge Destination

5.2.1 The discharge destination for the network has been determined in accordance with the discharge destination hierarchies of the NPPG and the Building Regulations H3.

See the Planning Practice Guidance

This states:

"Generally the aim should be discharge surface runoff as high up the following hierarchy of drainage options as reasonably practicable:

1. *Into the ground (infiltration)*
2. *To a surface water body;*
3. *To a surface water sewer, highway drain or another drainage system;*
4. *To a combined sewer."*

5.2.2 In accordance with the drainage destination hierarchy the preferred method for the disposal of surface water from a new development or redevelopment is via infiltration. However, during Geotechnical Investigations undertaken by Stantec in 2025 groundwater was encountered at depths between 0.75m to 3.5m below the surface. Therefore, making it difficult to achieve a 1m unsaturated zone beneath the base of infiltration devices. Refer to the Factual Ground Investigation Report, 19 September 2025 (ref: STA-ZZ-XX-RP-G-0001), and Preliminary Ground Investigation Report (ref: STA-ZZ-XX-RP-G-0002).

5.2.3 Ongoing groundwater monitoring is being undertaken as part of the 2025 investigation, with groundwater monitoring wells installed at each borehole. In September 2025 groundwater levels were recorded between 0.7 to 2.1m bgl in the standpipes installed within the Wittering Formation.

5.2.4 Infiltration testing was also undertaken within the 2025 Ground Investigation with limited results. A rate of 8.84×10^{-7} m/s was recorded in one trial pit on the Homestal parcel, with the test abandoned after 25hrs with no further appreciable drop in water level. A falling head test was also conducted in a borehole on the Homestal parcel with rates of between 0.0 – 0.002 l/s recorded before the test abandoned after 1 hour.

5.2.5 There were no successful tests recording any infiltration on the Holme parcel. As such, infiltration drainage is not proposed as the primary discharge method.

5.2.6 Therefore, the proposed surface water drainage system seeks to replicate the existing drainage regime by discharging rainfall run-off to the watercourses at the site's perimeter.

5.3 Peak Flow and Volume Control

5.3.1 As detailed within the One Horton Heath, Flood Risk Assessment (ref: G277-DOC FRA), the proposed surface water strategy for site seeks to replicate greenfield discharge rates.

5.3.2 The proposed redevelopment will result in an increase in the site's impermeable area and therefore an increase in the volumetric discharge. As the additional run-off cannot be effectively disposed of by infiltration it is proposed that the outfalls will be restricted to a greenfield peak discharge rate of Q_{MED} (8.1 l/s/ha), which is equivalent to a 2 year return period.

5.3.3 By restricting the run-off to the median annual peak rate (Q_{MED}) for all events up to an including the 100 year return period + climate change, the proposed development will reduce the flood risk for all higher order events, compared to existing greenfield rates.

5.3.4 The Q_{MED} discharge rate has been applied to contributing open space areas as well as all impermeable areas, to determine the allowable discharge rate.

5.3.5 Contributing permeable areas such as verges, bioretention areas and permeable paving have been conservatively included in the modelling at a runoff rate of 100%. Each individual combined catchment area has then been increased by an additional 10% to provide for the potential for urban creep. This robust allocation of additional runoff area provides the surface water strategy with additional capacity for the future.

5.3.6 The proposed catchment areas drawings for the Holme parcel (Ref: 332612639-STN-13-XX-DR-C-0504-0506) and the Homestal parcel (Ref: 332612639-STN-14-XX-DR-C-0504-0506) are contained in **Appendix B** and **C** respectively.

5.3.7 Table 5.1 provides a summary of the greenfield and proposed discharge rates for the Homestal and the Holme parcels.

Return Period	Greenfield rate (**l/s/ha**)	**Homestal Parcel**		**Holme Parcel**	
		Greenfield l/s (3.37 ha imp area)	Proposed Discharge (l/s)	**Greenfield l/s (3.29 ha imp area)**	Proposed Discharge (l/s)
1 year	7.8 l/s/ha	26.29 l/s	21.90 l/s	25.66 l/s	24.70 l/s
Q_{MED}	**8.1 l/s/ha**	27.30 l/s	-	26.65 l/s	-
30 year	21.2 l/s/ha	71.44 l/s	27.30 l/s	69.75 l/s	26.50 l/s
100 year	29.4 l/s/ha	99.08 l/s	27.30 l/s	96.73 l/s	26.50 l/s
100 year + 40% CC	-	-	27.30 l/s	-	26.50 l/s

Table 5.1: Proposed Discharge Rates

5.3.9 The drainage strategy modelling within the FRA (May 2021) undertaken for the outline consent was based on a potential 40% increase in rainfall intensity as a result of the effects of climate change.

5.3.10 The Environment Agency's, Climate Change Allowances for Peak Rainfall in England, guidance which supports the NPPF provides contingency allowances for potential increases in sea level rise, peak river flow and rainfall intensity, was updated in May 2022.

5.3.11 This guidance now shows the Upper End Allowance of 45% increase in rainfall intensity for a 1% annual probability event in the 2070s epoch, which should be used for developments with a lifetime of up to 2125.

5.3.12 Therefore, as part of the pre-application consultation with the LLFA it was agreed that the surface water modelling for the RMA would be undertaken using a 40% Climate Change allowance and sensitivity tested for 45%. The sensitivity tests shows there is no surface flooding within either the Homestal or Holme development parcels in the 1 in 100 year + 45% climate change scenario.

5.3.13 The proposed surface water drainage layout drawings for the Holme parcel (Ref: 332612639-STN-13-XX-DR-C-0501 to 0503) are contained in **Appendix D** and the proposed surface water drainage layout drawings for the Homestal parcel (Ref: 332612639-STN-14-XX-DR-C-0501 to 0503) are contained in **Appendix E**.

5.3.14 A copy of the proposed MicroDrainage calculations for the Holme and Homestal networks are contained within **Appendices F** and **G** respectively.

5.3.15 The proposed peak discharge rates are achieved by using Sustainable Drainage System (SuDS) treatment trains in line with the approach set out in the FRA addendum. A copy of the proposed management train drawing is contained within **Appendix H.**

5.4 Flood Risk Within the Development

5.4.1 The proposed surface water drainage strategy has been developed to accommodate a 1 in 100 year + 40% climate change rainfall event below ground.

5.4.2 At the detail design stage the final parcel levels will be developed and areas of hard standing will be designed to route surface water away from buildings and towards surface water drainage features. Overland flow paths which could form in an exceedance event will also be identified and directed away from properties.

5.5 Water Quality and SuDS Selection

5.5.1 The NPPG paragraph 055 describes SuDS as follows:

> *'Sustainable drainage systems (or SuDS) are designed to control surface water run off close to where it falls, combining a mixture of built and nature-based techniques to mimic natural drainage as closely as possible, and accounting for the predicted impacts of climate change. They provide benefits for water quantity, water quality, biodiversity and amenity. Many types of sustainable drainage systems are possible, contributing to reducing the causes and impacts of flooding.'*

5.5.2 As described previously, the proposed development will utilise SuDS management train principles to manage water quality and quantity, using **Prevention Measures, Source Control and Site Control Techniques, and Regional Control Features.**

5.5.3 **Prevention Measures** will take the form of high-quality landscaping throughout the parcel minimising the impermeable area where practicable, and encouraging the uptake of water and evapotranspiration. Water butts will also be used within rear gardens to collect water for re-use, and trapped gullies and separators will be incorporated to prevent potential highway pollution.

5.5.4 **Source Control Techniques** will be used to manage water as close to the sources as possible. Given that infiltration is not viable as a primary discharge destination on site areas these techniques will provide attenuation throughout the developments to prevent and / or delay water entering the drainage system, maximising its efficiency. Refer to Drawing Ref: 332612639-STN-13-XX-DR-C-0531 in **Appendix I** for typical construction details of the source control components.

5.5.5 The following Source Control techniques will be provided:

- **Bio-Retention Areas / Rain Gardens**: Where landscaping areas and strips are adjacent to paths, roads and parking areas, structured soil beds with under drains will be

implemented to allow run-off to be directed into the landscape areas, promoting interception storage, filtering and evapotranspiration.

- **Cellular Storage**: Will be provided within private parking court areas to provide attenuation throughout the development, delaying run-off entry to the system and making the drainage network more efficient.
- **Permeable Paving**: Porous asphalt and permeable block paving options will be implemented in parking bays within private parking courts. Permeable pavements filter and treat contaminants and pollutants from stormwater runoff, such as heavy metals, sediment and hydrocarbons. The ground conditions are not conducive to infiltration as a primary discharge mechanism. However, as the development platform is being raised as part of the site earthworks strategy the pavement sub-base will be above the potential high groundwater level and therefore permeable parking bays will not be lined. Parking bays will be connected to the surface water drainage system using diffuser units within the stone sub-base storage.

5.5.6 **Site Control Techniques** are used to manage water between sub-catchments within a development area. Typically, swales, ditches, filter drains or rills are implemented to keep water on the surface and avoid deep systems.

5.5.7 However, surface drainage features reduce the net developable area, and the Homestal and Holme development areas are relatively steep in topography terms, and consequently piped drainage networks are not driven excessively deep across the parcel. Therefore, to meet the required development density the use of SuDS conveyance features has been limited.

5.5.8 A section of swale has been used on the northern boundary of the Homestal catchment to convey run-off from the northern eastern corner of the development into the SuDS Basin.

5.5.9 **Regional Control Features** provide the primary attenuation for the development parcel at each discharge. For the two principal catchments on the Folds development Strategic SuDS basins will be provided to control the final discharge back to greenfield rates, and provide water quality and habitat benefits. The SuDS basin layouts are shown in **Appendix H.**

5.5.10 Typical SuDS basin layouts are shown on drawings 332612639-STN-13-XX-DR-C-0521 and 332612639-STN-14-XX-DR-C-0521 and are contained in **Appendix I.**

5.5.11 The SuDS basins will provide a planted wetland habitat across the base area with deeper sections creating seasonal micro pools, which will provide interception storage in smaller magnitude events.

5.5.12 Downstream defender vortex separators will be provided on the pipe network at each entry to the basin. Sediment forebays will also be provided on both inlets and the outfall to capture sediments and facilitate maintenance activities without damaging the planted habitat.

5.5.13 The micro pools will be linked by low flow channels from the inlet forebays so the pools will receive water for recharged first in each event. Once the pools are full further inflows will spread across the base of the basin before the outlet forebay berm is breached and controlled flow will be discharged.

5.5.14 The hydraulic control, in the form of a hydrobrake, will be provided in a chamber immediately downstream of the basin.

5.6 The SuDS Manual C753, CIRIA 2025, Simple Index Approach

5.6.1 To deliver adequate treatment, the Sustainable Drainage System (SuDS) components in the drainage system should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type).

Total SuDS Mitigation Index (for each contamination type)	≥	*Pollution Hazard Index (for each contamination type)*

5.6.2 Where two or more SuDS features are provided in a treatment train, the following equation is used to account for the performance of secondary components associated with already reduced inflow concentrations.

Total SuDS Mitigation Index = Mitigation Index$_1$ + 0.5(Mitigation Index$_2$)

Where: Mitigation Index$_n$ = Mitigation Index for Component n

5.6.3 Tables 4.2 to 4.3 below demonstrate how the Homestal and Holme parcel drainage systems provide the necessary water treatment required prior to discharge.

	Land Use and Pollution Hazard Indices[1]	**Example SuDS Treatment Train Mitigation Indices[2]**		
	Residential Roofs (Very Low)	Permeable Paving	Attenuation Basin	**Total**
Total Suspended Solids	**0.2**	0.7	0.5	**0.95**
Metals	**0.2**	0.6	0.5	**0.85**
Hydrocarbons	**0.05**	0.7	0.6	**1.0**

[1] Land Use Pollution Indices and Hazard Levels are taken from Table 26.2 Pollution Hazard Indices for Different Land Use Classifications, of The SuDS Manual C753, CIRIA 2015.
[2] SuDS Mitigation Indices are taken from Table 26.3 Indicative SuDS Mitigation Indices for Discharge to Surface Waters, of The SuDS Manual C753, CIRIA 2015.

Table 5.2: Example Simple Index Approach for Residential Roof Areas

	Land Use and Pollution Hazard Indices[1]	**Example SuDS Treatment Train Mitigation Indices[2]**			
	Link Roads (Medium)	Permeable Paving	Bioretention	Attenuation Basin	**Total**
Total Suspended Solids	**0.7**	0.7	0.8	0.5	**1.35**
Metals	**0.6**	0.6	0.8	0.5	**1.25**
Hydrocarbons	**0.7**	0.7	0.8	0.6	**1.40**

[1] Land Use Pollution Indices and Hazard Levels are taken from Table 26.2 Pollution Hazard Indices for Different Land Use Classifications, of The SuDS Manual C753, CIRIA 2015.
[2] SuDS Mitigation Indices are taken from Table 26.3 Indicative SuDS Mitigation Indices for Discharge to Surface Waters, of The SuDS Manual C753, CIRIA 2015.

Table 5.3: Example Simple Index Approach for Roads

6 SuDS Maintenance Strategy

6.1 Introduction

6.1.1 All those responsible for maintenance should take appropriate health, safety and welfare precautions for all activities including lone working, if relevant, and risk assessments should always be undertaken. The site's infrastructure Health and Safety File should be consulted before carrying out any works either inside or outside of the development's boundary and information regarding the location of existing utilities passed on to operatives.

6.1.2 The requirements of the Health and Safety at Work Act 1974 and The Construction (Design and Management) Regulations 2015 should be adhered to and any residual risks identified in the Health and Safety File should be managed and information passed on to maintenance operatives through task specific risk assessments.

6.2 Ownership and Maintenance Arrangements

6.2.1 The piped sewer networks within the development will be adopted and maintained by Southern Water.

6.2.2 Private surface water and foul water drainage serving privately owned buildings will be maintained by the riparian owner(s).

6.2.3 The communal private drainage and SuDS features will be maintained by an Eastleigh Borough Council appointed contractor that will undertake maintenance for the One Horton Heath site.

6.3 Operation and Maintenance

6.3.1 There are three types of maintenance activities associated with surface water drainage systems. The SuDS Manual C753, CIRIA 2015 defines these as:

- Regular maintenance – *'basic tasks carried out to a frequent and predictable schedule, including inspections/monitoring, silt or oil removal if required more frequently than once per year, vegetation management, sweeping of surfaces and litter and debris removal.'*
- Occasional maintenance – *'tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the regular tasks'*
- Remedial maintenance – *'intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design, construction and regular maintenance activities. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and so timings are difficult to predict*.'

6.3.2 The following maintenance schedules for specific SuDS features should be utilised for the first year of maintenance and the required frequency monitored so the schedules can be adjusted for ongoing use to suit the location and condition of the drainage feature in question.

6.3.3 The application of fertilisers, pesticides and herbicides should not be used as these pose a risk of entering surface water and downstream watercourses, or impacting the effectiveness of the SuDS systems.

6.3.4 De-icing agents which include urea or sodium chloride such as rock salt should be avoided and agents which use calcium magnesium acetate, potassium acetate or similar which have less of a less adverse environmental impact used instead. De-icing agents mixed with sand can also increase sediment loads and impact the effectiveness that a SuDS surface can allow water to move to its sub-base.

6.3.5 Silt / sediment removal is a maintenance activity associated with the majority of SuDS. Testing of the sediment should be undertaken to determine its classification and subsequent appropriate deposition / disposal which may vary depending on the SuDS location and / or association with a particular type of land use. Where necessary appropriate licences should be sought for disposal of silt.

Operation and Maintenance	SuDS Component					
	Swales	**Permeable Paving**	**Bioretention Area / Rain Gardens**	**Attenuation Basin**	**Cellular Storage**	**Piped Network / Inspection Chambers / Catchpits / Gullies**
Regular Maintenance						
Inspection	■	■	■	■	■	■
Litter and debris removal	■	■	■	■	□	■
Grass cutting	■	□	■	■	□	
Weed and invasive plant control	□	□	□	□		
Shrub management (including pruning)	■	□	■	■		
Aquatic vegetation management				□		
Occasional maintenance						
Sediment management[1]	■	■	■	■	■	■
Vegetation replacement	□		□	□		
Vacuum sweeping and brushing		■				
Remedial maintenance						
Structure rehabilitation / repair	□	□	□	□	□	□
Infiltration surface reconditioning	□	□	□			
■ will be required □ may be required [1]Sediment should be collected and managed in pre-treatment systems, upstream of the main device						

Table 6.1: Typical key SuDS components operation and maintenance activities

6.4 Swales

6.4.1 Swales are shallow, flat bottomed, vegetated open channels designed to convey, attenuate and in some cases treat surface water runoff. They can enhance the natural landscape and provide aesthetic and biodiversity benefits. Swales can have a variety of profiles, can be uniform or non-uniform, and can incorporate a range of different planting strategies.

6.4.2 Regular inspection and maintenance is important for the effective operation of swales as designed. One of the most regular activities required is cutting (and removal) of the vegetation, and removal of any accumulated silt. Inlet and outfall structures require checking for any erosion and to ensure that they don't become blocked either by litter or vegetation. Sediment removal and maintenance of any hydraulic controls should also be undertaken. Occasionally sediment will need to be removed, although this can be minimised by ensuring that upstream areas are stabilised and by incorporating effective pre-treatment devices.

6.4.3 Regular mowing is also required along maintenance strips and access routes. The use of fertiliser and / or weed killers in areas adjacent to swales can cause contamination of the runoff passing though the swale and if required needs to be carefully managed.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Litter and debris removal.	Monthly, or as required
	Cut grass – to retain grass height within specified design range.	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages and clear if required.	Monthly
	Inspect vegetation coverage.	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies.	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required.	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Maintenance	Repair erosion or other damage by re-turfing or reseeding.	As required
	Relevel uneven surfaces and reinstate design levels.	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface.	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip.	As required
	Remove and dispose of oils or petrol residues using safe standard practices.	As required

Table 6.2: The SuDS Manual Table 17.1: Operation and maintenance requirements for swales

6.5 Permeable Paving

6.5.1 Permeable pavements have a surface that is formed of a material that is itself impervious to water, however the materials are laid to provide void space between the materials. These voids allow surface water to pass between the materials and through to the sub-base below where it is temporarily stored. As such the surface of the pavement needs to be regularly cleaned to remove silt and sediment build up to maintain movement of water from the surface to the sub-base.

6.5.2 Permeable pavements have been shown to reduce the concentrations of heavy metals, hydrocarbons, sediment and some nutrients. Treatment processes occurring within permeable pavements include:

- filtration of silt and the attached pollutants,
- biodegradation of organic pollutants, such as petrol and diesel,
- adsorption of pollutants, and the
- settlement and retention of solids.

6.5.3 Permeable pavements can provide amenity and visual benefits as there are a wide range of surface materials which can be selected to meet overall planning, architectural or landscape design.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Once a year, after autumn leaf all, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas.	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection.	Monthly for three months after installation
	Inspect for evidence of poor operation and / or weed growth – if required take remedial action.	Three monthly, 48hr after large storm events in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor inspection chambers.	Annually

Table 6.3: The SuDS Manual Table 20.10: O&M requirements for pervious pavements

6.6 Bioretention and Rain Gardens

6.6.1 Bioretention areas and rain gardens are landscaped areas with a depressed surface formed with structural soils and vegetation. Runoff enters via the surface and filters though the different layers towards a perforated underdrain pipe connected to the wider drainage network.

6.6.2 They can help reduce pollutant levels in surface water runoff by filtering out sediments, metals and hydrocarbons and also remove dissolved pollutants by sorption to the filter medium.

6.6.3 They can be incorporated into a wide variety of landscapes using different shapes, materials, and planting, which also promote evapotranspiration.

6.6.4 Adequate access must be provided for all bioretention areas for inspection and maintenance, including the appropriate equipment and vehicles. Litter (including leaf litter) and debris removal is a key maintenance requirement to allow the surface to continue to operate as designed and could result in ponding on the surface.

Maintenance Schedule	Required Action	Frequency
Regular Inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underlain (if appropriate) to determine if maintenance is necessary.	Quarterly
	Check operation of underdrains by inspection of flows after rain.	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary.	Quarterly
	Inspect inlets and outlets for blockage.	Quarterly
Regular Maintenance	Remove litter and surface debris and weeds.	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density.	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays.	Quarterly to biannually
Occasional Maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required.	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch.	As required
Remedial Actions	Remove and replace filter medium and vegetation above.	As required but likely to be > 20 years

Table 6.4: The SuDS Manual Table 18.3: O&M requirements for bioretention systems

6.7 Attenuation Basins

6.7.1 Attenuation basins are landscaped depressions that are normally dry except during and immediately following storm events. Vegetated attenuation basins provide treatment of surface water runoff through the removal of sediment and buoyant materials, but levels of nutrients, heavy metals, toxic materials and oxygen-demanding materials may also be significantly reduced.

6.7.2 They can include small permanent wet pools, to prevent re-suspension of particles during high intensity rainfall events and / or sediment forebays to provide pre-treatment.

6.7.3 Regular mowing is required along maintenance access routes and amenity areas. Mowing or vegetation management of the main storage area should ideally retain a minimum grass of plant heights of 75–150mm to assist in filtering pollutants and retaining sediments.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove litter and debris.	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial Maintenance	Repair erosion or other damage by reseeding or re-turfing.	As required
	Realignment of rip-rap.	As required
	Aerate pond where signs of eutrophication are detected	As required
	Repair / rehabilitate inlets, outlets and overflows.	As required
	Relevel uneven surfaces and reinstate design levels	As required

Table 6.5: The SuDS Manual Table 22.1: O&M requirements for detention basins

6.8 Geocellular Storage

6.8.1 Geocellular storage systems are high porosity modular plastic units that can be used to efficiently create a below ground structure for the temporary storage of surface water. Their inherent flexibility in size and shape means that they can be tailored to suit the specific characteristics and requirements of most sites. This is aided by their ability to be located below both public open space and trafficked areas.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required take remedial action.	Monthly for three months, then annually

Maintenance Schedule	Required Action	Frequency
	Remove debris from the catchment surface (where may cause risks to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by silt, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and / or internal forebays.	Annually, or as required
Remedial Maintenance	Repair / rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect / check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Survey inside the tank for sediment build-up and remove if necessary.	Every 5 year as required

Table 6.6: Operation and maintenance requirements for geocellular storage

6.9 Piped Network / Inspection Chambers / Catchpits / Gullies

6.9.1 Sewers adopted by Southern Water will be maintained in accordance with their own policies and responsibilities under the Water Industry Act.

6.9.2 Piped drainage network components require regular inspection and maintenance to ensure that the individual components continue to operate as designed, both in terms of hydraulic capacity and potential pollutant removal. All the gullies, inspection chambers and catchpits will therefore be inspected and cleaned regularly.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any features that are not operating correctly. If required take remedial action	Monthly for three months, then six monthly
	Debris removal from catchment surface / gratings (where may cause risks to performance)	Monthly (and after large storms)
	Remove sediment from trapped sumps, manholes and catchpits.	Annually or as required
Remedial Maintenance	Repair / rehabilitation of gratings, inlets and outlets	As required
Monitoring	Inspect / check all gratings, trapped sumps, manholes and catchpits to ensure that they are in good condition and operating as designed	Annually and after large storm events
Structure Rehabilitation / Repair	Regular Maintenance and Monitoring to identify if repair and / or replacement of features or pipework is required.	As required

Table 6.7: Operation and maintenance requirements for pipes, inspection chambers and gullies

7 Summary and Conclusion

7.1.1 The Homestal and Holme development parcels are situated within Flood Zone 1, defined by the NPPF as land with a low probability of flooding from rivers or the sea, specifically, it has less than a 1 in 1,000 annual probability of flooding (less than 0.1%) from rivers (Fluvial Flood Risk).

7.1.2 The Surface Water Flood map similarly shows the majority of the Folds site is not a risk of surface water flooding, except for a small gully line crossing the Homestal parcel, which has a low risk of flooding Implementation of the site earthworks strategy and the proposed development's surface water drainage system will remove this low point and manage rainfall run-off on the site.

7.1.3 Geotechnical Investigations (GI) have shown the site has shallow groundwater, however, Hampshire County Council SFRA identifies the Folds development area as having a less than 25% probability of experiencing groundwater flooding. The British Geological Survey (BGS) Susceptibility to Groundwater Flooding mapping also shows the development area has limited potential for groundwater flooding.

7.1.4 The GI and groundwater monitoring have shown that infiltration drainage is not viable as a primary discharge mechanism. Therefore, the proposed surface water drainage system seeks to replicate the existing drainage regime by discharging rainfall run-off to the watercourses at the site's perimeter

7.1.5 The surface water drainage system will be designed to manage all rainfall events up to and including the 1 in 100 year + climate change design event, without surface flooding. All attenuation will be situated outside the floodplain and all water will be stored above the fluvial flood level. As such the Homestal and Holme developments will not be at risk from surface water flooding.

7.1.6 The development run-off will be restricted to the greenfield Q_{MED} rate, which is equivalent to a 2 year return period, for all events up to an including the 100 year return period + climate change. Therefore, proposed development will reduce the flood risk for all higher order events, compared to existing greenfield rates.

7.1.7 The surface water drainage system will utilise SuDS treatment trains in line with the strategy established in the OPP, to manage water quality and quantity, using Prevention Measures, Source Control and Site Control Techniques, and Regional Control Features.

7.1.8 The Simple Index method for water quality assessment, from the CIRIA SuDS Manual C753, has been used to demonstrate the proposed drainage system will provide adequate treatment for any potential pollutants or contaminants in the run-off.

7.1.9 In summary, the Homestal and Holme developments will not be at risk from flooding from any source, as per the FRA submitted with the OPP.

7.1.10 The proposed development will be safe from surface water flooding and the development will not increase flood risk elsewhere. The RMA SuDS drainage design will maintain water quality standards and has been prepared in accordance with the strategy developed for the OPP, the National Planning Policy Framework (NPPF), Planning practice Guidance (PPG) and the and the LLFA requirements.

Appendix A Landscape General Arrangements

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PLANNING ISSUE

Project
One Horton Heath
Holme & Homestal

Drawing Title
Landscape General Arrangement:
The Holme

Date	Scale	Drawn by	Check by
23.10.25	1:500 @A0	LA/EC	RMcW

Project No	Drawing No	Revision
332612639	STA-13-ZZ-DR-L-2003	A

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Project
One Horton Heath
Holme & Homestal

Drawing Title
Landscape General Arrangement:
The Homestal

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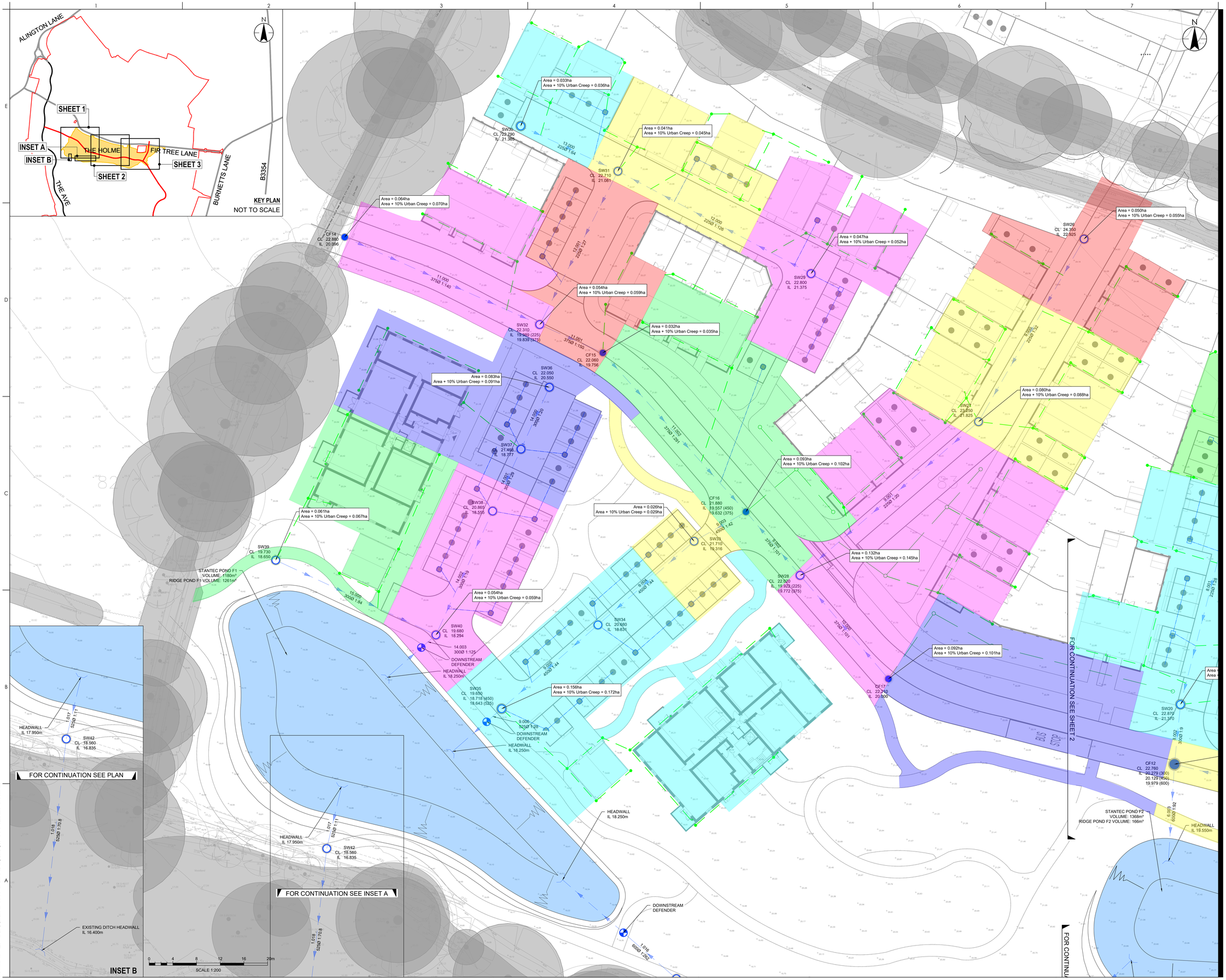
Appendix B Holme Proposed Catchment Areas Drawings



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6. TOPOGRAPHICAL SURVEY PROVIDED BY ENCOMPASS SURVEYS UNDERTAKEN ON SEPTEMBER 2024. ADDITIONAL SURVEY OF FIR TREE LANE PROVIDED BY ENCOMPASS GEOSPATIAL UNDERTAKEN ON JULY 2025.
7. TREE SURVEY BASED ON DRAWING 11705_P36 & 11705_P37 PROVIDED BY TYLER GRANGE UNDERTAKEN ON JUNE 2025.
8. THE HOLME AND HOMESTAL HOUSING LAYOUT BASED ON DRAWING 3423-PLB-ZZ-ZZ-M3-A-1020-ProposedSitePlan-P4 PROVIDED BY ARCHITECTURE PLB (RECEIVED 03.12.2025).
9. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION (DCG).
10. RWP AND SVP POSITIONS ARE SHOWN INDICATIVELY TO DEMONSTRATE HOW THE UNIT CAN CONNECT TO THE MAIN DRAINAGE SYSTEM. FINAL DETAILS WILL BE CONFIRMED AT THE DETAILED DESIGN STAGE.
11. PRIVATE SURFACE WATER DRAINS TO BE 100mm DIAMETER LAID AT 1:100 MIN GRADIENT
12. PRIVATE FOUL WATER DRAINS TO BE 100mm DIAMETER LAID BETWEEN 1:40 AND 1:80MM IN ACCORDANCE WITH PART H OF THE BUILDING REGULATIONS.
13. MANHOLES WITH CF REFERENCES DESIGNED BY RIDGE AND PARTNERS LLP (RECEIVED 26.09.2025).

KEY

- PROPOSED ATTENUATION BASIN
- PROPOSED CELLULAR STORAGE
- PROPOSED SWALE
- PROPOSED CATCHMENTS AREAS

PROPOSED (S104 ADOPTABLE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED HEADWALL

PROPOSED (PRIVATE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED LAND DRAIN IN PERMEABLE PAVING AND DIFFUSER UNIT
- PROPOSED LAND DRAIN IN RAIN GARDEN / BIORETENTION AND DIFFUSER UNIT
- EXISTING TREE ROOT PROTECTION ZONES

P01 FIRST ISSUE	DT	AB	2026.02.16
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	DT	DT	AB	2026.02.16
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Issue Status

S5 - FOR REVIEW AND ACCEPTANCE

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ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title

THE HOLME (PLOT 8)

SURFACE WATER CATCHMENT AREAS (SHEET 1 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P01	332612639-STN-13-XX-DR-C-0504

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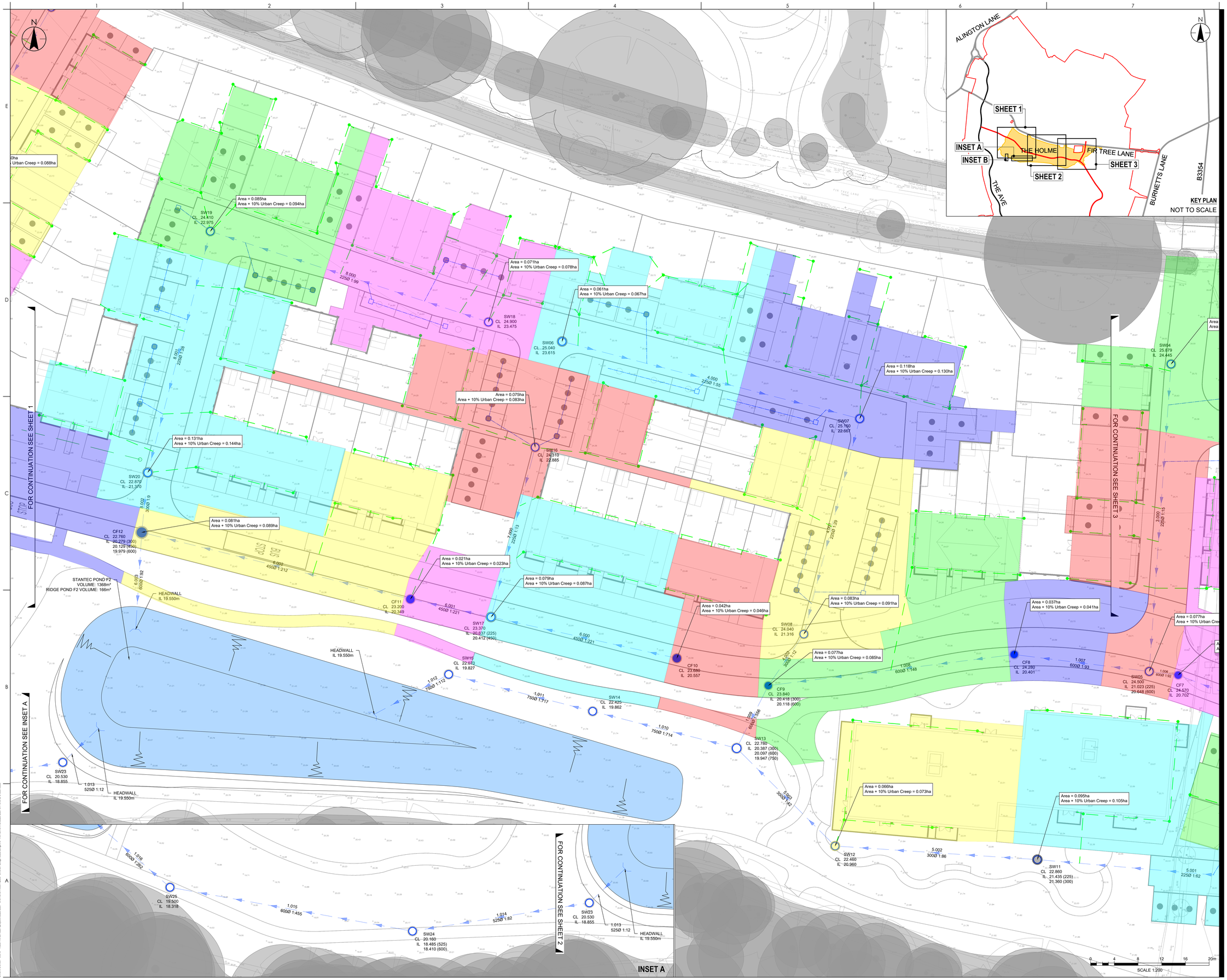

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13. MANHOLES WITH CF REFERENCES DESIGNED BY RIDGE AND PARTNERS LLP (RECEIVED 26.09.2025).

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- PROPOSED CELLULAR STORAGE
- PROPOSED SWALE
- PROPOSED CATCHMENTS AREAS

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- PROPOSED HEADWALL

PROPOSED (PRIVATE)

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P01 FIRST ISSUE	DT	AB	2026.02.16
Issued/Revision	By	Appd	YYYY.MM.DD
	DT	DT	AB	2026.02.16
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Title

THE HOLME (PLOT 8)

COMBINED DRAINAGE LAYOUT (SHEET 2 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P01	332612639-STN-13-XX-DR-C-0505

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SCALE 1:200

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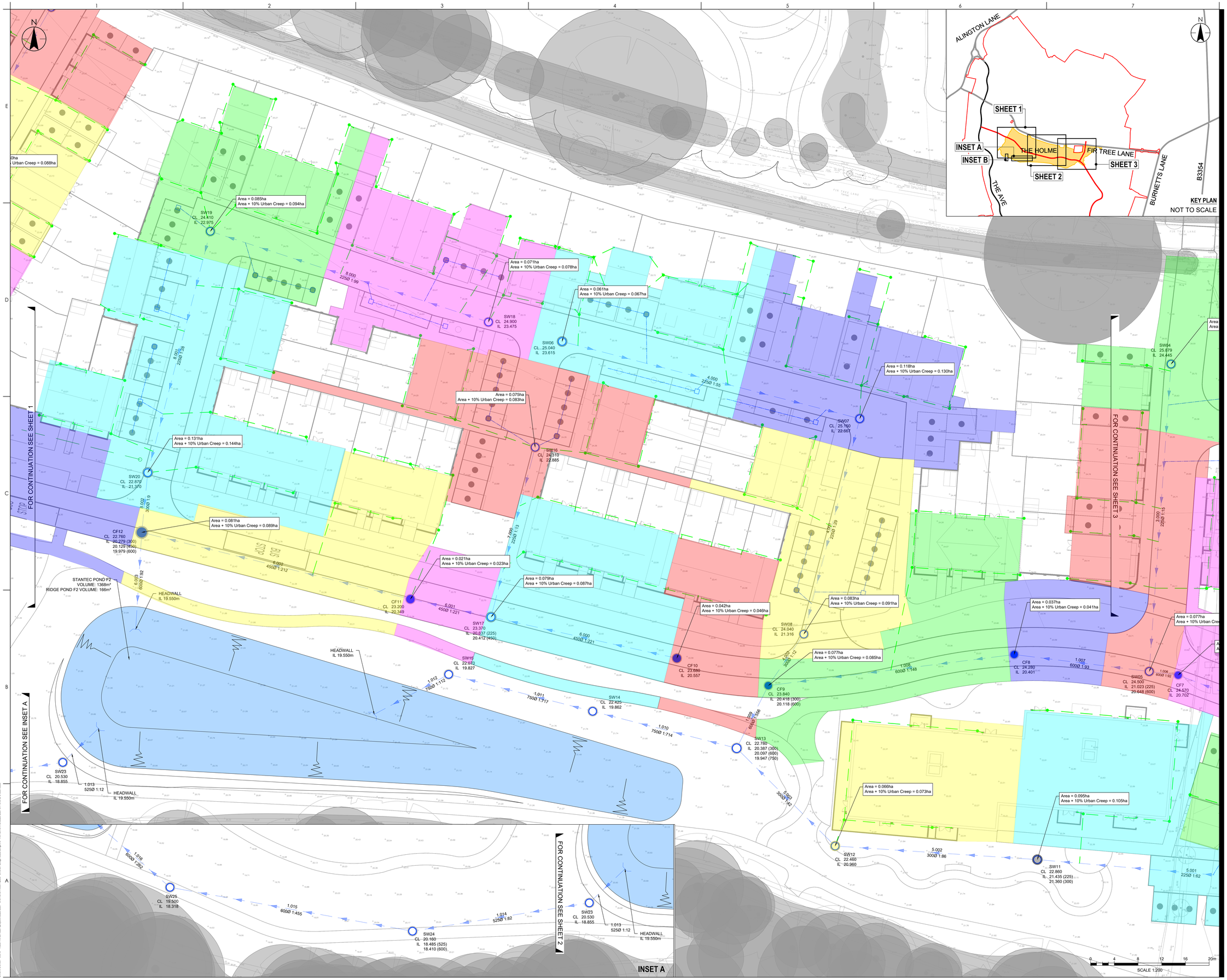

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P01 FIRST ISSUE	DT	AB	2026.02.16
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THE HOLME (PLOT 8)

COMBINED DRAINAGE LAYOUT (SHEET 2 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P01	332612639-STN-13-XX-DR-C-0505

Plotted: 26.02.2026 10:28:43 BY: Hill Mel, Bjorn Norcine, Arup
Storage: \\EMEA-S1-FILE\...\13-CDM-HORTON HEATH\ZZ-M3-A-1020-PROPOSED SITE PLAN-P4.rvt

Appendix C Homestal Proposed Catchment Areas Drawings

HEADWALL
IL 19.480m

SW65
CL 22.500
IL 21.250
CONTROL: HYRDOBRAKE
MAXIMUM DISCHARGE RATE: 27.30l/s

HEADWALL
IL 21.250m

+21.250

FOR CONTINUATION SEE SHEET 1

HEADWALL
IL 21.400m

DOWNSTREAM
DEFENDER

13.000
225Ø 1:100

FOR CONTINUATION SEE SHEET 2
525Ø 1:300

Area +

INSET A

ATTENUATION BASIN
BED LEVEL = 21.250
BED AREA = 2,012m² WITH 1:3 SIDE SLOPES
COVER LEVEL = 22.900
AREA AT COVER LEVEL = 3,526m²
FREEBOARD = 300mm
TOP WATER LEVEL (1:100YR + 40% CLIMATE CHANGE) = 22.164

+21.250

FOR CONTINUATION SEE INSET A

SW54
CL 23.950
IL 22.825

Area = 0.053ha
Area + 10% Urban Creep = 0.058ha

13.000
225Ø 1:100

SW60
CL 24.700
IL 23.200

16.000
300Ø 1:21

SW61
.685
.000 (225)
.925 (300)

Area = 0.039ha
Area + 10% Urban Creep = 0.043ha

Area = 0.029ha
Area + 10% Urban Creep = 0.032ha

SW29
CL 25.075
IL 23.250

5.004
300Ø 1:148

SW28
CL 25.200
IL 23.374

Area = 0.031ha
Area + 10% Urban Creep = 0.034ha

Area = 0.025ha
Area + 10% Urban Creep = 0.027ha

FOR CONTINUATION SEE SHEET 2

Area = 0.053ha
Area + 10% Urban Creep = 0.058ha

SW31
CL 25.192
IL 23.140 (225)
23.065 (300)
22.915 (450)

5.005
300Ø 1:148

7.000
225Ø 1:28

Area = 0.033ha
Area + 10% Urban Creep = 0.037ha

HEADWALL
SW34
IL 21.700m

HEADWALL
SW37
IL 21.520m

HEADWALL
SW38
IL 21.500m

SWALE
1:150

DOWNSTREAM
DEFENDER

8.001
225Ø 1:10

DOWNSTREAM
DEFENDER

HEADWALL
IL 21.400m

SW36
CL 23.281
IL 22.156

Area = 0.047ha
Area + 10% Urban Creep = 0.052ha

8.000
225Ø 1:68

SW35
CL 23.900
IL 22.850

Area = 0.065ha
Area + 10% Urban Creep = 0.072ha

1.014
525Ø 1:53

1.013
225Ø 1:38

Area = 0.22ha
Area + 10% Urban Creep = 0.024ha

SW33
CL 24.100
IL 22.270

Area = 0.075ha
Area + 10% Urban Creep = 0.083ha

1.013
525Ø 1:73

SW32
CL 24.275
IL 22.775 (300)
22.625 (450)
22.550 (525)

5.006
450Ø 1:218

1.012
225Ø 1:38

SW18
CL 24.675
IL 23.025

Area = 0.041ha
Area + 10% Urban Creep = 0.045ha

1.011
450Ø 1:32

Area = 0.076ha
Area + 10% Urban Creep = 0.084ha

0 4 8 12 16 20m
SCALE 1:200

N

ALINGTON LANE
SHEET 1
SHEET 2
SHEET 3
INSET A
HOMESTAL
FIR TREE LANE
THE AVE
BURNETTS LANE
B3354

KEY PLAN
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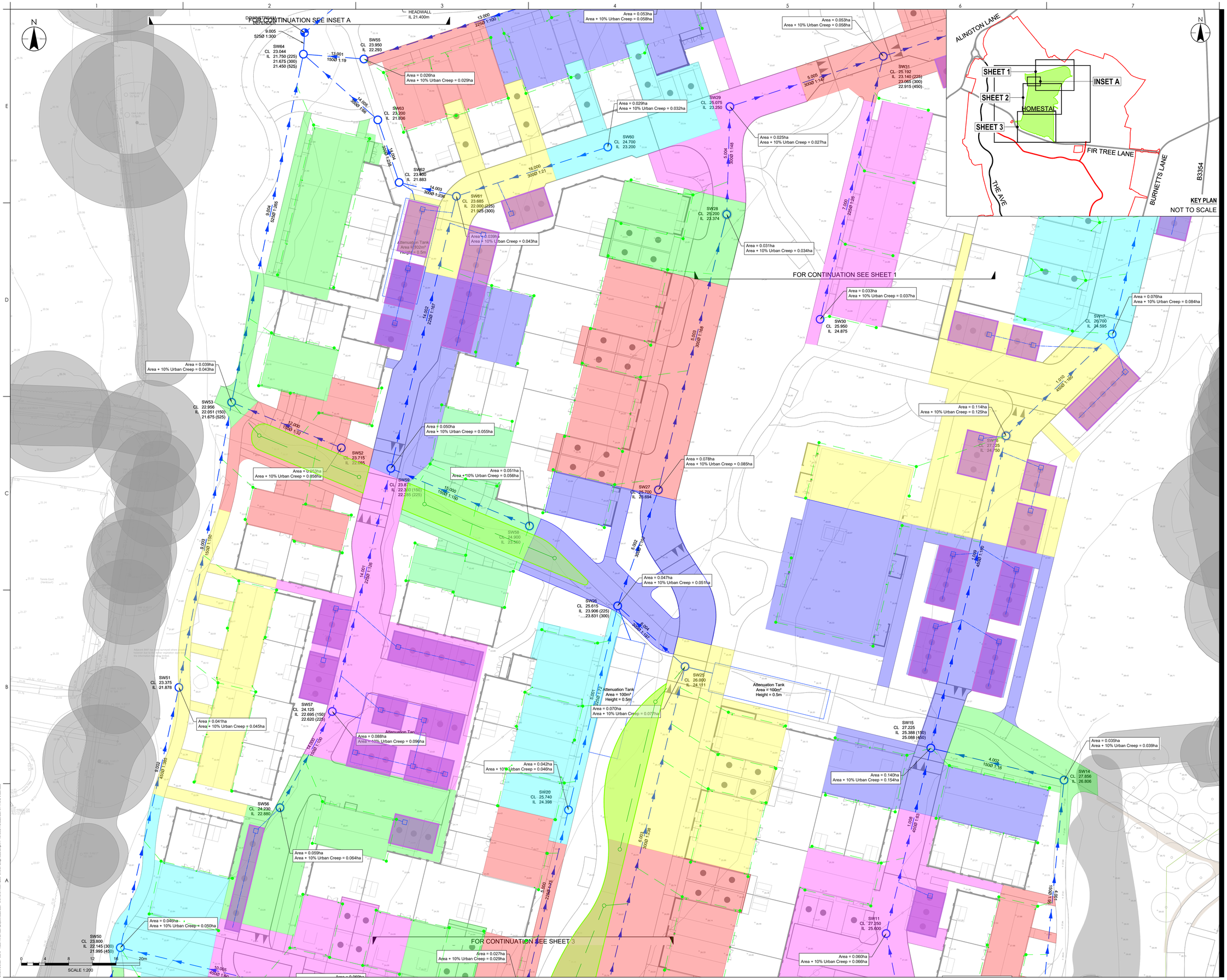
Title

THE HOMESTAL (PLOT 7)

SURFACE WATER CATCHMENT AREAS (SHEET 1 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P01	332612639-STN-14-XX-DR-C-0504

Plotted: 26.02.2026 09:29:43 BST by Ruth Hutchinson, Army
Drawing: 332612639-STN-14-XX-DR-C-0504.dwg | Layout: P01 | User: ruth.hutchinson@stantec.com



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THE HOMESTAL (PLOT 7)

SURFACE WATER CATCHMENT AREAS (SHEET 2 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P01	**332612639-STN-14-XX-DR-C-0505**

Plotted: 2026.2026.02.16 14:17 PM by Abdhishekrao, Amy
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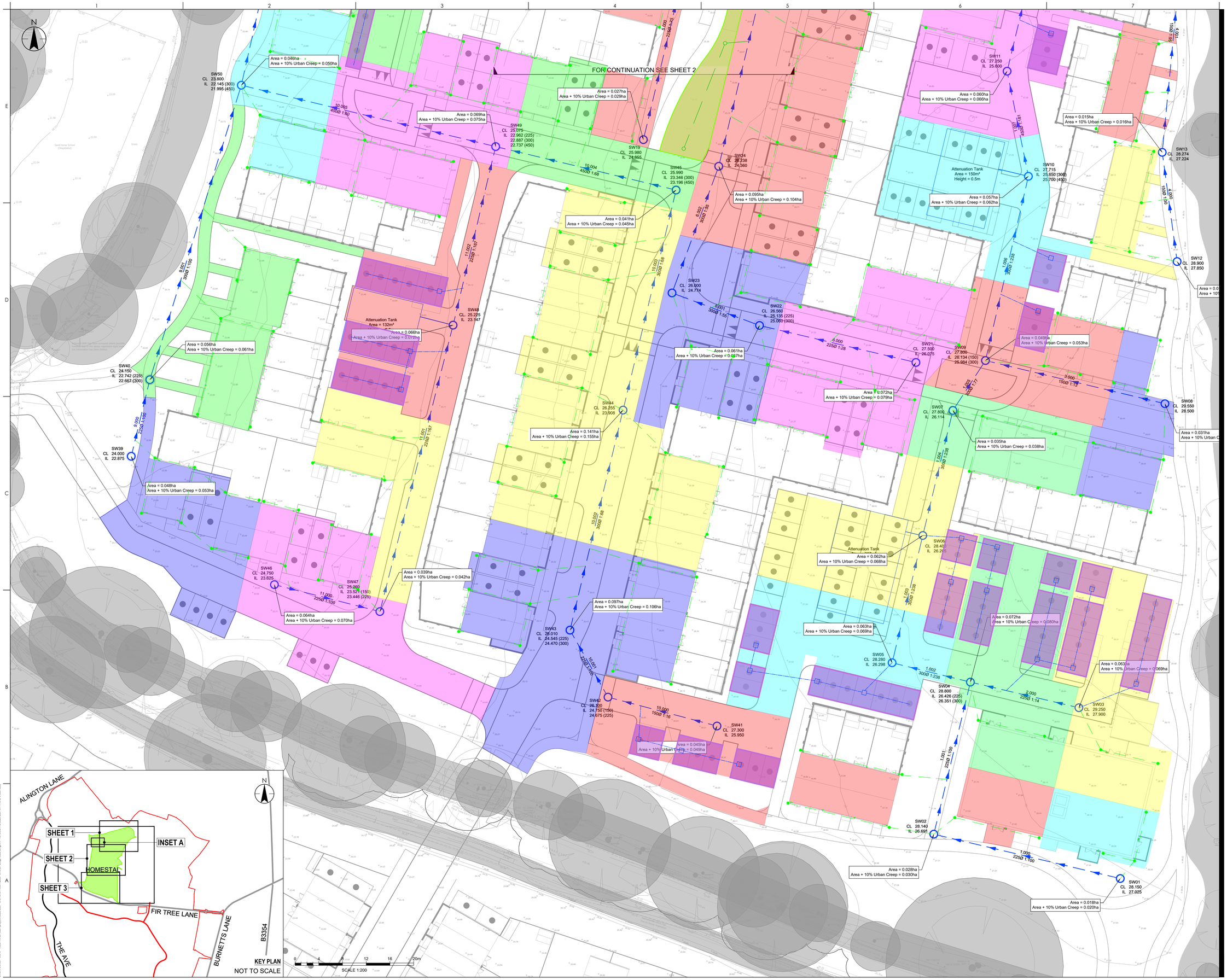

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Issued/Revision	By	Appd	YYYY.MM.DD
P02 MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
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THE HOMESTAL (PLOT 7)

SURFACE WATER CATCHMENT AREAS (SHEET 3 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P01	**332612639-STN-14-XX-DR-C-0506**

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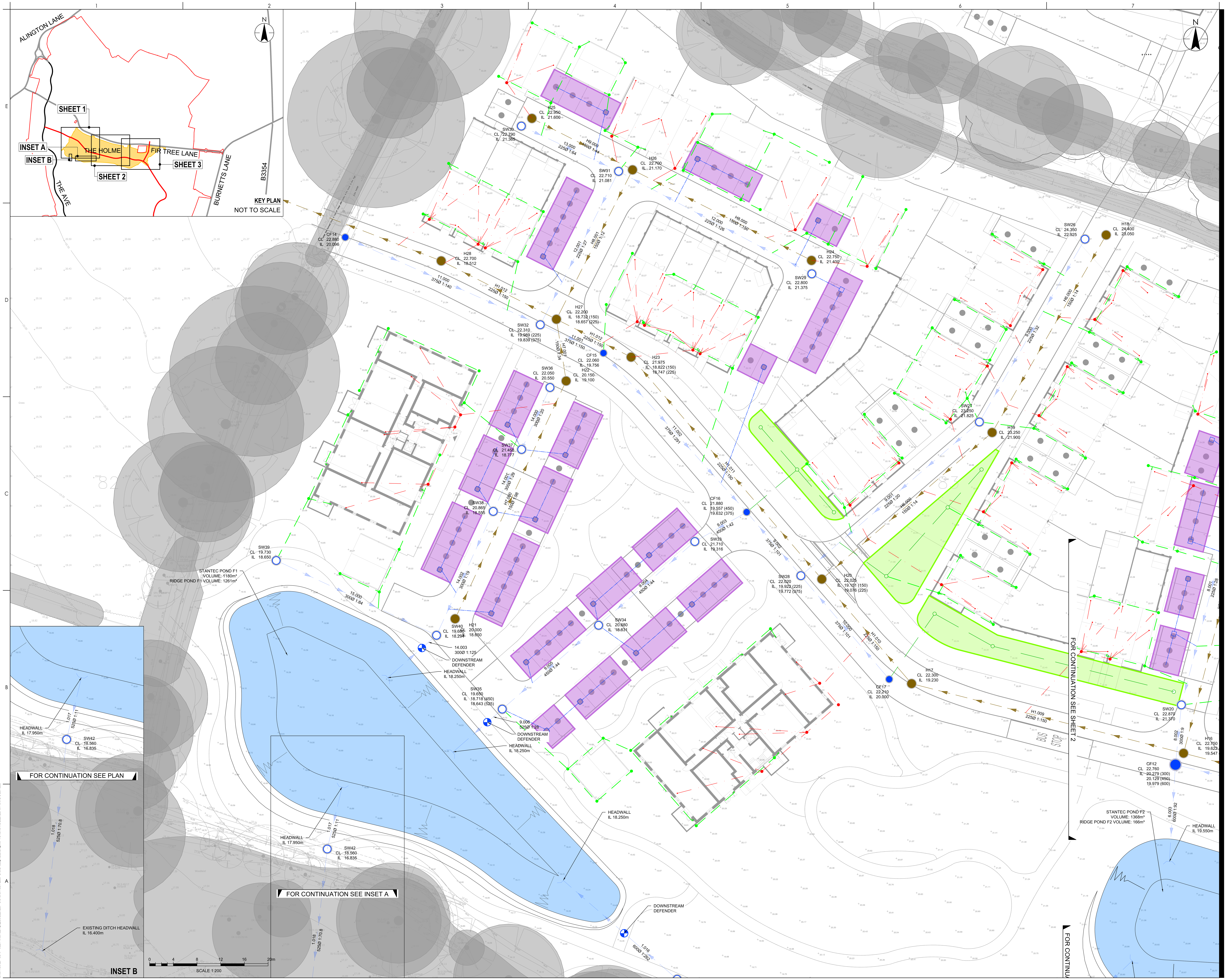
Appendix D Holme Drainage Layout Drawings



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PROPOSED ATTENUATION BASIN
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PROPOSED (S104 ADOPTABLE)

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Issued/Revision	By	Appd	YYYY.MM.DD
P03 CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
P01 FIRST ISSUE	DT	DH	2025.11.14

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
DT	AB	DH	2025.11.14

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ONE HORTON HEATH

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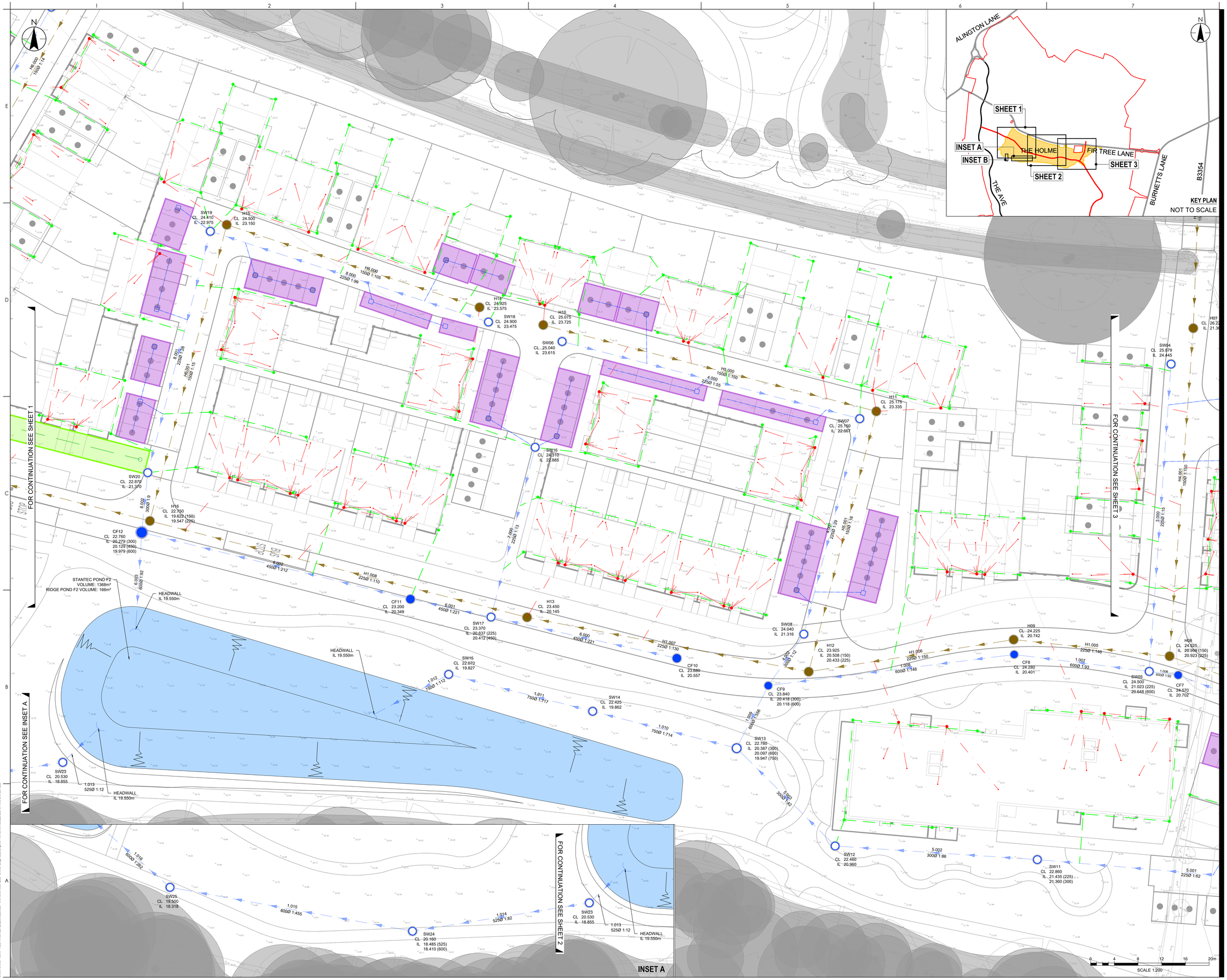
Title
THE HOLME (PLOT 8)

COMBINED DRAINAGE LAYOUT (SHEET 1 OF 3)

Project No. 332612639
A0 Scale 1:200
Revision P03
Drawing No. 332612639-STN-13-XX-DR-C-0501



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Issued/Revision	By	Appd	YYYY.MM.DD
	DT	AB	DH	2025.11.14
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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EASTLEIGH BOROUGH COUNCIL

Title

THE HOLME (PLOT 8)

COMBINED DRAINAGE LAYOUT (SHEET 2 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P03	**332612639-STN-13-XX-DR-C-0502**

Plotted: 26.02.2026 20:29 | By: BOTHA, Ane | Authorised: Anne
DRGNAME: 332612639-STN-13-XX-DR-C-0502.dwg | Layout: 13 - The Holme HH1 2026-02-26 | Xrefs: 332612639-STN-13-xx-dr-c-0501.dwg

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P03 CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
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	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title

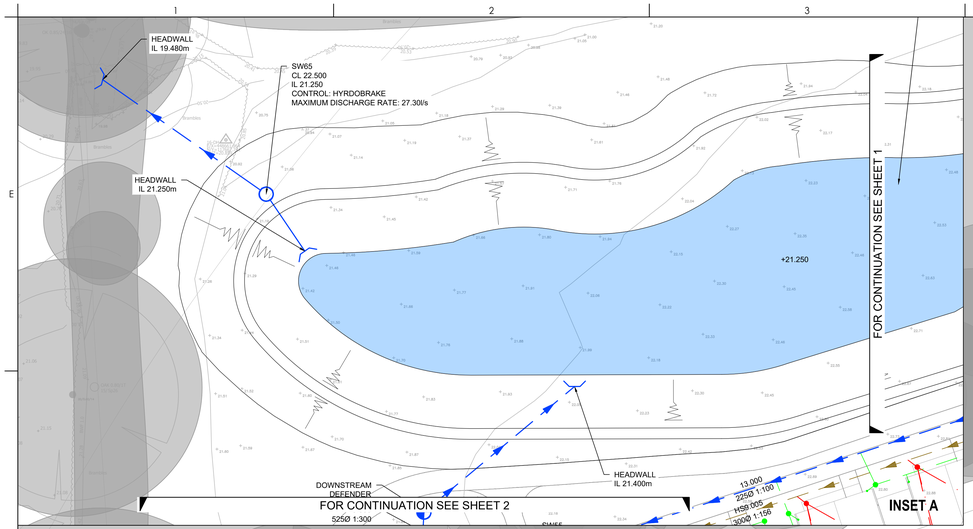
THE HOLME (PLOT 8)

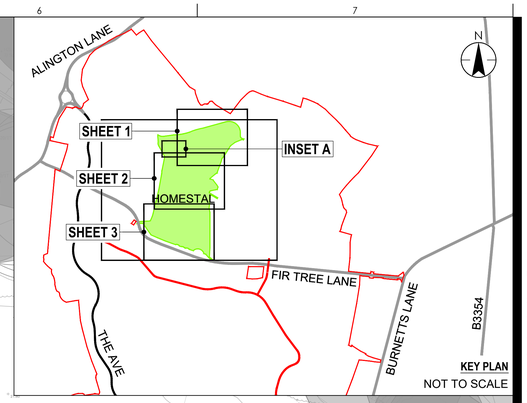
COMBINED DRAINAGE LAYOUT (SHEET 3 OF 3)

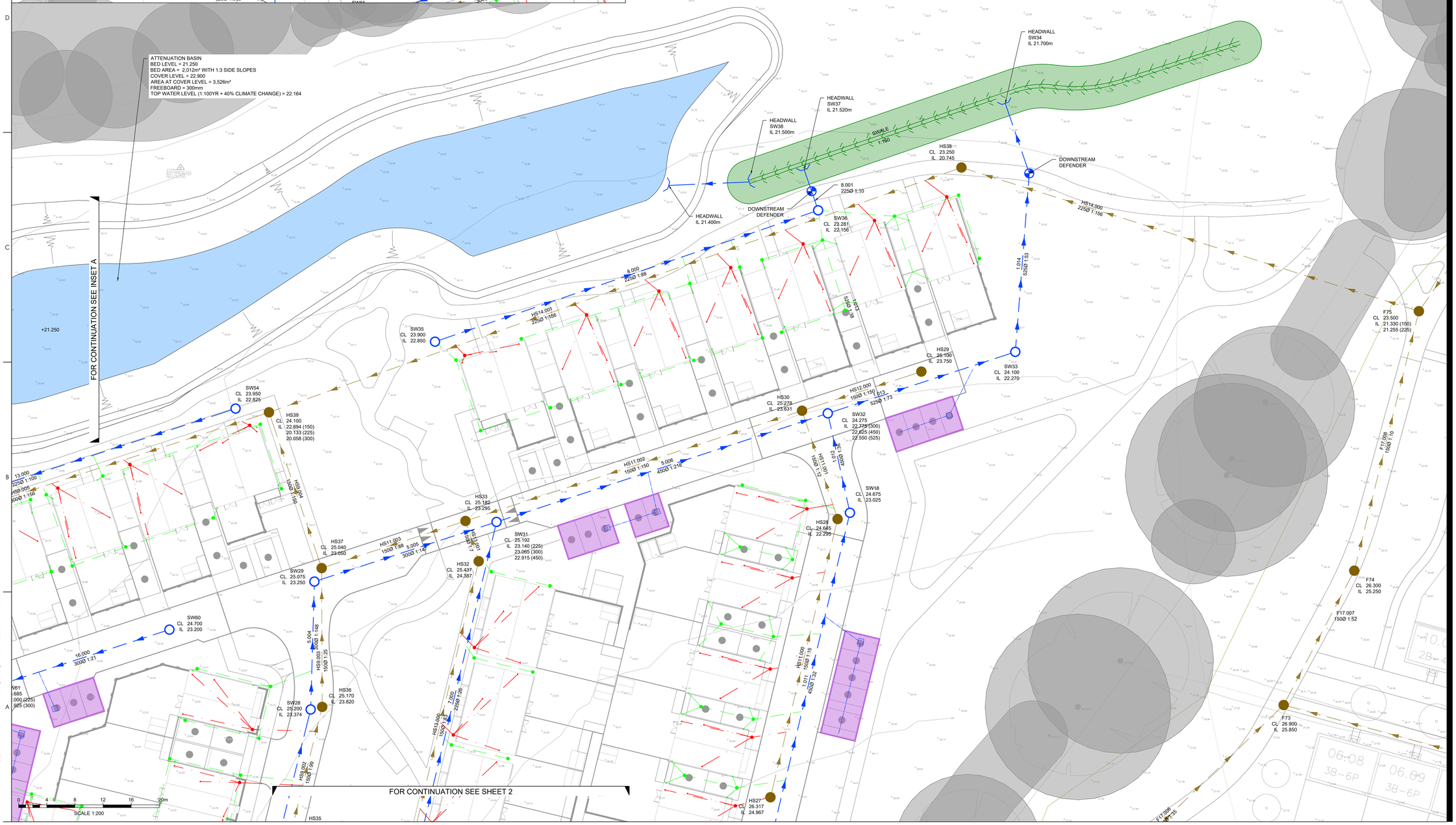
Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-13-XX-DR-C-0503

Plotted: 26.02.2026 20:52:20 BST | Plotted By: Bryan Downes, Anna | Drawing No.: 332612639-STN-13-XX-DR-C-0503 | P03 | C:\Users\AB\Documents\Projects\332612639-one horton heath (2026) - Civils\3 - Design\13 Drainage\13.3 - Fine Grading and Drainage\332612639-STN-13-XX-DR-C-0503.dwg

Appendix E Homestal Drainage Layout Drawings







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THE HOMESTAL (PLOT 7)

COMBINED DRAINAGE LAYOUT (SHEET 1 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-14-XX-DR-C-0501

Plotted: 20/02/2026 20:09:29 | BY: Matthew Pink, Rua Architecture, Arma
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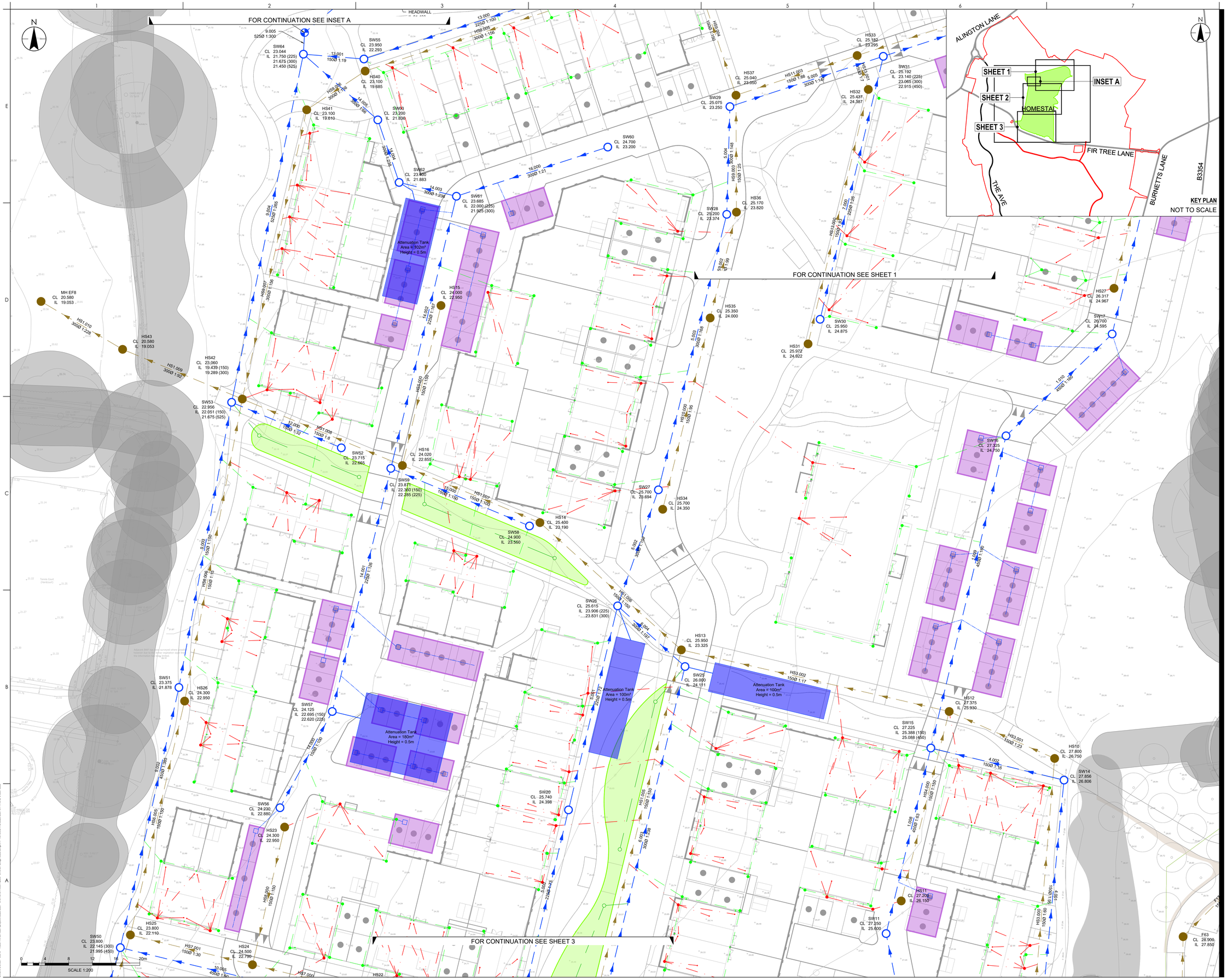

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P03	CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.19
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THE HOMESTAL (PLOT 7)

COMBINED DRAINAGE LAYOUT (SHEET 2 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P03	**332612639-STN-14-XX-DR-C-0502**

Plotted: 2026.02.19 09:23:18 AM BST By: Rumbelows, Amy
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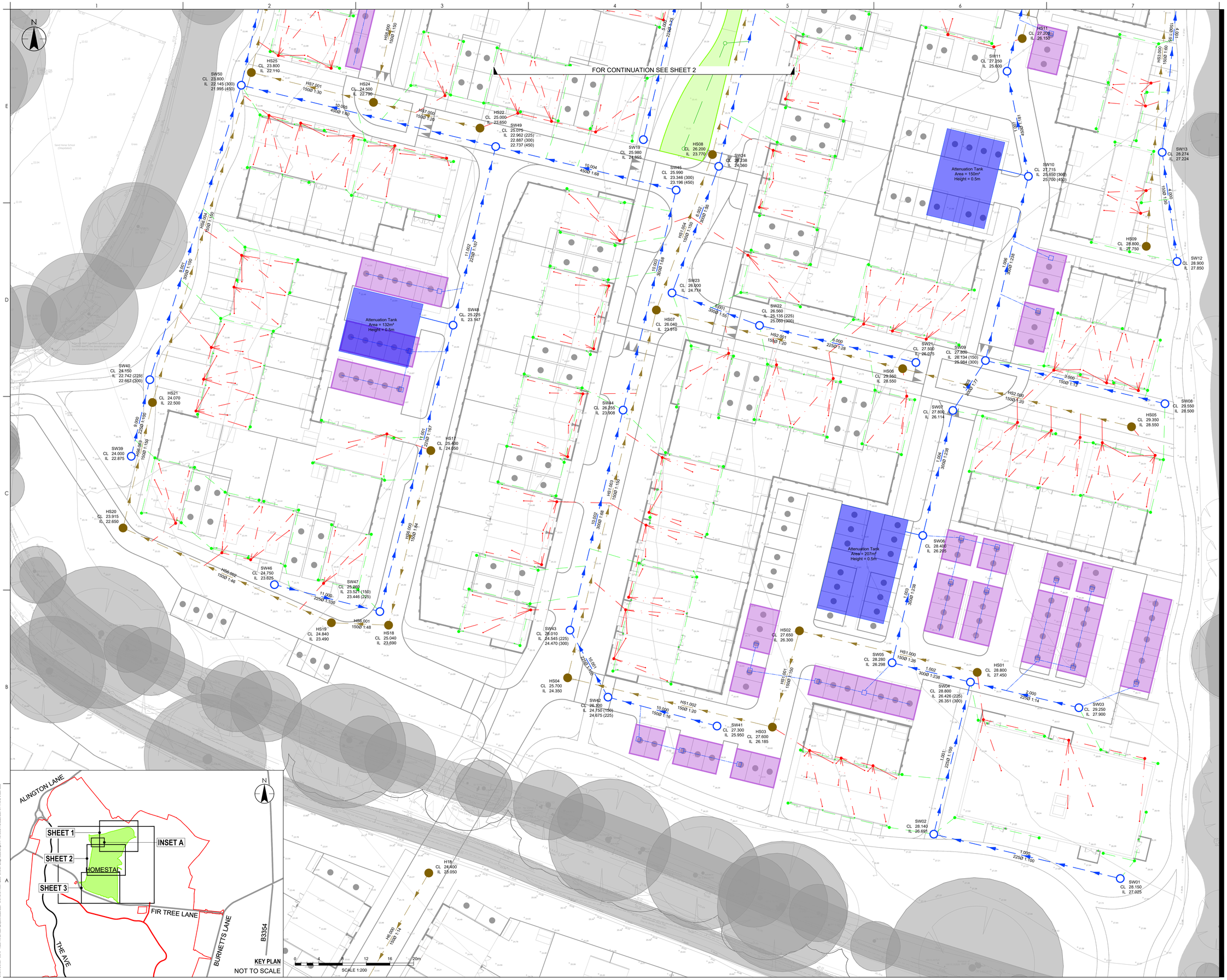

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8. THE HOLME AND HOMESTAL HOUSING LAYOUT BASED ON DRAWING 3423-PLB-ZZ-ZZ-M3-A-1020-ProposedSitePlan-P4 PROVIDED BY ARCHITECTURE PLB (RECEIVED 03.12.2025).
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10. RWP AND SVP POSITIONS ARE SHOWN INDICATIVELY TO DEMONSTRATE HOW THE UNIT CAN CONNECT TO THE MAIN DRAINAGE SYSTEM. FINAL DETAILS WILL BE CONFIRMED AT THE DETAILED DESIGN STAGE.
11. PRIVATE SURFACE WATER DRAINS TO BE 100mm DIAMETER LAID AT 1:100 MIN GRADIENT
12. PRIVATE FOUL WATER DRAINS TO BE 100mm DIAMETER LAID BETWEEN 1:40 AND 1:80MM IN ACCORDANCE WITH PART H OF THE BUILDING REGULATIONS.

KEY

- PROPOSED ATTENUATION BASIN
- PROPOSED PERMEABLE PAVING
- PROPOSED CELLULAR STORAGE
- PROPOSED RAIN GARDEN / BIORETENTION
- PROPOSED SWALE

PROPOSED (S104 ADOPTABLE)

- PROPOSED FOUL WATER SEWER AND MANHOLE
- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED HEADWALL

PROPOSED (PRIVATE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED FOUL WATER SEWER AND MANHOLE
- PROPOSED LAND DRAIN IN PERMEABLE PAVING AND DIFFUSER UNIT
- PROPOSED LAND DRAIN IN RAIN GARDEN / BIORETENTION AND ACCESS CHAMBERS
- EXISTING TREE ROOT PROTECTION ZONES

P03 CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
P01 FIRST ISSUE	DT	DH	2025.11.20
Issued/Revision	By	Appd	YYYY.MM.DD
	WH	JLW	DH	2025.11.20
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

S5 - FOR REVIEW AND ACCEPTANCE

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

EASTLEIGH BOROUGH COUNCIL

Client/Project
ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title
THE HOMESTAL (PLOT 7)

COMBINED DRAINAGE LAYOUT (SHEET 3 OF 3)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P03	**332612639-STN-14-XX-DR-C-0503**

Plotted: 20.02.2026 09:22:30 AM by Philip Bartholomew Amy
DRIVING SHEET: S2A3 I:\Jobs-UK\B01\project\332612639\3 - Live work\Homestal\02 - CAD\01 design\02 Civil\Layout\14 - Homestal-Hmes332612639-STN-14-xx-dr-c-0501.dwg

Appendix F Holme MicroDrainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Holme Network

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	250
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
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

Network Design Table for Holme Network

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	17.843	1.255	14.2	0.124	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	10.597	0.438	24.2	0.026	4.00	0.0	0.600	o	450	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	60.42	4.09	24.495	0.124	0.0	0.0	0.0	3.49	138.7	22.7
2.000	60.79	4.04	23.453	0.026	0.0	0.0	0.0	4.15	659.4	4.8

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.001	10.864	0.448	24.3	0.025	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.002	52.411	1.160	45.2	0.088	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.003	20.541	0.068	302.1	0.125	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.004	29.890	0.100	298.9	0.081	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	28.101	0.387	72.6	0.064	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.006	4.916	0.054	91.8	0.067	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	52.020	3.422	15.2	0.112	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	22.966	0.247	93.0	0.085	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	41.816	0.283	147.8	0.041	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	51.860	0.948	54.7	0.067	4.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	37.572	1.276	29.4	0.130	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	10.554	0.898	11.8	0.091	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	11.843	0.021	556.0	0.085	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	18.310	0.940	19.5	0.008	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	51.967	0.840	61.9	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	34.199	0.400	85.5	0.105	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.003	23.413	0.563	41.6	0.073	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)
1.001	60.03	4.13	23.015	0.175	0.0	0.0	0.0	4.14	658.8	31.9
1.002	57.67	4.42	22.567	0.263	0.0	0.0	0.0	3.03	482.1	46.0
1.003	55.84	4.66	21.257	0.388	0.0	0.0	0.0	1.40	394.7	65.7
1.004	53.45	5.02	21.189	0.469	0.0	0.0	0.0	1.40	396.8	76.0
1.005	52.43	5.18	21.089	0.533	0.0	0.0	0.0	2.86	808.7	84.8
1.006	52.24	5.21	20.702	0.600	0.0	0.0	0.0	2.54	718.8	95.1
3.000	58.95	4.26	24.445	0.112	0.0	0.0	0.0	3.37	134.1	20.0
1.007	51.35	5.36	20.648	0.797	0.0	0.0	0.0	2.53	714.2	124.1
1.008	49.46	5.71	20.401	0.838	0.0	0.0	0.0	2.00	565.8	125.7
4.000	57.12	4.49	23.615	0.067	0.0	0.0	0.0	1.77	70.5	11.6
4.001	55.24	4.75	22.667	0.197	0.0	0.0	0.0	2.42	96.2	33.0
4.002	54.98	4.78	21.316	0.288	0.0	0.0	0.0	4.61	325.9	48.0
1.009	48.49	5.91	20.118	1.211	0.0	0.0	0.0	1.03	290.0	178.1
5.000	60.26	4.10	23.215	0.008	0.0	0.0	0.0	2.98	118.4	1.5
5.001	56.12	4.62	22.275	0.056	0.0	0.0	0.0	1.67	66.2	9.5
5.002	53.83	4.96	21.360	0.161	0.0	0.0	0.0	1.70	120.3	26.3
5.003	52.82	5.12	20.960	0.234	0.0	0.0	0.0	2.45	172.8	37.5

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.010	25.080	0.035	716.6	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.011	25.080	0.035	716.6	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.012	14.250#	0.127	112.2	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.000	32.111	0.145	221.4	0.046	4.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	29.627	2.248	13.2	0.083	4.00	0.0	0.600	o	225	Pipe/Conduit	
6.001	13.940	0.063	221.3	0.087	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.002	46.694	0.220	212.3	0.023	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	49.370	0.500	98.7	0.078	4.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	42.046	1.530	27.5	0.094	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	10.151	1.091	9.3	0.144	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.003	8.192#	0.089	92.0	0.089	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.004	8.192#	0.140	58.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.013	8.311#	0.695	12.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.014	30.206	0.370	81.6	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.015	41.586	0.091	457.0	0.000	0.00	0.0	0.600	o	600	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)
1.010	46.62	6.31	19.947	1.445	0.0	0.0	0.0	1.04	458.4	204.4
1.011	44.93	6.71	19.862	1.445	0.0	0.0	0.0	1.04	458.4	204.4
1.012	44.58	6.80	19.827	1.445	0.0	0.0	0.0	2.64	1166.9	204.4
6.000	57.86	4.39	20.557	0.046	0.0	0.0	0.0	1.36	216.7	8.1
7.000	59.97	4.14	22.885	0.083	0.0	0.0	0.0	3.62	144.1	15.1
6.001	56.56	4.56	20.412	0.216	0.0	0.0	0.0	1.36	216.7	37.1
6.002	52.79	5.12	20.349	0.239	0.0	0.0	0.0	1.39	221.3	38.3
8.000	56.10	4.63	23.475	0.078	0.0	0.0	0.0	1.32	52.3	13.3
8.001	54.17	4.91	22.975	0.172	0.0	0.0	0.0	2.51	99.6	28.3
8.002	53.96	4.94	21.370	0.316	0.0	0.0	0.0	5.18	366.4	51.7
6.003	52.46	5.18	19.979	0.644	0.0	0.0	0.0	2.54	717.9	102.5
6.004	52.20	5.22	19.840	0.644	0.0	0.0	0.0	3.19	901.3	102.5
1.013	44.50	6.82	19.550	2.089	0.0	0.0	0.0	6.50	1407.6	281.9
1.014	43.72	7.03	18.855	2.089	0.0	0.0	0.0	2.48	537.0	281.9
1.015	41.60	7.64	18.410	2.089	0.0	0.0	0.0	1.13	320.2	281.9

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.016	24.641#	0.094	262.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	35.633	1.100	32.4	0.055	4.00	0.0	0.600	o	225	Pipe/Conduit	
9.001	39.747	1.903	20.9	0.088	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	22.974	0.228	100.7	0.100	4.00	0.0	0.600	o	375	Pipe/Conduit	
9.002	14.092	0.140	100.7	0.145	0.00	0.0	0.600	o	375	Pipe/Conduit	
11.000	36.066	0.257	140.3	0.070	4.00	0.0	0.600	o	375	Pipe/Conduit	
12.000	36.902	0.294	125.5	0.052	4.00	0.0	0.600	o	225	Pipe/Conduit	
13.000	18.087	0.284	63.7	0.036	4.00	0.0	0.600	o	225	Pipe/Conduit	
12.001	29.070	1.092	26.6	0.045	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.001	11.681	0.083	140.7	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit	
11.002	36.112	0.124	291.0	0.035	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.003	10.052	0.240	41.8	0.102	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.004	38.054#	0.485	78.5	0.029	0.00	0.0	0.600	o	450	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)
1.016	40.73	7.91	18.318	2.089	0.0	0.0	0.0	1.50	423.9	281.9
9.000	58.95	4.26	22.925	0.055	0.0	0.0	0.0	2.31	91.7	9.8
9.001	57.12	4.49	21.825	0.143	0.0	0.0	0.0	2.88	114.4	24.8
10.000	59.32	4.21	20.000	0.100	0.0	0.0	0.0	1.81	199.4	18.0
9.002	56.16	4.62	19.772	0.388	0.0	0.0	0.0	1.81	199.5	66.1
11.000	57.85	4.39	20.096	0.070	0.0	0.0	0.0	1.53	168.7	12.3
12.000	56.82	4.53	21.375	0.052	0.0	0.0	0.0	1.17	46.3	9.0
13.000	59.56	4.18	21.365	0.036	0.0	0.0	0.0	1.64	65.3	6.5
12.001	55.44	4.72	21.081	0.133	0.0	0.0	0.0	2.55	101.2	22.4
11.001	54.57	4.85	19.839	0.262	0.0	0.0	0.0	1.53	168.5	43.4
11.002	51.07	5.41	19.756	0.297	0.0	0.0	0.0	1.06	116.7	46.0
9.003	50.77	5.47	19.557	0.787	0.0	0.0	0.0	3.15	501.3	121.2
9.004	49.30	5.74	19.316	0.816	0.0	0.0	0.0	2.30	365.3	122.0

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
9.005	5.000#	0.113	44.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.006	11.186#	0.398	28.1	0.172	0.00	0.0	0.600	o	525	Pipe/Conduit	
14.000	35.987#	1.773	20.3	0.091	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	5.000#	0.172	29.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.002	5.000#	0.258	19.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.000	29.835	0.356	83.8	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.003	10.996#	0.088	125.0	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.017	12.714#	1.115	11.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.018	30.798	0.435	70.8	0.000	0.00	0.0	0.600	o	525	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)
9.005	49.16	5.77	18.831	0.816	0.0	0.0	0.0	3.06	487.1	122.0
9.006	48.94	5.82	18.643	0.988	0.0	0.0	0.0	4.24	917.2	146.7
14.000	59.67	4.17	20.550	0.091	0.0	0.0	0.0	3.51	247.8	16.5
14.001	59.43	4.20	18.777	0.091	0.0	0.0	0.0	2.93	206.9	16.5
14.002	59.23	4.22	18.555	0.091	0.0	0.0	0.0	3.59	253.6	16.5
15.000	58.68	4.29	18.650	0.066	0.0	0.0	0.0	1.72	121.5	11.7
14.003	57.65	4.42	18.294	0.216	0.0	0.0	0.0	1.41	99.3	37.8
1.017	40.64	7.94	17.950	3.293	0.0	0.0	0.0	6.66	1441.5	405.9
1.018	40.06	8.14	16.835	3.293	0.0	0.0	0.0	2.66	576.8	405.9

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Manhole Schedules for Holme Network

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW01	25.920	1.425	Open Manhole	1200	1.000	24.495	225				
CF2	26.520	3.067	Open Manhole	1350	2.000	23.453	450				
SW02	26.290	3.275	Open Manhole	1350	1.001	23.015	450	1.000	23.240	225	
								2.000	23.015	450	
CF3	26.090	3.523	Open Manhole	1350	1.002	22.567	450	1.001	22.567	450	
CF4	25.380	4.123	Open Manhole	1500	1.003	21.257	600	1.002	21.407	450	
CF5	25.130	3.941	Open Manhole	1500	1.004	21.189	600	1.003	21.189	600	
CF6	24.820	3.731	Open Manhole	1500	1.005	21.089	600	1.004	21.089	600	
CF7	24.570	3.868	Open Manhole	1500	1.006	20.702	600	1.005	20.702	600	
SW04	25.870	1.425	Open Manhole	1200	3.000	24.445	225				
SW05	24.500	3.852	Open Manhole	1500	1.007	20.648	600	1.006	20.648	600	
								3.000	21.023	225	
CF8	24.280	3.879	Open Manhole	1500	1.008	20.401	600	1.007	20.401	600	
SW06	25.040	1.425	Open Manhole	1200	4.000	23.615	225				
SW07	25.150	2.483	Open Manhole	1200	4.001	22.667	225	4.000	22.667	225	
SW08	24.040	2.724	Open Manhole	1200	4.002	21.316	300	4.001	21.391	225	
CF9	23.840	3.722	Open Manhole	1500	1.009	20.118	600	1.008	20.118	600	
								4.002	20.418	300	
SW09	24.640	1.425	Open Manhole	1200	5.000	23.215	225				
SW10	23.700	1.425	Open Manhole	1200	5.001	22.275	225	5.000	22.275	225	
SW11	22.860	1.500	Open Manhole	1200	5.002	21.360	300	5.001	21.435	225	
SW12	22.460	1.500	Open Manhole	1200	5.003	20.960	300	5.002	20.960	300	
SW13	22.780	2.833	Open Manhole	1800	1.010	19.947	750	1.009	20.097	600	
								5.003	20.397	300	
SW14	22.425	2.563	Open Manhole	1800	1.011	19.862	750	1.010	19.912	750	50
SW15	22.070	2.243	Open Manhole	1800	1.012	19.827	750	1.011	19.827	750	
CF10	23.680	3.123	Open Manhole	1350	6.000	20.557	450				
SW16	24.310	1.425	Open Manhole	1200	7.000	22.885	225				
SW17	23.370	2.958	Open Manhole	1350	6.001	20.412	450	6.000	20.412	450	
								7.000	20.637	225	
CF11	23.200	2.851	Open Manhole	1350	6.002	20.349	450	6.001	20.349	450	
SW18	24.900	1.425	Open Manhole	1200	8.000	23.475	225				
SW19	24.410	1.435	Open Manhole	1200	8.001	22.975	225	8.000	22.975	225	
SW20	22.870	1.500	Open Manhole	1200	8.002	21.370	300	8.001	21.445	225	
CF12	22.760	2.781	Open Manhole	1500	6.003	19.979	600	6.002	20.129	450	
								8.002	20.279	300	
SW21	22.005	2.165	Open Manhole	1500	6.004	19.840	600	6.003	19.890	600	50

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Manhole Schedules for Holme Network

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW22	21.250	1.700	Open Manhole	1800	1.013	19.550	525	1.012	19.700	750	375
								6.004	19.700	600	225
SW23	20.530	1.675	Open Manhole	1500	1.014	18.855	525	1.013	18.855	525	
SW24	20.160	1.750	Open Manhole	1500	1.015	18.410	600	1.014	18.485	525	
SW25	19.500	1.182	Open Manhole	1500	1.016	18.318	600	1.015	18.319	600	1
SW26	24.350	1.425	Open Manhole	1200	9.000	22.925	225				
SW27	23.250	1.425	Open Manhole	1200	9.001	21.825	225	9.000	21.825	225	
CF17	22.210	2.210	Open Manhole	1350	10.000	20.000	375				
SW28	22.020	2.248	Open Manhole	1350	9.002	19.772	375	9.001	19.922	225	
								10.000	19.772	375	
CF14	22.880	2.784	Open Manhole	1350	11.000	20.096	375				
SW29	22.800	1.425	Open Manhole	1200	12.000	21.375	225				
SW30	22.790	1.425	Open Manhole	1200	13.000	21.365	225				
SW31	22.710	1.629	Open Manhole	1200	12.001	21.081	225	12.000	21.081	225	
								13.000	21.081	225	
SW32	22.310	2.471	Open Manhole	1350	11.001	19.839	375	11.000	19.839	375	
								12.001	19.989	225	
CF15	22.060	2.304	Open Manhole	1350	11.002	19.756	375	11.001	19.756	375	
CF16	21.880	2.323	Open Manhole	1350	9.003	19.557	450	9.002	19.632	375	
								11.002	19.632	375	
SW33	21.710	2.394	Open Manhole	1350	9.004	19.316	450	9.003	19.316	450	
SW34	20.680	1.849	Open Manhole	1350	9.005	18.831	450	9.004	18.831	450	
SW35	19.650	1.007	Open Manhole	1500	9.006	18.643	525	9.005	18.718	450	
SW36	22.050	1.500	Open Manhole	1200	14.000	20.550	300				
SW37	21.458	2.681	Open Manhole	1200	14.001	18.777	300	14.000	18.777	300	
SW38	20.865	2.310	Open Manhole	1200	14.002	18.555	300	14.001	18.605	300	50
SW39	19.730	1.080	Open Manhole	1200	15.000	18.650	300				
SW40	19.680	1.386	Open Manhole	1200	14.003	18.294	300	14.002	18.297	300	3
								15.000	18.294	300	
SW41	19.450	1.500	Open Manhole	1500	1.017	17.950	525	1.016	18.224	600	349
								9.006	18.245	525	295
								14.003	18.206	300	31
SW42	18.560	1.725	Open Manhole	1500	1.018	16.835	525	1.017	16.835	525	
	17.600	1.200	Open Manhole	0		OUTFALL		1.018	16.400	525	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW01	448988.661	117269.080	448988.661	117269.080	Required	
CF2	448973.253	117281.571	448973.253	117281.571	Required	
SW02	448970.948	117271.228	448970.948	117271.228	Required	
CF3	448968.602	117260.621	448968.602	117260.621	Required	
CF4	448943.133	117214.815	448943.133	117214.815	Required	
CF5	448923.440	117220.656	448923.440	117220.656	Required	
CF6	448893.606	117222.480	448893.606	117222.480	Required	
CF7	448867.347	117232.489	448867.347	117232.489	Required	
SW04	448866.151	117284.996	448866.151	117284.996	Required	
SW05	448862.470	117233.106	448862.470	117233.106	Required	
CF8	448839.683	117235.966	448839.683	117235.966	Required	
SW06	448763.424	117288.803	448763.424	117288.803	Required	
SW07	448813.620	117275.774	448813.620	117275.774	Required	
SW08	448804.186	117239.406	448804.186	117239.406	Required	
CF9	448798.198	117230.715	448798.198	117230.715	Required	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW09	448900.569	117214.400	448900.569	117214.400	Required	
SW10	448895.361	117196.846	448895.361	117196.846	Required	
SW11	448843.589	117201.341	448843.589	117201.341	Required	
SW12	448809.467	117203.639	448809.467	117203.639	Required	
SW13	448792.860	117220.144	448792.860	117220.144	Required	
SW14	448768.567	117226.375	448768.567	117226.375	Required	
SW15	448744.274	117232.605	448744.274	117232.605	Required	
CF10	448782.765	117235.346	448782.765	117235.346	Required	
SW16	448758.860	117270.965	448758.860	117270.965	Required	
SW17	448751.414	117242.290	448751.414	117242.290	Required	
CF11	448737.806	117245.314	448737.806	117245.314	Required	
SW18	448750.980	117292.086	448750.980	117292.086	Required	
SW19	448704.047	117307.403	448704.047	117307.403	Required	
SW20	448693.493	117266.703	448693.493	117266.703	Required	
CF12	448692.497	117256.601	448692.497	117256.601	Required	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW21	448696.986	117242.032	448696.986	117242.032	Required	
SW22	448701.475	117227.463	448701.475	117227.463	Required	
SW23	448679.154	117217.759	448679.154	117217.759	Required	
SW24	448649.329	117212.975	448649.329	117212.975	Required	
SW25	448608.407	117220.380	448608.407	117220.380	Required	
SW26	448677.213	117345.263	448677.213	117345.263	Required	
SW27	448659.403	117314.400	448659.403	117314.400	Required	
CF17	448644.199	117270.986	448644.199	117270.986	Required	
SW28	448629.286	117288.463	448629.286	117288.463	Required	
CF14	448552.413	117345.556	448552.413	117345.556	Required	
SW29	448631.131	117339.391	448631.131	117339.391	Required	
SW30	448582.136	117364.321	448582.136	117364.321	Required	
SW31	448598.533	117356.686	448598.533	117356.686	Required	
SW32	448585.318	117330.793	448585.318	117330.793	Required	
CF15	448595.982	117326.024	448595.982	117326.024	Required	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
CF16	448620.145	117299.187	448620.145	117299.187	Required	
SW33	448611.399	117294.232	448611.399	117294.232	Required	
SW34	448595.162	117280.099	448595.162	117280.099	Required	
SW35	448578.925	117265.966	448578.925	117265.966	Required	
SW36	448586.960	117320.218	448586.960	117320.218	Required	
SW37	448582.173	117309.765	448582.173	117309.765	Required	
SW38	448577.386	117299.312	448577.386	117299.312	Required	
SW39	448540.776	117291.023	448540.776	117291.023	Required	
SW40	448567.813	117278.407	448567.813	117278.407	Required	
SW41	448557.259	117260.414	448557.259	117260.414	Required	
SW42	448536.496	117247.022	448536.496	117247.022	Required	
	448521.748	117219.985			No Entry	

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PIPELINE SCHEDULES for Holme Network

Upstream Manhole

- Indicates pipe length does not match coordinates

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	225	SW01	25.920	24.495	1.200	Open Manhole	1200
2.000	o	450	CF2	26.520	23.453	2.617	Open Manhole	1350
1.001	o	450	SW02	26.290	23.015	2.825	Open Manhole	1350
1.002	o	450	CF3	26.090	22.567	3.073	Open Manhole	1350
1.003	o	600	CF4	25.380	21.257	3.523	Open Manhole	1500
1.004	o	600	CF5	25.130	21.189	3.341	Open Manhole	1500
1.005	o	600	CF6	24.820	21.089	3.131	Open Manhole	1500
1.006	o	600	CF7	24.570	20.702	3.268	Open Manhole	1500
3.000	o	225	SW04	25.870	24.445	1.200	Open Manhole	1200
1.007	o	600	SW05	24.500	20.648	3.252	Open Manhole	1500
1.008	o	600	CF8	24.280	20.401	3.279	Open Manhole	1500
4.000	o	225	SW06	25.040	23.615	1.200	Open Manhole	1200
4.001	o	225	SW07	25.150	22.667	2.258	Open Manhole	1200
4.002	o	300	SW08	24.040	21.316	2.424	Open Manhole	1200

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	17.843	14.2	SW02	26.290	23.240	2.825	Open Manhole	1350
2.000	10.597	24.2	SW02	26.290	23.015	2.825	Open Manhole	1350
1.001	10.864	24.3	CF3	26.090	22.567	3.073	Open Manhole	1350
1.002	52.411	45.2	CF4	25.380	21.407	3.523	Open Manhole	1500
1.003	20.541	302.1	CF5	25.130	21.189	3.341	Open Manhole	1500
1.004	29.890	298.9	CF6	24.820	21.089	3.131	Open Manhole	1500
1.005	28.101	72.6	CF7	24.570	20.702	3.268	Open Manhole	1500
1.006	4.916	91.8	SW05	24.500	20.648	3.252	Open Manhole	1500
3.000	52.020	15.2	SW05	24.500	21.023	3.252	Open Manhole	1500
1.007	22.966	93.0	CF8	24.280	20.401	3.279	Open Manhole	1500
1.008	41.816	147.8	CF9	23.840	20.118	3.122	Open Manhole	1500
4.000	51.860	54.7	SW07	25.150	22.667	2.258	Open Manhole	1200
4.001	37.572	29.4	SW08	24.040	21.391	2.424	Open Manhole	1200
4.002	10.554	11.8	CF9	23.840	20.418	3.122	Open Manhole	1500

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PIPELINE SCHEDULES for Holme Network

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)
1.009	o	600	CF9	23.840	20.118	3.122	Open Manhole	1500
5.000	o	225	SW09	24.640	23.215	1.200	Open Manhole	1200
5.001	o	225	SW10	23.700	22.275	1.200	Open Manhole	1200
5.002	o	300	SW11	22.860	21.360	1.200	Open Manhole	1200
5.003	o	300	SW12	22.460	20.960	1.200	Open Manhole	1200
1.010	o	750	SW13	22.780	19.947	2.083	Open Manhole	1800
1.011	o	750	SW14	22.425	19.862	1.813	Open Manhole	1800
1.012	o	750	SW15	22.070	19.827	1.493	Open Manhole	1800
6.000	o	450	CF10	23.680	20.557	2.673	Open Manhole	1350
7.000	o	225	SW16	24.310	22.885	1.200	Open Manhole	1200
6.001	o	450	SW17	23.370	20.412	2.508	Open Manhole	1350
6.002	o	450	CF11	23.200	20.349	2.401	Open Manhole	1350
8.000	o	225	SW18	24.900	23.475	1.200	Open Manhole	1200

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)
1.009	11.843	556.0	SW13	22.780	20.097	2.083	Open Manhole	1800
5.000	18.310	19.5	SW10	23.700	22.275	1.200	Open Manhole	1200
5.001	51.967	61.9	SW11	22.860	21.435	1.200	Open Manhole	1200
5.002	34.199	85.5	SW12	22.460	20.960	1.200	Open Manhole	1200
5.003	23.413	41.6	SW13	22.780	20.397	2.083	Open Manhole	1800
1.010	25.080	716.6	SW14	22.425	19.912	1.763	Open Manhole	1800
1.011	25.080	716.6	SW15	22.070	19.827	1.493	Open Manhole	1800
1.012	14.250#	112.2	SW22	21.250	19.700	0.800	Open Manhole	1800
6.000	32.111	221.4	SW17	23.370	20.412	2.508	Open Manhole	1350
7.000	29.627	13.2	SW17	23.370	20.637	2.508	Open Manhole	1350
6.001	13.940	221.3	CF11	23.200	20.349	2.401	Open Manhole	1350
6.002	46.694	212.3	CF12	22.760	20.129	2.181	Open Manhole	1500
8.000	49.370	98.7	SW19	24.410	22.975	1.210	Open Manhole	1200

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PIPELINE SCHEDULES for Holme Network

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)
8.001	o	225	SW19	24.410	22.975	1.210	Open Manhole	1200
8.002	o	300	SW20	22.870	21.370	1.200	Open Manhole	1200
6.003	o	600	CF12	22.760	19.979	2.181	Open Manhole	1500
6.004	o	600	SW21	22.005	19.840	1.565	Open Manhole	1500
1.013	o	525	SW22	21.250	19.550	1.175	Open Manhole	1800
1.014	o	525	SW23	20.530	18.855	1.150	Open Manhole	1500
1.015	o	600	SW24	20.160	18.410	1.150	Open Manhole	1500
1.016	o	600	SW25	19.500	18.318	0.582	Open Manhole	1500
9.000	o	225	SW26	24.350	22.925	1.200	Open Manhole	1200
9.001	o	225	SW27	23.250	21.825	1.200	Open Manhole	1200
10.000	o	375	CF17	22.210	20.000	1.835	Open Manhole	1350
9.002	o	375	SW28	22.020	19.772	1.873	Open Manhole	1350
11.000	o	375	CF14	22.880	20.096	2.409	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)
8.001	42.046	27.5	SW20	22.870	21.445	1.200	Open Manhole	1200
8.002	10.151	9.3	CF12	22.760	20.279	2.181	Open Manhole	1500
6.003	8.192#	92.0	SW21	22.005	19.890	1.515	Open Manhole	1500
6.004	8.192#	58.5	SW22	21.250	19.700	0.950	Open Manhole	1800
1.013	8.311#	12.0	SW23	20.530	18.855	1.150	Open Manhole	1500
1.014	30.206	81.6	SW24	20.160	18.485	1.150	Open Manhole	1500
1.015	41.586	457.0	SW25	19.500	18.319	0.581	Open Manhole	1500
1.016	24.641#	262.1	SW41	19.450	18.224	0.626	Open Manhole	1500
9.000	35.633	32.4	SW27	23.250	21.825	1.200	Open Manhole	1200
9.001	39.747	20.9	SW28	22.020	19.922	1.873	Open Manhole	1350
10.000	22.974	100.7	SW28	22.020	19.772	1.873	Open Manhole	1350
9.002	14.092	100.7	CF16	21.880	19.632	1.873	Open Manhole	1350
11.000	36.066	140.3	SW32	22.310	19.839	2.096	Open Manhole	1350

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PIPELINE SCHEDULES for Holme Network

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)
12.000	o	225	SW29	22.800	21.375	1.200	Open Manhole	1200
13.000	o	225	SW30	22.790	21.365	1.200	Open Manhole	1200
12.001	o	225	SW31	22.710	21.081	1.404	Open Manhole	1200
11.001	o	375	SW32	22.310	19.839	2.096	Open Manhole	1350
11.002	o	375	CF15	22.060	19.756	1.929	Open Manhole	1350
9.003	o	450	CF16	21.880	19.557	1.873	Open Manhole	1350
9.004	o	450	SW33	21.710	19.316	1.944	Open Manhole	1350
9.005	o	450	SW34	20.680	18.831	1.399	Open Manhole	1350
9.006	o	525	SW35	19.650	18.643	0.482	Open Manhole	1500
14.000	o	300	SW36	22.050	20.550	1.200	Open Manhole	1200
14.001	o	300	SW37	21.458	18.777	2.381	Open Manhole	1200
14.002	o	300	SW38	20.865	18.555	2.010	Open Manhole	1200
15.000	o	300	SW39	19.730	18.650	0.780	Open Manhole	1200

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)
12.000	36.902	125.5	SW31	22.710	21.081	1.404	Open Manhole	1200
13.000	18.087	63.7	SW31	22.710	21.081	1.404	Open Manhole	1200
12.001	29.070	26.6	SW32	22.310	19.989	2.096	Open Manhole	1350
11.001	11.681	140.7	CF15	22.060	19.756	1.929	Open Manhole	1350
11.002	36.112	291.0	CF16	21.880	19.632	1.873	Open Manhole	1350
9.003	10.052	41.8	SW33	21.710	19.316	1.944	Open Manhole	1350
9.004	38.054#	78.5	SW34	20.680	18.831	1.399	Open Manhole	1350
9.005	5.000#	44.2	SW35	19.650	18.718	0.482	Open Manhole	1500
9.006	11.186#	28.1	SW41	19.450	18.245	0.680	Open Manhole	1500
14.000	35.987#	20.3	SW37	21.458	18.777	2.381	Open Manhole	1200
14.001	5.000#	29.1	SW38	20.865	18.605	1.960	Open Manhole	1200
14.002	5.000#	19.4	SW40	19.680	18.297	1.083	Open Manhole	1200
15.000	29.835	83.8	SW40	19.680	18.294	1.086	Open Manhole	1200

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PIPELINE SCHEDULES for Holme Network

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)
14.003	o	300	SW40	19.680	18.294	1.086	Open Manhole	1200
1.017	o	525	SW41	19.450	17.950	0.975	Open Manhole	1500
1.018	o	525	SW42	18.560	16.835	1.200	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)
14.003	10.996#	125.0	SW41	19.450	18.206	0.944	Open Manhole	1500
1.017	12.714#	11.4	SW42	18.560	16.835	1.200	Open Manhole	1500
1.018	30.798	70.8		17.600	16.400	0.675	Open Manhole	0

Simulation Criteria for Holme Network

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Holme Network

Orifice Manhole: SW22, DS/PN: 1.013, Volume (m³): 11.7

Diameter (m) 0.106 Discharge Coefficient 0.600 Invert Level (m) 19.550

Hydro-Brake® Optimum Manhole: SW41, DS/PN: 1.017, Volume (m³): 12.0

Unit Reference	MD-SHE-0222-2660-1200-2660
Design Head (m)	1.200
Design Flow (l/s)	26.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	222
Invert Level (m)	17.950
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	26.6
Flush-Flo™	0.398	26.5
Kick-Flo®	0.850	22.6
Mean Flow over Head Range	-	22.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.5	1.200	26.6	3.000	41.3	7.000	62.2
0.200	22.0	1.400	28.6	3.500	44.5	7.500	64.3
0.300	26.1	1.600	30.5	4.000	47.4	8.000	66.4
0.400	26.5	1.800	32.3	4.500	50.2	8.500	68.4
0.500	26.3	2.000	34.0	5.000	52.8	9.000	70.3
0.600	25.8	2.200	35.6	5.500	55.3	9.500	72.2
0.800	23.8	2.400	37.1	6.000	57.7		
1.000	24.4	2.600	38.5	6.500	60.0		

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Storage Structures for Holme Network

Tank or Pond Manhole: SW22, DS/PN: 1.013

Invert Level (m) 19.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	447.9	1.400	1582.6	1.700	1863.3

Tank or Pond Manhole: SW41, DS/PN: 1.017

Invert Level (m) 17.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	616.9	1.200	1383.4	1.500	1607.6

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Summer	1	+0%					24.546
2.000	CF2	15 Summer	1	+0%					23.471
1.001	SW02	15 Summer	1	+0%					23.081
1.002	CF3	15 Summer	1	+0%					22.640
1.003	CF4	15 Summer	1	+0%	100/15 Summer				21.403
1.004	CF5	15 Summer	1	+0%	100/15 Summer				21.338
1.005	CF6	15 Summer	1	+0%	100/15 Summer				21.203
1.006	CF7	15 Summer	1	+0%	100/15 Summer				20.863
3.000	SW04	15 Summer	1	+0%					24.493
1.007	SW05	15 Summer	1	+0%	100/15 Summer				20.801
1.008	CF8	15 Summer	1	+0%	100/15 Summer				20.578
4.000	SW06	15 Summer	1	+0%	100/15 Summer				23.666

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.174	0.000	0.12			14.7	OK	
2.000	CF2	-0.432	0.000	0.01			3.1	OK	
1.001	SW02	-0.384	0.000	0.05			20.0	OK	
1.002	CF3	-0.377	0.000	0.06			27.8	OK	
1.003	CF4	-0.454	0.000	0.13			38.3	OK	
1.004	CF5	-0.451	0.000	0.14			45.1	OK	
1.005	CF6	-0.486	0.000	0.08			49.8	OK	
1.006	CF7	-0.439	0.000	0.16			55.4	OK	
3.000	SW04	-0.177	0.000	0.10			13.2	OK	
1.007	SW05	-0.447	0.000	0.15			72.8	OK	
1.008	CF8	-0.423	0.000	0.15			74.8	OK	
4.000	SW06	-0.174	0.000	0.12			7.8	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.001	SW07	15 Summer	1	+0%	100/15 Summer			
4.002	SW08	15 Summer	1	+0%	100/15 Summer			
1.009	CF9	15 Summer	1	+0%	30/15 Summer			
5.000	SW09	15 Summer	1	+0%				
5.001	SW10	15 Summer	1	+0%				
5.002	SW11	15 Summer	1	+0%	100/15 Summer			
5.003	SW12	15 Summer	1	+0%	100/15 Summer			
1.010	SW13	15 Summer	1	+0%	30/15 Summer			
1.011	SW14	15 Summer	1	+0%	30/15 Summer			
1.012	SW15	15 Summer	1	+0%	100/15 Summer			
6.000	CF10	15 Summer	1	+0%				
7.000	SW16	15 Summer	1	+0%				
6.001	SW17	15 Summer	1	+0%	100/15 Summer			
6.002	CF11	15 Summer	1	+0%	100/15 Summer			
8.000	SW18	15 Summer	1	+0%	100/15 Summer			
8.001	SW19	15 Summer	1	+0%	100/15 Summer			
8.002	SW20	15 Summer	1	+0%				
6.003	CF12	15 Summer	1	+0%	100/15 Summer			
6.004	SW21	15 Summer	1	+0%	100/15 Summer			
1.013	SW22	480 Summer	1	+0%	30/30 Summer			
1.014	SW23	480 Summer	1	+0%				
1.015	SW24	480 Summer	1	+0%	100/480 Summer			
1.016	SW25	480 Summer	1	+0%	100/360 Summer			
9.000	SW26	15 Summer	1	+0%				
9.001	SW27	15 Summer	1	+0%	100/15 Summer			
10.000	CF17	15 Summer	1	+0%	100/15 Summer			
9.002	SW28	15 Summer	1	+0%	100/15 Summer			
11.000	CF14	15 Summer	1	+0%	100/15 Summer			
12.000	SW29	15 Summer	1	+0%	100/15 Summer			
13.000	SW30	15 Summer	1	+0%	100/15 Summer			
12.001	SW31	15 Summer	1	+0%	100/15 Summer			
11.001	SW32	15 Summer	1	+0%	100/15 Summer			
11.002	CF15	15 Summer	1	+0%	100/15 Summer			
9.003	CF16	15 Summer	1	+0%	100/15 Summer			
9.004	SW33	15 Summer	1	+0%	100/15 Summer			
9.005	SW34	15 Summer	1	+0%	30/15 Summer			
9.006	SW35	15 Summer	1	+0%	100/15 Summer			
14.000	SW36	15 Summer	1	+0%				
14.001	SW37	15 Summer	1	+0%	100/15 Summer			
14.002	SW38	15 Summer	1	+0%	100/15 Summer			
15.000	SW39	15 Summer	1	+0%	100/15 Summer			
14.003	SW40	15 Summer	1	+0%	30/15 Summer			
1.017	SW41	480 Summer	1	+0%	30/360 Summer			
1.018	SW42	480 Summer	1	+0%				

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.001	SW07	22.737	-0.155	0.000	0.21			19.2	OK	
4.002	SW08	21.384	-0.232	0.000	0.11			27.2	OK	
1.009	CF9	20.499	-0.219	0.000	0.72			101.3	OK	
5.000	SW09	23.224	-0.216	0.000	0.01			0.9	OK	
5.001	SW10	22.318	-0.182	0.000	0.08			5.2	OK	
5.002	SW11	21.432	-0.228	0.000	0.13			14.3	OK	
5.003	SW12	21.034	-0.226	0.000	0.13			20.7	OK	
1.010	SW13	20.285	-0.412	0.000	0.41			118.6	OK	
1.011	SW14	20.196	-0.416	0.000	0.41			116.5	OK	
1.012	SW15	20.049	-0.528	0.000	0.19			115.4	OK	
6.000	CF10	20.608	-0.399	0.000	0.03			5.4	OK	
7.000	SW16	22.925	-0.185	0.000	0.07			9.8	OK	
6.001	SW17	20.524	-0.338	0.000	0.14			22.4	OK	
6.002	CF11	20.454	-0.345	0.000	0.12			24.7	OK	
8.000	SW18	23.540	-0.160	0.000	0.18			8.9	OK	
8.001	SW19	23.040	-0.160	0.000	0.18			17.1	OK	
8.002	SW20	21.438	-0.232	0.000	0.11			29.6	OK	
6.003	CF12	20.150	-0.429	0.000	0.18			62.0	OK	
6.004	SW21	20.003	-0.437	0.000	0.17			62.0	OK	
1.013	SW22	19.957	-0.118	0.000	0.02			13.9	OK	
1.014	SW23	18.915	-0.465	0.000	0.03			13.9	OK	
1.015	SW24	18.501	-0.509	0.000	0.05			13.9	OK	
1.016	SW25	18.396	-0.522	0.000	0.04			13.9	OK	
9.000	SW26	22.966	-0.184	0.000	0.08			6.5	OK	
9.001	SW27	21.879	-0.171	0.000	0.13			14.3	OK	
10.000	CF17	20.064	-0.311	0.000	0.07			11.8	OK	
9.002	SW28	19.904	-0.243	0.000	0.27			38.9	OK	
11.000	CF14	20.152	-0.319	0.000	0.05			8.2	OK	
12.000	SW29	21.431	-0.169	0.000	0.14			6.0	OK	
13.000	SW30	21.405	-0.185	0.000	0.07			4.3	OK	
12.001	SW31	21.139	-0.167	0.000	0.15			14.2	OK	
11.001	SW32	19.965	-0.249	0.000	0.24			27.3	OK	
11.002	CF15	19.894	-0.237	0.000	0.28			29.8	OK	
9.003	CF16	19.718	-0.289	0.000	0.28			76.6	OK	
9.004	SW33	19.466	-0.300	0.000	0.24			78.3	OK	
9.005	SW34	19.034	-0.247	0.000	0.41			77.8	OK	
9.006	SW35	18.799	-0.369	0.000	0.19			91.6	OK	
14.000	SW36	20.592	-0.258	0.000	0.05			10.8	OK	
14.001	SW37	18.841	-0.236	0.000	0.10			10.8	OK	
14.002	SW38	18.614	-0.241	0.000	0.08			10.8	OK	
15.000	SW39	18.702	-0.248	0.000	0.07			7.8	OK	
14.003	SW40	18.411	-0.183	0.000	0.32			23.4	OK	
1.017	SW41	18.173	-0.302	0.000	0.03			24.7	OK	
1.018	SW42	16.911	-0.449	0.000	0.05			24.7	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Summer	30	+0%					24.590
2.000	CF2	15 Summer	30	+0%					23.501
1.001	SW02	15 Summer	30	+0%					23.141
1.002	CF3	15 Summer	30	+0%					22.711
1.003	CF4	15 Summer	30	+0%	100/15 Summer				21.564
1.004	CF5	15 Summer	30	+0%	100/15 Summer				21.504
1.005	CF6	15 Summer	30	+0%	100/15 Summer				21.318
1.006	CF7	15 Summer	30	+0%	100/15 Summer				21.042
3.000	SW04	15 Summer	30	+0%					24.533
1.007	SW05	15 Summer	30	+0%	100/15 Summer				21.018
1.008	CF8	15 Summer	30	+0%	100/15 Summer				20.957
4.000	SW06	15 Summer	30	+0%	100/15 Summer				23.710

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.130	0.000	0.38			46.8	OK	
2.000	CF2	-0.402	0.000	0.03			9.8	OK	
1.001	SW02	-0.324	0.000	0.17			66.0	OK	
1.002	CF3	-0.306	0.000	0.23			98.9	OK	
1.003	CF4	-0.293	0.000	0.48			143.1	OK	
1.004	CF5	-0.285	0.000	0.53			170.2	OK	
1.005	CF6	-0.371	0.000	0.31			192.1	OK	
1.006	CF7	-0.260	0.000	0.61			212.5	OK	
3.000	SW04	-0.137	0.000	0.33			42.2	OK	
1.007	SW05	-0.230	0.000	0.55			272.8	OK	
1.008	CF8	-0.044	0.000	0.58			279.2	OK	
4.000	SW06	-0.130	0.000	0.37			25.0	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.001	SW07	15 Summer	30	+0%	100/15 Summer			
4.002	SW08	15 Summer	30	+0%	100/15 Summer			
1.009	CF9	15 Summer	30	+0%	30/15 Summer			
5.000	SW09	15 Summer	30	+0%				
5.001	SW10	15 Summer	30	+0%				
5.002	SW11	15 Summer	30	+0%	100/15 Summer			
5.003	SW12	15 Summer	30	+0%	100/15 Summer			
1.010	SW13	15 Summer	30	+0%	30/15 Summer			
1.011	SW14	15 Summer	30	+0%	30/15 Summer			
1.012	SW15	480 Summer	30	+0%	100/15 Summer			
6.000	CF10	15 Summer	30	+0%				
7.000	SW16	15 Summer	30	+0%				
6.001	SW17	15 Summer	30	+0%	100/15 Summer			
6.002	CF11	15 Summer	30	+0%	100/15 Summer			
8.000	SW18	15 Summer	30	+0%	100/15 Summer			
8.001	SW19	15 Summer	30	+0%	100/15 Summer			
8.002	SW20	15 Summer	30	+0%				
6.003	CF12	480 Summer	30	+0%	100/15 Summer			
6.004	SW21	480 Summer	30	+0%	100/15 Summer			
1.013	SW22	480 Summer	30	+0%	30/30 Summer			
1.014	SW23	480 Summer	30	+0%				
1.015	SW24	480 Summer	30	+0%	100/480 Summer			
1.016	SW25	480 Summer	30	+0%	100/360 Summer			
9.000	SW26	15 Summer	30	+0%				
9.001	SW27	15 Summer	30	+0%	100/15 Summer			
10.000	CF17	15 Summer	30	+0%	100/15 Summer			
9.002	SW28	15 Summer	30	+0%	100/15 Summer			
11.000	CF14	15 Summer	30	+0%	100/15 Summer			
12.000	SW29	15 Summer	30	+0%	100/15 Summer			
13.000	SW30	15 Summer	30	+0%	100/15 Summer			
12.001	SW31	15 Summer	30	+0%	100/15 Summer			
11.001	SW32	15 Summer	30	+0%	100/15 Summer			
11.002	CF15	15 Summer	30	+0%	100/15 Summer			
9.003	CF16	15 Summer	30	+0%	100/15 Summer			
9.004	SW33	15 Summer	30	+0%	100/15 Summer			
9.005	SW34	15 Summer	30	+0%	30/15 Summer			
9.006	SW35	15 Summer	30	+0%	100/15 Summer			
14.000	SW36	15 Summer	30	+0%				
14.001	SW37	15 Summer	30	+0%	100/15 Summer			
14.002	SW38	15 Summer	30	+0%	100/15 Summer			
15.000	SW39	15 Summer	30	+0%	100/15 Summer			
14.003	SW40	15 Summer	30	+0%	30/15 Summer			
1.017	SW41	480 Summer	30	+0%	30/360 Summer			
1.018	SW42	120 Winter	30	+0%				

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.001	SW07	22.822	-0.070	0.000	0.81			73.4	OK
4.002	SW08	21.458	-0.158	0.000	0.45			107.3	OK
1.009	CF9	20.860	0.142	0.000	2.72			384.0	SURCHARGED
5.000	SW09	23.240	-0.200	0.000	0.03			3.0	OK
5.001	SW10	22.364	-0.136	0.000	0.33			20.9	OK
5.002	SW11	21.519	-0.141	0.000	0.54			59.6	OK
5.003	SW12	21.123	-0.137	0.000	0.56			86.4	OK
1.010	SW13	20.703	0.006	0.000	1.60			456.7	SURCHARGED
1.011	SW14	20.613	0.001	0.000	1.55			442.6	SURCHARGED
1.012	SW15	20.370	-0.207	0.000	0.14			83.1	OK
6.000	CF10	20.672	-0.335	0.000	0.09			17.1	OK
7.000	SW16	22.958	-0.152	0.000	0.23			31.3	OK
6.001	SW17	20.636	-0.226	0.000	0.49			80.0	OK
6.002	CF11	20.560	-0.239	0.000	0.43			86.8	OK
8.000	SW18	23.599	-0.101	0.000	0.57			28.5	OK
8.001	SW19	23.111	-0.089	0.000	0.66			62.9	OK
8.002	SW20	21.511	-0.159	0.000	0.45			116.5	OK
6.003	CF12	20.370	-0.209	0.000	0.11			38.5	OK
6.004	SW21	20.369	-0.071	0.000	0.10			37.9	OK
1.013	SW22	20.369	0.294	0.000	0.03			20.5	SURCHARGED
1.014	SW23	18.927	-0.453	0.000	0.05			20.5	OK
1.015	SW24	18.548	-0.462	0.000	0.07			20.5	OK
1.016	SW25	18.502	-0.416	0.000	0.06			20.4	OK
9.000	SW26	22.999	-0.151	0.000	0.24			20.7	OK
9.001	SW27	21.937	-0.113	0.000	0.50			53.9	OK
10.000	CF17	20.129	-0.246	0.000	0.22			37.7	OK
9.002	SW28	20.073	-0.074	0.000	1.00			145.8	OK
11.000	CF14	20.201	-0.270	0.000	0.17			26.3	OK
12.000	SW29	21.480	-0.120	0.000	0.44			19.3	OK
13.000	SW30	21.438	-0.152	0.000	0.23			13.6	OK
12.001	SW31	21.198	-0.108	0.000	0.53			49.6	OK
11.001	SW32	20.120	-0.094	0.000	0.83			93.5	OK
11.002	CF15	20.075	-0.056	0.000	0.98			103.1	OK
9.003	CF16	19.948	-0.059	0.000	0.96			266.0	OK
9.004	SW33	19.731	-0.036	0.000	0.85			273.1	OK
9.005	SW34	19.382	0.101	0.000	1.44			273.0	SURCHARGED
9.006	SW35	18.960	-0.208	0.000	0.66			319.1	OK
14.000	SW36	20.627	-0.223	0.000	0.15			34.3	OK
14.001	SW37	18.895	-0.182	0.000	0.33			34.3	OK
14.002	SW38	18.661	-0.194	0.000	0.27			34.4	OK
15.000	SW39	18.746	-0.204	0.000	0.23			24.8	OK
14.003	SW40	18.598	0.004	0.000	1.03			76.8	SURCHARGED
1.017	SW41	18.495	0.020	0.000	0.03			26.5	SURCHARGED
1.018	SW42	16.914	-0.446	0.000	0.05			26.5	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Level Exceeded
4.001	SW07	
4.002	SW08	
1.009	CF9	
5.000	SW09	
5.001	SW10	
5.002	SW11	
5.003	SW12	
1.010	SW13	
1.011	SW14	
1.012	SW15	
6.000	CF10	
7.000	SW16	
6.001	SW17	
6.002	CF11	
8.000	SW18	
8.001	SW19	
8.002	SW20	
6.003	CF12	
6.004	SW21	
1.013	SW22	
1.014	SW23	
1.015	SW24	
1.016	SW25	
9.000	SW26	
9.001	SW27	
10.000	CF17	
9.002	SW28	
11.000	CF14	
12.000	SW29	
13.000	SW30	
12.001	SW31	
11.001	SW32	
11.002	CF15	
9.003	CF16	
9.004	SW33	
9.005	SW34	
9.006	SW35	
14.000	SW36	
14.001	SW37	
14.002	SW38	
15.000	SW39	
14.003	SW40	
1.017	SW41	
1.018	SW42	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Summer	100	+40%					24.648
2.000	CF2	15 Summer	100	+40%					23.521
1.001	SW02	15 Summer	100	+40%					23.204
1.002	CF3	15 Summer	100	+40%					22.787
1.003	CF4	15 Summer	100	+40%	100/15 Summer				22.532
1.004	CF5	15 Summer	100	+40%	100/15 Summer				22.490
1.005	CF6	15 Summer	100	+40%	100/15 Summer				22.421
1.006	CF7	15 Summer	100	+40%	100/15 Summer				22.333
3.000	SW04	15 Summer	100	+40%					24.584
1.007	SW05	15 Summer	100	+40%	100/15 Summer				22.217
1.008	CF8	15 Summer	100	+40%	100/15 Summer				21.994
4.000	SW06	15 Summer	100	+40%	100/15 Summer				24.635

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.072	0.000	0.80			99.3	OK	
2.000	CF2	-0.382	0.000	0.06			20.8	OK	
1.001	SW02	-0.261	0.000	0.37			140.2	OK	
1.002	CF3	-0.230	0.000	0.48			210.2	OK	
1.003	CF4	0.675	0.000	0.87			260.0	SURCHARGED	
1.004	CF5	0.701	0.000	0.89			288.6	SURCHARGED	
1.005	CF6	0.732	0.000	0.50			312.2	SURCHARGED	
1.006	CF7	1.031	0.000	1.00			347.6	SURCHARGED	
3.000	SW04	-0.086	0.000	0.70			89.7	OK	
1.007	SW05	0.969	0.000	0.94			469.3	SURCHARGED	
1.008	CF8	0.993	0.000	0.99			477.8	SURCHARGED	
4.000	SW06	0.795	0.000	0.65			43.8	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.001	SW07	15 Summer	100	+40%	100/15 Summer			
4.002	SW08	15 Summer	100	+40%	100/15 Summer			
1.009	CF9	15 Summer	100	+40%	30/15 Summer			
5.000	SW09	15 Summer	100	+40%				
5.001	SW10	15 Summer	100	+40%				
5.002	SW11	15 Summer	100	+40%	100/15 Summer			
5.003	SW12	15 Summer	100	+40%	100/15 Summer			
1.010	SW13	15 Summer	100	+40%	30/15 Summer			
1.011	SW14	15 Summer	100	+40%	30/15 Summer			
1.012	SW15	480 Winter	100	+40%	100/15 Summer			
6.000	CF10	15 Summer	100	+40%				
7.000	SW16	15 Summer	100	+40%				
6.001	SW17	15 Summer	100	+40%	100/15 Summer			
6.002	CF11	480 Winter	100	+40%	100/15 Summer			
8.000	SW18	15 Summer	100	+40%	100/15 Summer			
8.001	SW19	15 Summer	100	+40%	100/15 Summer			
8.002	SW20	15 Summer	100	+40%				
6.003	CF12	480 Winter	100	+40%	100/15 Summer			
6.004	SW21	480 Winter	100	+40%	100/15 Summer			
1.013	SW22	480 Winter	100	+40%	30/30 Summer			
1.014	SW23	960 Summer	100	+40%				
1.015	SW24	960 Summer	100	+40%	100/480 Summer			
1.016	SW25	960 Summer	100	+40%	100/360 Summer			
9.000	SW26	15 Summer	100	+40%				
9.001	SW27	15 Summer	100	+40%	100/15 Summer			
10.000	CF17	15 Summer	100	+40%	100/15 Summer			
9.002	SW28	15 Summer	100	+40%	100/15 Summer			
11.000	CF14	15 Summer	100	+40%	100/15 Summer			
12.000	SW29	15 Summer	100	+40%	100/15 Summer			
13.000	SW30	15 Summer	100	+40%	100/15 Summer			
12.001	SW31	15 Summer	100	+40%	100/15 Summer			
11.001	SW32	15 Summer	100	+40%	100/15 Summer			
11.002	CF15	15 Summer	100	+40%	100/15 Summer			
9.003	CF16	15 Summer	100	+40%	100/15 Summer			
9.004	SW33	15 Summer	100	+40%	100/15 Summer			
9.005	SW34	15 Summer	100	+40%	30/15 Summer			
9.006	SW35	15 Summer	100	+40%	100/15 Summer			
14.000	SW36	15 Summer	100	+40%				
14.001	SW37	15 Summer	100	+40%	100/15 Summer			
14.002	SW38	960 Summer	100	+40%	100/15 Summer			
15.000	SW39	960 Summer	100	+40%	100/15 Summer			
14.003	SW40	960 Summer	100	+40%	30/15 Summer			
1.017	SW41	960 Summer	100	+40%	30/360 Summer			
1.018	SW42	480 Winter	100	+40%				

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.001	SW07	24.313	1.421	0.000	1.32			120.2	SURCHARGED
4.002	SW08	22.165	0.549	0.000	0.73			172.8	SURCHARGED
1.009	CF9	21.705	0.987	0.000	4.86			684.9	SURCHARGED
5.000	SW09	23.251	-0.189	0.000	0.06			6.4	OK
5.001	SW10	22.415	-0.085	0.000	0.70			44.3	OK
5.002	SW11	22.034	0.374	0.000	1.00			110.2	SURCHARGED
5.003	SW12	21.722	0.462	0.000	0.97			148.9	SURCHARGED
1.010	SW13	21.212	0.515	0.000	2.87			821.7	SURCHARGED
1.011	SW14	20.955	0.343	0.000	2.81			805.1	SURCHARGED
1.012	SW15	20.874	0.297	0.000	0.17			101.7	SURCHARGED
6.000	CF10	20.911	-0.096	0.000	0.18			33.8	OK
7.000	SW16	22.997	-0.113	0.000	0.49			66.5	OK
6.001	SW17	20.895	0.033	0.000	0.95			154.4	SURCHARGED
6.002	CF11	20.876	0.077	0.000	0.09			17.6	SURCHARGED
8.000	SW18	24.236	0.536	0.000	1.02			51.4	SURCHARGED
8.001	SW19	23.746	0.546	0.000	1.15			108.8	SURCHARGED
8.002	SW20	21.583	-0.087	0.000	0.83			217.3	OK
6.003	CF12	20.874	0.295	0.000	0.13			45.6	SURCHARGED
6.004	SW21	20.873	0.433	0.000	0.12			45.0	SURCHARGED
1.013	SW22	20.872	0.797	0.000	0.04			26.4	SURCHARGED
1.014	SW23	19.100	-0.280	0.000	0.06			26.2	OK
1.015	SW24	19.092	0.082	0.000	0.10			26.1	SURCHARGED
1.016	SW25	19.086	0.168	0.000	0.08			26.1	SURCHARGED
9.000	SW26	23.094	-0.056	0.000	0.51			44.0	OK
9.001	SW27	22.938	0.888	0.000	0.84			91.6	SURCHARGED
10.000	CF17	21.817	1.442	0.000	0.35			59.6	SURCHARGED
9.002	SW28	21.780	1.633	0.000	1.57			230.3	FLOOD RISK
11.000	CF14	21.841	1.370	0.000	0.25			38.6	SURCHARGED
12.000	SW29	22.408	0.808	0.000	0.82			35.8	SURCHARGED
13.000	SW30	22.341	0.751	0.000	0.47			27.6	SURCHARGED
12.001	SW31	22.308	1.002	0.000	0.79			74.3	SURCHARGED
11.001	SW32	21.811	1.597	0.000	1.19			134.4	SURCHARGED
11.002	CF15	21.692	1.561	0.000	1.46			154.0	SURCHARGED
9.003	CF16	21.435	1.428	0.000	1.55			427.8	SURCHARGED
9.004	SW33	20.833	1.067	0.000	1.38			445.2	SURCHARGED
9.005	SW34	19.892	0.611	0.000	2.36			447.8	SURCHARGED
9.006	SW35	19.267	0.099	0.000	1.12			541.4	SURCHARGED
14.000	SW36	20.666	-0.184	0.000	0.32			72.9	OK
14.001	SW37	19.094	0.017	0.000	0.67			69.7	SURCHARGED
14.002	SW38	19.081	0.226	0.000	0.05			6.1	SURCHARGED
15.000	SW39	19.081	0.131	0.000	0.04			4.5	SURCHARGED
14.003	SW40	19.081	0.487	0.000	0.19			13.9	SURCHARGED
1.017	SW41	19.081	0.606	0.000	0.03			26.5	SURCHARGED
1.018	SW42	16.914	-0.446	0.000	0.05			26.5	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Level Exceeded
4.001	SW07	
4.002	SW08	
1.009	CF9	
5.000	SW09	
5.001	SW10	
5.002	SW11	
5.003	SW12	
1.010	SW13	
1.011	SW14	
1.012	SW15	
6.000	CF10	
7.000	SW16	
6.001	SW17	
6.002	CF11	
8.000	SW18	
8.001	SW19	
8.002	SW20	
6.003	CF12	
6.004	SW21	
1.013	SW22	
1.014	SW23	
1.015	SW24	
1.016	SW25	
9.000	SW26	
9.001	SW27	
10.000	CF17	
9.002	SW28	
11.000	CF14	
12.000	SW29	
13.000	SW30	
12.001	SW31	
11.001	SW32	
11.002	CF15	
9.003	CF16	
9.004	SW33	
9.005	SW34	
9.006	SW35	
14.000	SW36	
14.001	SW37	
14.002	SW38	
15.000	SW39	
14.003	SW40	
1.017	SW41	
1.018	SW42	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Holme Network

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	250
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
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

Network Design Table for Holme Network

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	17.843	1.255	14.2	0.124	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	10.597	0.438	24.2	0.026	4.00	0.0	0.600	o	450	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	60.42	4.09	24.495	0.124	0.0	0.0	0.0	3.49	138.7	22.7
2.000	60.79	4.04	23.453	0.026	0.0	0.0	0.0	4.15	659.4	4.8

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.001	10.864	0.448	24.3	0.025	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.002	52.411	1.160	45.2	0.088	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.003	20.541	0.068	302.1	0.125	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.004	29.890	0.100	298.9	0.081	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	28.101	0.387	72.6	0.064	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.006	4.916	0.054	91.8	0.067	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	52.020	3.422	15.2	0.112	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	22.966	0.247	93.0	0.085	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	41.816	0.283	147.8	0.041	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	51.860	0.948	54.7	0.067	4.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	37.572	1.276	29.4	0.130	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	10.554	0.898	11.8	0.091	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	11.843	0.021	556.0	0.085	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	18.310	0.940	19.5	0.008	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	51.967	0.840	61.9	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	34.199	0.400	85.5	0.105	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.003	23.413	0.563	41.6	0.073	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)
1.001	60.03	4.13	23.015	0.175	0.0	0.0	0.0	4.14	658.8	31.9
1.002	57.67	4.42	22.567	0.263	0.0	0.0	0.0	3.03	482.1	46.0
1.003	55.84	4.66	21.257	0.388	0.0	0.0	0.0	1.40	394.7	65.7
1.004	53.45	5.02	21.189	0.469	0.0	0.0	0.0	1.40	396.8	76.0
1.005	52.43	5.18	21.089	0.533	0.0	0.0	0.0	2.86	808.7	84.8
1.006	52.24	5.21	20.702	0.600	0.0	0.0	0.0	2.54	718.8	95.1
3.000	58.95	4.26	24.445	0.112	0.0	0.0	0.0	3.37	134.1	20.0
1.007	51.35	5.36	20.648	0.797	0.0	0.0	0.0	2.53	714.2	124.1
1.008	49.46	5.71	20.401	0.838	0.0	0.0	0.0	2.00	565.8	125.7
4.000	57.12	4.49	23.615	0.067	0.0	0.0	0.0	1.77	70.5	11.6
4.001	55.24	4.75	22.667	0.197	0.0	0.0	0.0	2.42	96.2	33.0
4.002	54.98	4.78	21.316	0.288	0.0	0.0	0.0	4.61	325.9	48.0
1.009	48.49	5.91	20.118	1.211	0.0	0.0	0.0	1.03	290.0	178.1
5.000	60.26	4.10	23.215	0.008	0.0	0.0	0.0	2.98	118.4	1.5
5.001	56.12	4.62	22.275	0.056	0.0	0.0	0.0	1.67	66.2	9.5
5.002	53.83	4.96	21.360	0.161	0.0	0.0	0.0	1.70	120.3	26.3
5.003	52.82	5.12	20.960	0.234	0.0	0.0	0.0	2.45	172.8	37.5

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.010	25.080	0.035	716.6	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.011	25.080	0.035	716.6	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.012	14.250#	0.127	112.2	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.000	32.111	0.145	221.4	0.046	4.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	29.627	2.248	13.2	0.083	4.00	0.0	0.600	o	225	Pipe/Conduit	
6.001	13.940	0.063	221.3	0.087	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.002	46.694	0.220	212.3	0.023	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	49.370	0.500	98.7	0.078	4.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	42.046	1.530	27.5	0.094	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	10.151	1.091	9.3	0.144	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.003	8.192#	0.089	92.0	0.089	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.004	8.192#	0.140	58.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.013	8.311#	0.695	12.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.014	30.206	0.370	81.6	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.015	41.586	0.091	457.0	0.000	0.00	0.0	0.600	o	600	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)
1.010	46.62	6.31	19.947	1.445	0.0	0.0	0.0	1.04	458.4	204.4
1.011	44.93	6.71	19.862	1.445	0.0	0.0	0.0	1.04	458.4	204.4
1.012	44.58	6.80	19.827	1.445	0.0	0.0	0.0	2.64	1166.9	204.4
6.000	57.86	4.39	20.557	0.046	0.0	0.0	0.0	1.36	216.7	8.1
7.000	59.97	4.14	22.885	0.083	0.0	0.0	0.0	3.62	144.1	15.1
6.001	56.56	4.56	20.412	0.216	0.0	0.0	0.0	1.36	216.7	37.1
6.002	52.79	5.12	20.349	0.239	0.0	0.0	0.0	1.39	221.3	38.3
8.000	56.10	4.63	23.475	0.078	0.0	0.0	0.0	1.32	52.3	13.3
8.001	54.17	4.91	22.975	0.172	0.0	0.0	0.0	2.51	99.6	28.3
8.002	53.96	4.94	21.370	0.316	0.0	0.0	0.0	5.18	366.4	51.7
6.003	52.46	5.18	19.979	0.644	0.0	0.0	0.0	2.54	717.9	102.5
6.004	52.20	5.22	19.840	0.644	0.0	0.0	0.0	3.19	901.3	102.5
1.013	44.50	6.82	19.550	2.089	0.0	0.0	0.0	6.50	1407.6	281.9
1.014	43.72	7.03	18.855	2.089	0.0	0.0	0.0	2.48	537.0	281.9
1.015	41.60	7.64	18.410	2.089	0.0	0.0	0.0	1.13	320.2	281.9

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.016	24.641#	0.094	262.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	35.633	1.100	32.4	0.055	4.00	0.0	0.600	o	225	Pipe/Conduit	
9.001	39.747	1.903	20.9	0.088	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	22.974	0.228	100.7	0.100	4.00	0.0	0.600	o	375	Pipe/Conduit	
9.002	14.092	0.140	100.7	0.145	0.00	0.0	0.600	o	375	Pipe/Conduit	
11.000	36.066	0.257	140.3	0.070	4.00	0.0	0.600	o	375	Pipe/Conduit	
12.000	36.902	0.294	125.5	0.052	4.00	0.0	0.600	o	225	Pipe/Conduit	
13.000	18.087	0.284	63.7	0.036	4.00	0.0	0.600	o	225	Pipe/Conduit	
12.001	29.070	1.092	26.6	0.045	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.001	11.681	0.083	140.7	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit	
11.002	36.112	0.124	291.0	0.035	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.003	10.052	0.240	41.8	0.102	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.004	38.054#	0.485	78.5	0.029	0.00	0.0	0.600	o	450	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)
1.016	40.73	7.91	18.318	2.089	0.0	0.0	0.0	1.50	423.9	281.9
9.000	58.95	4.26	22.925	0.055	0.0	0.0	0.0	2.31	91.7	9.8
9.001	57.12	4.49	21.825	0.143	0.0	0.0	0.0	2.88	114.4	24.8
10.000	59.32	4.21	20.000	0.100	0.0	0.0	0.0	1.81	199.4	18.0
9.002	56.16	4.62	19.772	0.388	0.0	0.0	0.0	1.81	199.5	66.1
11.000	57.85	4.39	20.096	0.070	0.0	0.0	0.0	1.53	168.7	12.3
12.000	56.82	4.53	21.375	0.052	0.0	0.0	0.0	1.17	46.3	9.0
13.000	59.56	4.18	21.365	0.036	0.0	0.0	0.0	1.64	65.3	6.5
12.001	55.44	4.72	21.081	0.133	0.0	0.0	0.0	2.55	101.2	22.4
11.001	54.57	4.85	19.839	0.262	0.0	0.0	0.0	1.53	168.5	43.4
11.002	51.07	5.41	19.756	0.297	0.0	0.0	0.0	1.06	116.7	46.0
9.003	50.77	5.47	19.557	0.787	0.0	0.0	0.0	3.15	501.3	121.2
9.004	49.30	5.74	19.316	0.816	0.0	0.0	0.0	2.30	365.3	122.0

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Network Design Table for Holme Network

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
9.005	5.000#	0.113	44.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.006	11.186#	0.398	28.1	0.172	0.00	0.0	0.600	o	525	Pipe/Conduit	
14.000	35.987#	1.773	20.3	0.091	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	5.000#	0.172	29.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.002	5.000#	0.258	19.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.000	29.835	0.356	83.8	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.003	10.996#	0.088	125.0	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.017	12.714#	1.115	11.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.018	30.798	0.435	70.8	0.000	0.00	0.0	0.600	o	525	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)
9.005	49.16	5.77	18.831	0.816	0.0	0.0	0.0	3.06	487.1	122.0
9.006	48.94	5.82	18.643	0.988	0.0	0.0	0.0	4.24	917.2	146.7
14.000	59.67	4.17	20.550	0.091	0.0	0.0	0.0	3.51	247.8	16.5
14.001	59.43	4.20	18.777	0.091	0.0	0.0	0.0	2.93	206.9	16.5
14.002	59.23	4.22	18.555	0.091	0.0	0.0	0.0	3.59	253.6	16.5
15.000	58.68	4.29	18.650	0.066	0.0	0.0	0.0	1.72	121.5	11.7
14.003	57.65	4.42	18.294	0.216	0.0	0.0	0.0	1.41	99.3	37.8
1.017	40.64	7.94	17.950	3.293	0.0	0.0	0.0	6.66	1441.5	405.9
1.018	40.06	8.14	16.835	3.293	0.0	0.0	0.0	2.66	576.8	405.9

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Manhole Schedules for Holme Network

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW01	25.920	1.425	Open Manhole	1200	1.000	24.495	225				
CF2	26.520	3.067	Open Manhole	1350	2.000	23.453	450				
SW02	26.290	3.275	Open Manhole	1350	1.001	23.015	450	1.000	23.240	225	
								2.000	23.015	450	
CF3	26.090	3.523	Open Manhole	1350	1.002	22.567	450	1.001	22.567	450	
CF4	25.380	4.123	Open Manhole	1500	1.003	21.257	600	1.002	21.407	450	
CF5	25.130	3.941	Open Manhole	1500	1.004	21.189	600	1.003	21.189	600	
CF6	24.820	3.731	Open Manhole	1500	1.005	21.089	600	1.004	21.089	600	
CF7	24.570	3.868	Open Manhole	1500	1.006	20.702	600	1.005	20.702	600	
SW04	25.870	1.425	Open Manhole	1200	3.000	24.445	225				
SW05	24.500	3.852	Open Manhole	1500	1.007	20.648	600	1.006	20.648	600	
								3.000	21.023	225	
CF8	24.280	3.879	Open Manhole	1500	1.008	20.401	600	1.007	20.401	600	
SW06	25.040	1.425	Open Manhole	1200	4.000	23.615	225				
SW07	25.150	2.483	Open Manhole	1200	4.001	22.667	225	4.000	22.667	225	
SW08	24.040	2.724	Open Manhole	1200	4.002	21.316	300	4.001	21.391	225	
CF9	23.840	3.722	Open Manhole	1500	1.009	20.118	600	1.008	20.118	600	
								4.002	20.418	300	
SW09	24.640	1.425	Open Manhole	1200	5.000	23.215	225				
SW10	23.700	1.425	Open Manhole	1200	5.001	22.275	225	5.000	22.275	225	
SW11	22.860	1.500	Open Manhole	1200	5.002	21.360	300	5.001	21.435	225	
SW12	22.460	1.500	Open Manhole	1200	5.003	20.960	300	5.002	20.960	300	
SW13	22.780	2.833	Open Manhole	1800	1.010	19.947	750	1.009	20.097	600	
								5.003	20.397	300	
SW14	22.425	2.563	Open Manhole	1800	1.011	19.862	750	1.010	19.912	750	50
SW15	22.070	2.243	Open Manhole	1800	1.012	19.827	750	1.011	19.827	750	
CF10	23.680	3.123	Open Manhole	1350	6.000	20.557	450				
SW16	24.310	1.425	Open Manhole	1200	7.000	22.885	225				
SW17	23.370	2.958	Open Manhole	1350	6.001	20.412	450	6.000	20.412	450	
								7.000	20.637	225	
CF11	23.200	2.851	Open Manhole	1350	6.002	20.349	450	6.001	20.349	450	
SW18	24.900	1.425	Open Manhole	1200	8.000	23.475	225				
SW19	24.410	1.435	Open Manhole	1200	8.001	22.975	225	8.000	22.975	225	
SW20	22.870	1.500	Open Manhole	1200	8.002	21.370	300	8.001	21.445	225	
CF12	22.760	2.781	Open Manhole	1500	6.003	19.979	600	6.002	20.129	450	
								8.002	20.279	300	
SW21	22.005	2.165	Open Manhole	1500	6.004	19.840	600	6.003	19.890	600	50

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Manhole Schedules for Holme Network

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW22	21.250	1.700	Open Manhole	1800	1.013	19.550	525	1.012	19.700	750	375
								6.004	19.700	600	225
SW23	20.530	1.675	Open Manhole	1500	1.014	18.855	525	1.013	18.855	525	
SW24	20.160	1.750	Open Manhole	1500	1.015	18.410	600	1.014	18.485	525	
SW25	19.500	1.182	Open Manhole	1500	1.016	18.318	600	1.015	18.319	600	1
SW26	24.350	1.425	Open Manhole	1200	9.000	22.925	225				
SW27	23.250	1.425	Open Manhole	1200	9.001	21.825	225	9.000	21.825	225	
CF17	22.210	2.210	Open Manhole	1350	10.000	20.000	375				
SW28	22.020	2.248	Open Manhole	1350	9.002	19.772	375	9.001	19.922	225	
								10.000	19.772	375	
CF14	22.880	2.784	Open Manhole	1350	11.000	20.096	375				
SW29	22.800	1.425	Open Manhole	1200	12.000	21.375	225				
SW30	22.790	1.425	Open Manhole	1200	13.000	21.365	225				
SW31	22.710	1.629	Open Manhole	1200	12.001	21.081	225	12.000	21.081	225	
								13.000	21.081	225	
SW32	22.310	2.471	Open Manhole	1350	11.001	19.839	375	11.000	19.839	375	
								12.001	19.989	225	
CF15	22.060	2.304	Open Manhole	1350	11.002	19.756	375	11.001	19.756	375	
CF16	21.880	2.323	Open Manhole	1350	9.003	19.557	450	9.002	19.632	375	
								11.002	19.632	375	
SW33	21.710	2.394	Open Manhole	1350	9.004	19.316	450	9.003	19.316	450	
SW34	20.680	1.849	Open Manhole	1350	9.005	18.831	450	9.004	18.831	450	
SW35	19.650	1.007	Open Manhole	1500	9.006	18.643	525	9.005	18.718	450	
SW36	22.050	1.500	Open Manhole	1200	14.000	20.550	300				
SW37	21.458	2.681	Open Manhole	1200	14.001	18.777	300	14.000	18.777	300	
SW38	20.865	2.310	Open Manhole	1200	14.002	18.555	300	14.001	18.605	300	50
SW39	19.730	1.080	Open Manhole	1200	15.000	18.650	300				
SW40	19.680	1.386	Open Manhole	1200	14.003	18.294	300	14.002	18.297	300	3
								15.000	18.294	300	
SW41	19.450	1.500	Open Manhole	1500	1.017	17.950	525	1.016	18.224	600	349
								9.006	18.245	525	295
								14.003	18.206	300	31
SW42	18.560	1.725	Open Manhole	1500	1.018	16.835	525	1.017	16.835	525	
	17.600	1.200	Open Manhole	0		OUTFALL		1.018	16.400	525	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW01	448988.661	117269.080	448988.661	117269.080	Required	
CF2	448973.253	117281.571	448973.253	117281.571	Required	
SW02	448970.948	117271.228	448970.948	117271.228	Required	
CF3	448968.602	117260.621	448968.602	117260.621	Required	
CF4	448943.133	117214.815	448943.133	117214.815	Required	
CF5	448923.440	117220.656	448923.440	117220.656	Required	
CF6	448893.606	117222.480	448893.606	117222.480	Required	
CF7	448867.347	117232.489	448867.347	117232.489	Required	
SW04	448866.151	117284.996	448866.151	117284.996	Required	
SW05	448862.470	117233.106	448862.470	117233.106	Required	
CF8	448839.683	117235.966	448839.683	117235.966	Required	
SW06	448763.424	117288.803	448763.424	117288.803	Required	
SW07	448813.620	117275.774	448813.620	117275.774	Required	
SW08	448804.186	117239.406	448804.186	117239.406	Required	
CF9	448798.198	117230.715	448798.198	117230.715	Required	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW09	448900.569	117214.400	448900.569	117214.400	Required	
SW10	448895.361	117196.846	448895.361	117196.846	Required	
SW11	448843.589	117201.341	448843.589	117201.341	Required	
SW12	448809.467	117203.639	448809.467	117203.639	Required	
SW13	448792.860	117220.144	448792.860	117220.144	Required	
SW14	448768.567	117226.375	448768.567	117226.375	Required	
SW15	448744.274	117232.605	448744.274	117232.605	Required	
CF10	448782.765	117235.346	448782.765	117235.346	Required	
SW16	448758.860	117270.965	448758.860	117270.965	Required	
SW17	448751.414	117242.290	448751.414	117242.290	Required	
CF11	448737.806	117245.314	448737.806	117245.314	Required	
SW18	448750.980	117292.086	448750.980	117292.086	Required	
SW19	448704.047	117307.403	448704.047	117307.403	Required	
SW20	448693.493	117266.703	448693.493	117266.703	Required	
CF12	448692.497	117256.601	448692.497	117256.601	Required	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW21	448696.986	117242.032	448696.986	117242.032	Required	
SW22	448701.475	117227.463	448701.475	117227.463	Required	
SW23	448679.154	117217.759	448679.154	117217.759	Required	
SW24	448649.329	117212.975	448649.329	117212.975	Required	
SW25	448608.407	117220.380	448608.407	117220.380	Required	
SW26	448677.213	117345.263	448677.213	117345.263	Required	
SW27	448659.403	117314.400	448659.403	117314.400	Required	
CF17	448644.199	117270.986	448644.199	117270.986	Required	
SW28	448629.286	117288.463	448629.286	117288.463	Required	
CF14	448552.413	117345.556	448552.413	117345.556	Required	
SW29	448631.131	117339.391	448631.131	117339.391	Required	
SW30	448582.136	117364.321	448582.136	117364.321	Required	
SW31	448598.533	117356.686	448598.533	117356.686	Required	
SW32	448585.318	117330.793	448585.318	117330.793	Required	
CF15	448595.982	117326.024	448595.982	117326.024	Required	

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Manhole Schedules for Holme Network

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
CF16	448620.145	117299.187	448620.145	117299.187	Required	
SW33	448611.399	117294.232	448611.399	117294.232	Required	
SW34	448595.162	117280.099	448595.162	117280.099	Required	
SW35	448578.925	117265.966	448578.925	117265.966	Required	
SW36	448586.960	117320.218	448586.960	117320.218	Required	
SW37	448582.173	117309.765	448582.173	117309.765	Required	
SW38	448577.386	117299.312	448577.386	117299.312	Required	
SW39	448540.776	117291.023	448540.776	117291.023	Required	
SW40	448567.813	117278.407	448567.813	117278.407	Required	
SW41	448557.259	117260.414	448557.259	117260.414	Required	
SW42	448536.496	117247.022	448536.496	117247.022	Required	
	448521.748	117219.985			No Entry	

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PIPELINE SCHEDULES for Holme Network

Upstream Manhole

- Indicates pipe length does not match coordinates

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	225	SW01	25.920	24.495	1.200	Open Manhole	1200
2.000	o	450	CF2	26.520	23.453	2.617	Open Manhole	1350
1.001	o	450	SW02	26.290	23.015	2.825	Open Manhole	1350
1.002	o	450	CF3	26.090	22.567	3.073	Open Manhole	1350
1.003	o	600	CF4	25.380	21.257	3.523	Open Manhole	1500
1.004	o	600	CF5	25.130	21.189	3.341	Open Manhole	1500
1.005	o	600	CF6	24.820	21.089	3.131	Open Manhole	1500
1.006	o	600	CF7	24.570	20.702	3.268	Open Manhole	1500
3.000	o	225	SW04	25.870	24.445	1.200	Open Manhole	1200
1.007	o	600	SW05	24.500	20.648	3.252	Open Manhole	1500
1.008	o	600	CF8	24.280	20.401	3.279	Open Manhole	1500
4.000	o	225	SW06	25.040	23.615	1.200	Open Manhole	1200
4.001	o	225	SW07	25.150	22.667	2.258	Open Manhole	1200
4.002	o	300	SW08	24.040	21.316	2.424	Open Manhole	1200

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	17.843	14.2	SW02	26.290	23.240	2.825	Open Manhole	1350
2.000	10.597	24.2	SW02	26.290	23.015	2.825	Open Manhole	1350
1.001	10.864	24.3	CF3	26.090	22.567	3.073	Open Manhole	1350
1.002	52.411	45.2	CF4	25.380	21.407	3.523	Open Manhole	1500
1.003	20.541	302.1	CF5	25.130	21.189	3.341	Open Manhole	1500
1.004	29.890	298.9	CF6	24.820	21.089	3.131	Open Manhole	1500
1.005	28.101	72.6	CF7	24.570	20.702	3.268	Open Manhole	1500
1.006	4.916	91.8	SW05	24.500	20.648	3.252	Open Manhole	1500
3.000	52.020	15.2	SW05	24.500	21.023	3.252	Open Manhole	1500
1.007	22.966	93.0	CF8	24.280	20.401	3.279	Open Manhole	1500
1.008	41.816	147.8	CF9	23.840	20.118	3.122	Open Manhole	1500
4.000	51.860	54.7	SW07	25.150	22.667	2.258	Open Manhole	1200
4.001	37.572	29.4	SW08	24.040	21.391	2.424	Open Manhole	1200
4.002	10.554	11.8	CF9	23.840	20.418	3.122	Open Manhole	1500

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PIPELINE SCHEDULES for Holme Network

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)
1.009	o	600	CF9	23.840	20.118	3.122	Open Manhole	1500
5.000	o	225	SW09	24.640	23.215	1.200	Open Manhole	1200
5.001	o	225	SW10	23.700	22.275	1.200	Open Manhole	1200
5.002	o	300	SW11	22.860	21.360	1.200	Open Manhole	1200
5.003	o	300	SW12	22.460	20.960	1.200	Open Manhole	1200
1.010	o	750	SW13	22.780	19.947	2.083	Open Manhole	1800
1.011	o	750	SW14	22.425	19.862	1.813	Open Manhole	1800
1.012	o	750	SW15	22.070	19.827	1.493	Open Manhole	1800
6.000	o	450	CF10	23.680	20.557	2.673	Open Manhole	1350
7.000	o	225	SW16	24.310	22.885	1.200	Open Manhole	1200
6.001	o	450	SW17	23.370	20.412	2.508	Open Manhole	1350
6.002	o	450	CF11	23.200	20.349	2.401	Open Manhole	1350
8.000	o	225	SW18	24.900	23.475	1.200	Open Manhole	1200

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)
1.009	11.843	556.0	SW13	22.780	20.097	2.083	Open Manhole	1800
5.000	18.310	19.5	SW10	23.700	22.275	1.200	Open Manhole	1200
5.001	51.967	61.9	SW11	22.860	21.435	1.200	Open Manhole	1200
5.002	34.199	85.5	SW12	22.460	20.960	1.200	Open Manhole	1200
5.003	23.413	41.6	SW13	22.780	20.397	2.083	Open Manhole	1800
1.010	25.080	716.6	SW14	22.425	19.912	1.763	Open Manhole	1800
1.011	25.080	716.6	SW15	22.070	19.827	1.493	Open Manhole	1800
1.012	14.250#	112.2	SW22	21.250	19.700	0.800	Open Manhole	1800
6.000	32.111	221.4	SW17	23.370	20.412	2.508	Open Manhole	1350
7.000	29.627	13.2	SW17	23.370	20.637	2.508	Open Manhole	1350
6.001	13.940	221.3	CF11	23.200	20.349	2.401	Open Manhole	1350
6.002	46.694	212.3	CF12	22.760	20.129	2.181	Open Manhole	1500
8.000	49.370	98.7	SW19	24.410	22.975	1.210	Open Manhole	1200

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PIPELINE SCHEDULES for Holme Network

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)
8.001	o	225	SW19	24.410	22.975	1.210	Open Manhole	1200
8.002	o	300	SW20	22.870	21.370	1.200	Open Manhole	1200
6.003	o	600	CF12	22.760	19.979	2.181	Open Manhole	1500
6.004	o	600	SW21	22.005	19.840	1.565	Open Manhole	1500
1.013	o	525	SW22	21.250	19.550	1.175	Open Manhole	1800
1.014	o	525	SW23	20.530	18.855	1.150	Open Manhole	1500
1.015	o	600	SW24	20.160	18.410	1.150	Open Manhole	1500
1.016	o	600	SW25	19.500	18.318	0.582	Open Manhole	1500
9.000	o	225	SW26	24.350	22.925	1.200	Open Manhole	1200
9.001	o	225	SW27	23.250	21.825	1.200	Open Manhole	1200
10.000	o	375	CF17	22.210	20.000	1.835	Open Manhole	1350
9.002	o	375	SW28	22.020	19.772	1.873	Open Manhole	1350
11.000	o	375	CF14	22.880	20.096	2.409	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)
8.001	42.046	27.5	SW20	22.870	21.445	1.200	Open Manhole	1200
8.002	10.151	9.3	CF12	22.760	20.279	2.181	Open Manhole	1500
6.003	8.192#	92.0	SW21	22.005	19.890	1.515	Open Manhole	1500
6.004	8.192#	58.5	SW22	21.250	19.700	0.950	Open Manhole	1800
1.013	8.311#	12.0	SW23	20.530	18.855	1.150	Open Manhole	1500
1.014	30.206	81.6	SW24	20.160	18.485	1.150	Open Manhole	1500
1.015	41.586	457.0	SW25	19.500	18.319	0.581	Open Manhole	1500
1.016	24.641#	262.1	SW41	19.450	18.224	0.626	Open Manhole	1500
9.000	35.633	32.4	SW27	23.250	21.825	1.200	Open Manhole	1200
9.001	39.747	20.9	SW28	22.020	19.922	1.873	Open Manhole	1350
10.000	22.974	100.7	SW28	22.020	19.772	1.873	Open Manhole	1350
9.002	14.092	100.7	CF16	21.880	19.632	1.873	Open Manhole	1350
11.000	36.066	140.3	SW32	22.310	19.839	2.096	Open Manhole	1350

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PIPELINE SCHEDULES for Holme Network

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)
12.000	o	225	SW29	22.800	21.375	1.200	Open Manhole	1200
13.000	o	225	SW30	22.790	21.365	1.200	Open Manhole	1200
12.001	o	225	SW31	22.710	21.081	1.404	Open Manhole	1200
11.001	o	375	SW32	22.310	19.839	2.096	Open Manhole	1350
11.002	o	375	CF15	22.060	19.756	1.929	Open Manhole	1350
9.003	o	450	CF16	21.880	19.557	1.873	Open Manhole	1350
9.004	o	450	SW33	21.710	19.316	1.944	Open Manhole	1350
9.005	o	450	SW34	20.680	18.831	1.399	Open Manhole	1350
9.006	o	525	SW35	19.650	18.643	0.482	Open Manhole	1500
14.000	o	300	SW36	22.050	20.550	1.200	Open Manhole	1200
14.001	o	300	SW37	21.458	18.777	2.381	Open Manhole	1200
14.002	o	300	SW38	20.865	18.555	2.010	Open Manhole	1200
15.000	o	300	SW39	19.730	18.650	0.780	Open Manhole	1200

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)
12.000	36.902	125.5	SW31	22.710	21.081	1.404	Open Manhole	1200
13.000	18.087	63.7	SW31	22.710	21.081	1.404	Open Manhole	1200
12.001	29.070	26.6	SW32	22.310	19.989	2.096	Open Manhole	1350
11.001	11.681	140.7	CF15	22.060	19.756	1.929	Open Manhole	1350
11.002	36.112	291.0	CF16	21.880	19.632	1.873	Open Manhole	1350
9.003	10.052	41.8	SW33	21.710	19.316	1.944	Open Manhole	1350
9.004	38.054#	78.5	SW34	20.680	18.831	1.399	Open Manhole	1350
9.005	5.000#	44.2	SW35	19.650	18.718	0.482	Open Manhole	1500
9.006	11.186#	28.1	SW41	19.450	18.245	0.680	Open Manhole	1500
14.000	35.987#	20.3	SW37	21.458	18.777	2.381	Open Manhole	1200
14.001	5.000#	29.1	SW38	20.865	18.605	1.960	Open Manhole	1200
14.002	5.000#	19.4	SW40	19.680	18.297	1.083	Open Manhole	1200
15.000	29.835	83.8	SW40	19.680	18.294	1.086	Open Manhole	1200

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PIPELINE SCHEDULES for Holme Network

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)
14.003	o	300	SW40	19.680	18.294	1.086	Open Manhole	1200
1.017	o	525	SW41	19.450	17.950	0.975	Open Manhole	1500
1.018	o	525	SW42	18.560	16.835	1.200	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)
14.003	10.996#	125.0	SW41	19.450	18.206	0.944	Open Manhole	1500
1.017	12.714#	11.4	SW42	18.560	16.835	1.200	Open Manhole	1500
1.018	30.798	70.8		17.600	16.400	0.675	Open Manhole	0

Simulation Criteria for Holme Network

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Holme Network

Orifice Manhole: SW22, DS/PN: 1.013, Volume (m³): 11.7

Diameter (m) 0.106 Discharge Coefficient 0.600 Invert Level (m) 19.550

Hydro-Brake® Optimum Manhole: SW41, DS/PN: 1.017, Volume (m³): 12.0

Unit Reference	MD-SHE-0222-2660-1200-2660
Design Head (m)	1.200
Design Flow (l/s)	26.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	222
Invert Level (m)	17.950
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	26.6
Flush-Flo™	0.398	26.5
Kick-Flo®	0.850	22.6
Mean Flow over Head Range	-	22.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.5	1.200	26.6	3.000	41.3	7.000	62.2
0.200	22.0	1.400	28.6	3.500	44.5	7.500	64.3
0.300	26.1	1.600	30.5	4.000	47.4	8.000	66.4
0.400	26.5	1.800	32.3	4.500	50.2	8.500	68.4
0.500	26.3	2.000	34.0	5.000	52.8	9.000	70.3
0.600	25.8	2.200	35.6	5.500	55.3	9.500	72.2
0.800	23.8	2.400	37.1	6.000	57.7		
1.000	24.4	2.600	38.5	6.500	60.0		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Summer	100	+45%					24.652
2.000	CF2	15 Summer	100	+45%					23.523
1.001	SW02	15 Summer	100	+45%					23.208
1.002	CF3	15 Summer	100	+45%					22.834
1.003	CF4	15 Summer	100	+45%	100/15 Summer				22.670
1.004	CF5	15 Summer	100	+45%	100/15 Summer				22.624
1.005	CF6	15 Summer	100	+45%	100/15 Summer				22.546
1.006	CF7	15 Summer	100	+45%	100/15 Summer				22.450
3.000	SW04	15 Summer	100	+45%					24.587
1.007	SW05	15 Summer	100	+45%	100/15 Summer				22.316
1.008	CF8	15 Summer	100	+45%	100/15 Summer				22.077
4.000	SW06	15 Summer	100	+45%	100/15 Summer				24.821

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.068	0.000	0.83			102.9	OK	
2.000	CF2	-0.380	0.000	0.06			21.6	OK	
1.001	SW02	-0.257	0.000	0.38			145.2	OK	
1.002	CF3	-0.183	0.000	0.50			217.7	OK	
1.003	CF4	0.813	0.000	0.90			267.8	SURCHARGED	
1.004	CF5	0.835	0.000	0.89			287.3	SURCHARGED	
1.005	CF6	0.857	0.000	0.51			321.0	SURCHARGED	
1.006	CF7	1.148	0.000	1.03			357.0	SURCHARGED	
3.000	SW04	-0.083	0.000	0.72			92.9	OK	
1.007	SW05	1.068	0.000	0.96			479.2	SURCHARGED	
1.008	CF8	1.076	0.000	1.01			490.6	SURCHARGED	
4.000	SW06	0.981	0.000	0.65			43.8	FLOOD RISK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.001	SW07	15 Summer	100	+45%	100/15 Summer			
4.002	SW08	15 Summer	100	+45%	100/15 Summer			
1.009	CF9	15 Summer	100	+45%	100/15 Summer			
5.000	SW09	15 Summer	100	+45%				
5.001	SW10	15 Summer	100	+45%				
5.002	SW11	15 Summer	100	+45%	100/15 Summer			
5.003	SW12	15 Summer	100	+45%	100/15 Summer			
1.010	SW13	15 Summer	100	+45%	100/15 Summer			
1.011	SW14	15 Summer	100	+45%	100/15 Summer			
1.012	SW15	480 Winter	100	+45%	100/15 Summer			
6.000	CF10	15 Summer	100	+45%				
7.000	SW16	15 Summer	100	+45%				
6.001	SW17	15 Summer	100	+45%	100/15 Summer			
6.002	CF11	480 Winter	100	+45%	100/15 Summer			
8.000	SW18	15 Summer	100	+45%	100/15 Summer			
8.001	SW19	15 Summer	100	+45%	100/15 Summer			
8.002	SW20	15 Summer	100	+45%				
6.003	CF12	480 Winter	100	+45%	100/15 Summer			
6.004	SW21	480 Winter	100	+45%	100/15 Summer			
1.013	SW22	480 Winter	100	+45%	100/15 Summer			
1.014	SW23	960 Summer	100	+45%				
1.015	SW24	960 Summer	100	+45%	100/480 Summer			
1.016	SW25	960 Summer	100	+45%	100/360 Summer			
9.000	SW26	15 Summer	100	+45%	100/15 Summer			
9.001	SW27	15 Summer	100	+45%	100/15 Summer			
10.000	CF17	15 Summer	100	+45%	100/15 Summer			
9.002	SW28	15 Summer	100	+45%	100/15 Summer			
11.000	CF14	15 Summer	100	+45%	100/15 Summer			
12.000	SW29	15 Summer	100	+45%	100/15 Summer			
13.000	SW30	15 Summer	100	+45%	100/15 Summer			
12.001	SW31	15 Summer	100	+45%	100/15 Summer			
11.001	SW32	15 Summer	100	+45%	100/15 Summer			
11.002	CF15	15 Summer	100	+45%	100/15 Summer			
9.003	CF16	15 Summer	100	+45%	100/15 Summer			
9.004	SW33	15 Summer	100	+45%	100/15 Summer			
9.005	SW34	15 Summer	100	+45%	100/15 Summer			
9.006	SW35	15 Summer	100	+45%	100/15 Summer			
14.000	SW36	15 Summer	100	+45%				
14.001	SW37	15 Summer	100	+45%	100/15 Summer			
14.002	SW38	960 Summer	100	+45%	100/15 Summer			
15.000	SW39	960 Summer	100	+45%	100/15 Summer			
14.003	SW40	960 Summer	100	+45%	100/15 Summer			
1.017	SW41	960 Summer	100	+45%	100/30 Summer			
1.018	SW42	1440 Winter	100	+45%				

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.001	SW07	24.493	1.601	0.000	1.34			122.1	SURCHARGED
4.002	SW08	22.261	0.645	0.000	0.74			175.9	SURCHARGED
1.009	CF9	21.771	1.053	0.000	4.99			703.5	SURCHARGED
5.000	SW09	23.251	-0.189	0.000	0.06			6.6	OK
5.001	SW10	22.427	-0.073	0.000	0.72			45.8	OK
5.002	SW11	22.136	0.476	0.000	1.01			111.9	SURCHARGED
5.003	SW12	21.798	0.538	0.000	1.00			153.4	SURCHARGED
1.010	SW13	21.258	0.561	0.000	2.95			844.4	SURCHARGED
1.011	SW14	20.986	0.374	0.000	2.89			827.5	SURCHARGED
1.012	SW15	20.910	0.333	0.000	0.17			105.3	SURCHARGED
6.000	CF10	20.953	-0.054	0.000	0.18			34.6	OK
7.000	SW16	22.999	-0.111	0.000	0.51			68.8	OK
6.001	SW17	20.938	0.076	0.000	0.98			159.9	SURCHARGED
6.002	CF11	20.911	0.112	0.000	0.09			18.0	SURCHARGED
8.000	SW18	24.379	0.679	0.000	1.04			52.0	SURCHARGED
8.001	SW19	23.861	0.661	0.000	1.18			111.9	SURCHARGED
8.002	SW20	21.587	-0.083	0.000	0.85			222.7	OK
6.003	CF12	20.910	0.331	0.000	0.14			47.3	SURCHARGED
6.004	SW21	20.909	0.469	0.000	0.12			46.6	SURCHARGED
1.013	SW22	20.908	0.833	0.000	0.04			26.8	SURCHARGED
1.014	SW23	19.133	-0.247	0.000	0.06			26.6	OK
1.015	SW24	19.126	0.116	0.000	0.10			26.6	SURCHARGED
1.016	SW25	19.119	0.201	0.000	0.08			26.5	SURCHARGED
9.000	SW26	23.231	0.081	0.000	0.52			45.1	SURCHARGED
9.001	SW27	23.080	1.030	0.000	0.84			91.2	FLOOD RISK
10.000	CF17	21.954	1.579	0.000	0.36			61.3	FLOOD RISK
9.002	SW28	21.916	1.769	0.000	1.61			235.2	FLOOD RISK
11.000	CF14	21.976	1.505	0.000	0.26			39.6	SURCHARGED
12.000	SW29	22.558	0.958	0.000	0.83			36.4	FLOOD RISK
13.000	SW30	22.488	0.898	0.000	0.48			28.0	SURCHARGED
12.001	SW31	22.455	1.149	0.000	0.80			75.0	FLOOD RISK
11.001	SW32	21.946	1.732	0.000	1.22			137.3	SURCHARGED
11.002	CF15	21.822	1.691	0.000	1.50			157.7	FLOOD RISK
9.003	CF16	21.555	1.548	0.000	1.58			436.7	SURCHARGED
9.004	SW33	20.927	1.160	0.000	1.41			455.0	SURCHARGED
9.005	SW34	19.944	0.663	0.000	2.41			457.6	SURCHARGED
9.006	SW35	19.291	0.123	0.000	1.15			555.0	SURCHARGED
14.000	SW36	20.668	-0.182	0.000	0.33			75.5	OK
14.001	SW37	19.134	0.057	0.000	0.69			71.8	SURCHARGED
14.002	SW38	19.114	0.259	0.000	0.05			6.3	SURCHARGED
15.000	SW39	19.114	0.164	0.000	0.04			4.6	SURCHARGED
14.003	SW40	19.114	0.520	0.000	0.19			14.4	SURCHARGED
1.017	SW41	19.114	0.639	0.000	0.03			26.5	SURCHARGED
1.018	SW42	16.914	-0.446	0.000	0.05			26.5	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Holme Network

PN	US/MH Name	Level Exceeded
4.001	SW07	
4.002	SW08	
1.009	CF9	
5.000	SW09	
5.001	SW10	
5.002	SW11	
5.003	SW12	
1.010	SW13	
1.011	SW14	
1.012	SW15	
6.000	CF10	
7.000	SW16	
6.001	SW17	
6.002	CF11	
8.000	SW18	
8.001	SW19	
8.002	SW20	
6.003	CF12	
6.004	SW21	
1.013	SW22	
1.014	SW23	
1.015	SW24	
1.016	SW25	
9.000	SW26	
9.001	SW27	
10.000	CF17	
9.002	SW28	
11.000	CF14	
12.000	SW29	
13.000	SW30	
12.001	SW31	
11.001	SW32	
11.002	CF15	
9.003	CF16	
9.004	SW33	
9.005	SW34	
9.006	SW35	
14.000	SW36	
14.001	SW37	
14.002	SW38	
15.000	SW39	
14.003	SW40	
1.017	SW41	
1.018	SW42	

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Appendix G Homestal MicroDrainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
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

Network Design Table for Storm

- Indicates pipe length does not match coordinates

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	33.393	0.334	100.0	0.020	4.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	26.487	0.265	100.0	0.030	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.000	19.856	1.474	13.5	0.069	4.00	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)
1.000	50.00	4.43	27.025	0.020	0.0	0.0	0.0	1.31	52.0	3.0
1.001	50.00	4.76	26.691	0.050	0.0	0.0	0.0	1.31	52.0	7.6
2.000	50.00	4.09	27.900	0.069	0.0	0.0	0.0	3.58	142.5	10.5

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Network Design Table for Storm

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
1.002	12.562	0.053	238.0	0.080	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.003	22.102	0.093	238.0	0.069	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.004	21.710	0.091	238.0	0.068	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.005	10.061	0.130	77.4	0.038	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.000	31.151	2.366	13.2	0.034	4.00	0.0	0.600		o	150	Pipe/Conduit	
1.006	31.931	0.134	238.3	0.053	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.007	18.101	0.100	181.0	0.062	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.008	32.223	0.512	62.9	0.066	0.00	0.0	0.600		o	450	Pipe/Conduit	
4.000	18.608	0.626	29.7	0.019	4.00	0.0	0.600		o	150	Pipe/Conduit	
4.001	39.795	0.418	95.2	0.016	0.00	0.0	0.600		o	150	Pipe/Conduit	
4.002	23.120	1.418	16.3	0.052	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.009	54.210	0.338	160.4	0.154	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.010	24.816	0.155	160.0	0.125	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.011	49.556	1.570	31.6	0.084	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.012	14.491	0.400	36.2	0.045	0.00	0.0	0.600		o	450	Pipe/Conduit	
5.000	33.355	0.457	73.0	0.029	4.00	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)
1.002	50.00	4.97	26.351	0.199	0.0	0.0	0.0	1.01	71.7	30.2
1.003	50.00	5.33	26.298	0.268	0.0	0.0	0.0	1.01	71.7	40.6
1.004	49.59	5.69	26.205	0.336	0.0	0.0	0.0	1.01	71.7	50.5
1.005	49.11	5.78	26.114	0.374	0.0	0.0	0.0	1.79	126.5	55.7
3.000	50.00	4.19	28.500	0.034	0.0	0.0	0.0	2.79	49.3	5.2
1.006	46.63	6.31	25.984	0.461	0.0	0.0	0.0	1.01	71.7	65.2
1.007	45.77	6.51	25.700	0.523	0.0	0.0	0.0	1.51	239.8	72.6
1.008	44.91	6.72	25.600	0.589	0.0	0.0	0.0	2.57	408.1	80.2
4.000	50.00	4.17	27.850	0.019	0.0	0.0	0.0	1.85	32.8	2.9
4.001	50.00	4.81	27.224	0.035	0.0	0.0	0.0	1.03	18.2	5.3
4.002	50.00	4.96	26.806	0.087	0.0	0.0	0.0	2.51	44.3	13.2
1.009	42.80	7.28	25.088	0.830	0.0	0.0	0.0	1.60	254.9	107.8
1.010	41.92	7.54	24.750	0.955	0.0	0.0	0.0	1.60	255.2	121.4
1.011	41.19	7.77	24.595	1.039	0.0	0.0	0.0	3.63	577.2	129.8
1.012	40.96	7.84	23.025	1.084	0.0	0.0	0.0	3.39	538.6	134.7
5.000	50.00	4.36	24.855	0.029	0.0	0.0	0.0	1.53	60.9	4.4

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Network Design Table for Storm

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
5.001	35.422	0.492	72.0	0.046	0.00	0.0	0.600		o	225	Pipe/Conduit	
6.000	27.113	0.940	28.8	0.079	4.00	0.0	0.600		o	225	Pipe/Conduit	
6.001	15.747	0.286	55.1	0.067	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.002	22.785	0.414	55.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.003	62.881	0.249	252.5	0.104	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.004	15.300	0.280	54.6	0.077	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.002	20.763	0.137	151.6	0.051	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.003	47.913	0.320	149.7	0.085	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.004	18.197	0.124	146.8	0.034	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.005	27.235	0.185	147.0	0.027	0.00	0.0	0.600		o	300	Pipe/Conduit	
7.000	45.653	1.685	27.1	0.037	4.00	0.0	0.600		o	225	Pipe/Conduit	
5.006	49.555	0.140	354.0	0.058	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.013	28.046	0.280	100.2	0.083	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.014	30.256	0.570	53.1	0.024	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.015	32.775	0.180	182.1	0.000	0.00	0.0		0.050		-1	Pipe/Conduit	
8.000	57.575	0.694	83.0	0.072	4.00	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)
5.001	50.00	4.75	24.398	0.075	0.0	0.0	0.0	1.54	61.4	11.4
6.000	50.00	4.18	26.075	0.079	0.0	0.0	0.0	2.45	97.2	12.0
6.001	50.00	4.31	25.060	0.146	0.0	0.0	0.0	2.12	150.1	22.1
6.002	50.00	4.49	24.774	0.146	0.0	0.0	0.0	2.12	150.1	22.1
6.003	50.00	5.55	24.360	0.250	0.0	0.0	0.0	0.98	69.6	37.9
6.004	49.68	5.67	24.111	0.327	0.0	0.0	0.0	2.13	150.7	49.3
5.002	48.31	5.94	23.831	0.453	0.0	0.0	0.0	1.27	90.1	66.4
5.003	45.53	6.57	23.694	0.538	0.0	0.0	0.0	1.28	90.7	74.3
5.004	44.59	6.80	23.374	0.572	0.0	0.0	0.0	1.30	91.6	77.4
5.005	43.27	7.15	23.250	0.599	0.0	0.0	0.0	1.29	91.5	78.6
7.000	50.00	4.30	24.825	0.037	0.0	0.0	0.0	2.52	100.3	5.6
5.006	40.71	7.92	22.915	0.694	0.0	0.0	0.0	1.07	170.9	85.7
1.013	40.09	8.13	22.550	1.861	0.0	0.0	0.0	2.24	484.5	226.3
1.014	39.61	8.29	22.270	1.885	0.0	0.0	0.0	3.08	666.6	226.5
1.015	37.56	9.07	21.700	1.885	0.0	0.0	0.0	0.71	973.0	226.5
8.000	50.00	4.67	22.850	0.072	0.0	0.0	0.0	1.44	57.1	10.9

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Network Design Table for Storm

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
8.001	6.752	0.636	10.6	0.052	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.016	7.853	0.020	392.7	0.000	0.00	0.0		0.050		-1	Pipe/Conduit	
1.017	11.238#	0.100	112.4	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	
9.000	13.307	0.133	100.1	0.053	4.00	0.0	0.600		o	225	Pipe/Conduit	
9.001	52.049	0.522	99.7	0.061	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.000	19.028	1.200	15.9	0.049	4.00	0.0	0.600		o	150	Pipe/Conduit	
10.001	13.003	0.130	100.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
10.002	38.209	0.562	68.0	0.106	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.003	38.209	0.562	68.0	0.155	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.004	31.319	0.459	68.2	0.045	0.00	0.0	0.600		o	450	Pipe/Conduit	
11.000	18.366	0.179	102.6	0.070	4.00	0.0	0.600		o	225	Pipe/Conduit	
11.001	49.906	0.299	166.9	0.042	0.00	0.0	0.600		o	225	Pipe/Conduit	
11.002	30.989	0.185	167.5	0.072	0.00	0.0	0.600		o	225	Pipe/Conduit	
10.005	44.150	0.742	59.5	0.075	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.002	45.019	0.117	384.8	0.050	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.003	48.950	0.127	385.4	0.045	0.00	0.0	0.600		o	450	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)
8.001	50.00	4.70	22.156	0.124	0.0	0.0	0.0	4.04	160.6	18.8
1.016	36.90	9.34	21.520	2.009	0.0	0.0	0.0	0.48	662.6	226.5
1.017	36.69	9.43	21.500	2.009	0.0	0.0	0.0	2.11	457.3	226.5
9.000	50.00	4.17	22.875	0.053	0.0	0.0	0.0	1.31	52.0	8.0
9.001	50.00	4.72	22.667	0.114	0.0	0.0	0.0	1.57	111.3	17.3
10.000	50.00	4.12	25.950	0.049	0.0	0.0	0.0	2.54	44.9	7.4
10.001	50.00	4.29	24.675	0.049	0.0	0.0	0.0	1.31	52.0	7.4
10.002	50.00	4.62	24.470	0.155	0.0	0.0	0.0	1.91	135.0	23.5
10.003	50.00	4.96	23.908	0.310	0.0	0.0	0.0	1.91	135.0	47.0
10.004	50.00	5.17	23.196	0.355	0.0	0.0	0.0	2.46	391.9	53.8
11.000	50.00	4.24	23.625	0.070	0.0	0.0	0.0	1.29	51.3	10.6
11.001	50.00	5.06	23.446	0.112	0.0	0.0	0.0	1.01	40.1	17.0
11.002	50.00	5.57	23.147	0.184	0.0	0.0	0.0	1.01	40.1	27.9
10.005	48.75	5.85	22.737	0.614	0.0	0.0	0.0	2.64	419.8	90.8
9.002	45.46	6.58	21.995	0.778	0.0	0.0	0.0	1.03	163.9	107.3
9.003	42.48	7.37	21.878	0.823	0.0	0.0	0.0	1.03	163.7	107.3

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Network Design Table for Storm

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
12.000	20.040	0.614	32.6	0.058	4.00	0.0	0.600		o	150	Pipe/Conduit	
9.004	59.996	0.226	265.5	0.043	0.00	0.0	0.600		o	525	Pipe/Conduit	
13.000	53.189	0.532	100.0	0.058	4.00	0.0	0.600		o	225	Pipe/Conduit	
13.001	10.249	0.543	18.9	0.029	0.00	0.0	0.600		o	225	Pipe/Conduit	
14.000	18.485	0.185	99.9	0.064	4.00	0.0	0.600		o	150	Pipe/Conduit	
14.001	42.209	0.335	126.0	0.096	0.00	0.0	0.600		o	225	Pipe/Conduit	
15.000	25.332	1.190	21.3	0.056	4.00	0.0	0.600		o	150	Pipe/Conduit	
14.002	47.255	0.285	165.8	0.055	0.00	0.0	0.600		o	300	Pipe/Conduit	
16.000	26.853	1.275	21.1	0.032	4.00	0.0	0.600		o	300	Pipe/Conduit	
14.003	9.942	0.042	236.7	0.043	0.00	0.0	0.600		o	300	Pipe/Conduit	
14.004	11.157	0.047	237.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
14.005	16.753	0.161	104.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
9.005	15.753#	0.050	315.1	0.000	0.00	0.0	0.600		o	525	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)
12.000	50.00	4.19	22.665	0.058	0.0	0.0	0.0	1.77	31.2	8.8
9.004	40.16	8.10	21.676	0.924	0.0	0.0	0.0	1.37	296.6	112.5
13.000	50.00	4.68	22.825	0.058	0.0	0.0	0.0	1.31	52.0	8.8
13.001	50.00	4.73	22.293	0.087	0.0	0.0	0.0	3.03	120.3	13.2
14.000	50.00	4.31	22.880	0.064	0.0	0.0	0.0	1.01	17.8	9.7
14.001	50.00	4.91	22.620	0.160	0.0	0.0	0.0	1.16	46.3	24.3
15.000	50.00	4.19	23.550	0.056	0.0	0.0	0.0	2.19	38.7	8.5
14.002	50.00	5.56	22.210	0.271	0.0	0.0	0.0	1.22	86.1	41.1
16.000	50.00	4.13	23.200	0.032	0.0	0.0	0.0	3.44	243.2	4.9
14.003	49.42	5.72	21.925	0.346	0.0	0.0	0.0	1.02	71.9	51.9
14.004	48.51	5.90	21.883	0.346	0.0	0.0	0.0	1.02	71.8	51.9
14.005	47.64	6.08	21.836	0.346	0.0	0.0	0.0	1.54	108.9	51.9
9.005	39.55	8.31	21.450	1.357	0.0	0.0	0.0	1.26	272.0	162.8

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Network Design Table for Storm

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
1.018	11.448	1.770	6.5	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)
1.018	36.62	9.46	21.250	3.366	0.0	0.0	0.0	6.22	439.7	373.9

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW01	28.150	1.125	Open Manhole	1200	1.000	27.025	225				
SW02	28.140	1.449	Open Manhole	1200	1.001	26.691	225	1.000	26.691	225	
SW03	29.250	1.350	Open Manhole	1200	2.000	27.900	225				
SW04	28.800	2.449	Open Manhole	1200	1.002	26.351	300	1.001	26.426	225	
								2.000	26.426	225	
SW05	28.280	1.982	Open Manhole	1200	1.003	26.298	300	1.002	26.298	300	
SW06	28.400	2.195	Open Manhole	1200	1.004	26.205	300	1.003	26.205	300	
SW07	27.800	1.686	Open Manhole	1200	1.005	26.114	300	1.004	26.114	300	
SW08	29.550	1.050	Open Manhole	1200	3.000	28.500	150				
SW09	27.800	1.816	Open Manhole	1200	1.006	25.984	300	1.005	25.984	300	
								3.000	26.134	150	
SW10	27.714	2.014	Open Manhole	1350	1.007	25.700	450	1.006	25.850	300	
SW11	27.250	1.650	Open Manhole	1350	1.008	25.600	450	1.007	25.600	450	
SW12	28.900	1.050	Open Manhole	1200	4.000	27.850	150				
SW13	28.274	1.050	Open Manhole	1200	4.001	27.224	150	4.000	27.224	150	
SW14	27.856	1.050	Open Manhole	1200	4.002	26.806	150	4.001	26.806	150	
SW15	27.255	2.167	Open Manhole	1350	1.009	25.088	450	1.008	25.088	450	
								4.002	25.388	150	
SW16	27.325	2.575	Open Manhole	1350	1.010	24.750	450	1.009	24.750	450	
SW17	26.700	2.105	Open Manhole	1350	1.011	24.595	450	1.010	24.595	450	
SW18	24.735	1.710	Open Manhole	1350	1.012	23.025	450	1.011	23.025	450	
SW19	25.980	1.125	Open Manhole	1200	5.000	24.855	225				
SW20	25.741	1.343	Open Manhole	1200	5.001	24.398	225	5.000	24.398	225	
SW21	27.500	1.425	Open Manhole	1200	6.000	26.075	225				
SW22	26.560	1.500	Open Manhole	1200	6.001	25.060	300	6.000	25.135	225	
SW23	26.001	1.227	Open Manhole	1200	6.002	24.774	300	6.001	24.774	300	
SW24	26.238	1.878	Open Manhole	1200	6.003	24.360	300	6.002	24.360	300	
SW25	26.025	1.914	Open Manhole	1200	6.004	24.111	300	6.003	24.111	300	
SW26	25.615	1.784	Open Manhole	1200	5.002	23.831	300	5.001	23.906	225	
								6.004	23.831	300	
SW27	25.700	2.006	Open Manhole	1200	5.003	23.694	300	5.002	23.694	300	
SW28	25.200	1.826	Open Manhole	1200	5.004	23.374	300	5.003	23.374	300	
SW29	25.075	1.825	Open Manhole	1200	5.005	23.250	300	5.004	23.250	300	
SW30	25.950	1.125	Open Manhole	1200	7.000	24.825	225				
SW31	25.112	2.197	Open Manhole	1350	5.006	22.915	450	5.005	23.065	300	
								7.000	23.140	225	
SW32	24.422	1.872	Open Manhole	1500	1.013	22.550	525	1.012	22.625	450	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								5.006	22.775	450	150
SW33	24.100	1.830	Open Manhole	1500	1.014	22.270	525	1.013	22.270	525	
SW34	23.192	1.492	Junction		1.015	21.700	-1	1.014	21.700	525	
SW35	23.896	1.046	Open Manhole	1200	8.000	22.850	225				
SW36	23.261	1.105	Open Manhole	1200	8.001	22.156	225	8.000	22.156	225	
SW37	23.200	1.680	Junction		1.016	21.520	-1	1.015	21.520	-1	
								8.001	21.520	225	
SW38	23.119	1.619	Junction		1.017	21.500	525	1.016	21.500	-1	
SW39	24.000	1.125	Open Manhole	1200	9.000	22.875	225				
SW40	24.150	1.483	Open Manhole	1200	9.001	22.667	300	9.000	22.742	225	
SW41	27.300	1.350	Open Manhole	1200	10.000	25.950	150				
SW42	26.100	1.425	Open Manhole	1200	10.001	24.675	225	10.000	24.750	150	
SW43	26.010	1.540	Open Manhole	1200	10.002	24.470	300	10.001	24.545	225	
SW44	26.238	2.330	Open Manhole	1200	10.003	23.908	300	10.002	23.908	300	
SW45	26.039	2.843	Open Manhole	1350	10.004	23.196	450	10.003	23.346	300	
SW46	24.750	1.125	Open Manhole	1200	11.000	23.625	225				
SW47	25.354	1.908	Open Manhole	1200	11.001	23.446	225	11.000	23.446	225	
SW48	25.253	2.106	Open Manhole	1200	11.002	23.147	225	11.001	23.147	225	
SW49	25.089	2.352	Open Manhole	1350	10.005	22.737	450	10.004	22.737	450	
								11.002	22.962	225	
SW50	23.796	1.801	Open Manhole	1350	9.002	21.995	450	9.001	22.145	300	
								10.005	21.995	450	
SW51	23.344	1.466	Open Manhole	1350	9.003	21.878	450	9.002	21.878	450	
SW52	23.715	1.050	Open Manhole	1200	12.000	22.665	150				
SW53	22.821	1.145	Open Manhole	1500	9.004	21.676	525	9.003	21.751	450	
								12.000	22.051	150	
SW54	23.950	1.125	Open Manhole	1200	13.000	22.825	225				
SW55	23.497	1.204	Open Manhole	1200	13.001	22.293	225	13.000	22.293	225	
SW56	24.230	1.350	Open Manhole	1200	14.000	22.880	150				
SW57	24.125	1.505	Open Manhole	1200	14.001	22.620	225	14.000	22.695	150	
SW58	24.900	1.350	Open Manhole	1200	15.000	23.550	150				
SW59	23.872	1.662	Open Manhole	1200	14.002	22.210	300	14.001	22.285	225	
								15.000	22.360	150	
SW60	24.700	1.500	Open Manhole	1200	16.000	23.200	300				
SW61	23.685	1.760	Open Manhole	1200	14.003	21.925	300	14.002	21.925	300	
								16.000	21.925	300	
SW62	23.452	1.569	Open Manhole	1200	14.004	21.883	300	14.003	21.883	300	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW63	23.326	1.490	Open Manhole	1200	14.005	21.836	300	14.004	21.836	300	
SW64	23.044	1.594	Open Manhole	1500	9.005	21.450	525	9.004	21.450	525	
								13.001	21.750	225	
								14.005	21.675	300	
SW65	22.500	1.250	Open Manhole	1500	1.018	21.250	300	1.017	21.400	525	375
								9.005	21.400	525	375
	21.230	1.750	Open Manhole	0		OUTFALL		1.018	19.480	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW01	448797.461	117345.007	448797.461	117345.007	Required	
SW02	448764.974	117352.734	448764.974	117352.734	Required	
SW03	448790.480	117373.836	448790.480	117373.836	Required	
SW04	448771.176	117378.485	448771.176	117378.485	Required	
SW05	448758.963	117381.426	448758.963	117381.426	Required	
SW06	448764.138	117402.913	448764.138	117402.913	Required	
SW07	448769.220	117424.020	448769.220	117424.020	Required	
SW08	448805.000	117425.155	448805.000	117425.155	Required	
SW09	448774.715	117432.448	448774.715	117432.448	Required	
SW10	448781.958	117463.547	448781.958	117463.547	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW11	448778.362	117481.286	448778.362	117481.286	Required	
SW12	448807.052	117449.155	448807.052	117449.155	Required	
SW13	448804.539	117467.592	448804.539	117467.592	Required	
SW14	448808.384	117507.201	448808.384	117507.201	Required	
SW15	448785.906	117512.614	448785.906	117512.614	Required	
SW16	448798.598	117565.317	448798.598	117565.317	Required	
SW17	448816.502	117582.500	448816.502	117582.500	Required	
SW18	448828.122	117630.675	448828.122	117630.675	Required	
SW19	448716.991	117469.733	448716.991	117469.733	Required	
SW20	448724.771	117502.168	448724.771	117502.168	Required	
SW21	448762.963	117432.090	448762.963	117432.090	Required	
SW22	448736.588	117438.371	448736.588	117438.371	Required	
SW23	448721.828	117443.857	448721.828	117443.857	Required	
SW24	448729.712	117465.234	448729.712	117465.234	Required	
SW25	448744.434	117526.368	448744.434	117526.368	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW26	448733.064	117536.606	448733.064	117536.606	Required	
SW27	448739.942	117556.197	448739.942	117556.197	Required	
SW28	448751.474	117602.701	448751.474	117602.701	Required	
SW29	448752.008	117620.891	448752.008	117620.891	Required	
SW30	448767.224	117584.988	448767.224	117584.988	Required	
SW31	448777.887	117629.378	448777.887	117629.378	Required	
SW32	448824.974	117644.820	448824.974	117644.820	Required	
SW33	448851.624	117653.560	448851.624	117653.560	Required	
SW34	448853.983	117683.724			No Entry	
SW35	448769.146	117655.010	448769.146	117655.010	Required	
SW36	448823.605	117673.692	448823.605	117673.692	Required	
SW37	448821.411	117680.079			No Entry	
SW38	448813.565	117679.752			No Entry	
SW39	448630.580	117416.279	448630.580	117416.279	Required	
SW40	448633.714	117429.212	448633.714	117429.212	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW41	448729.418	117370.747	448729.418	117370.747	Required	
SW42	448711.026	117375.624	448711.026	117375.624	Required	
SW43	448704.608	117386.933	448704.608	117386.933	Required	
SW44	448713.563	117424.078	448713.563	117424.078	Required	
SW45	448722.518	117461.223	448722.518	117461.223	Required	
SW46	448654.739	117394.614	448654.739	117394.614	Required	
SW47	448672.533	117390.068	448672.533	117390.068	Required	
SW48	448684.886	117438.421	448684.886	117438.421	Required	
SW49	448692.072	117468.566	448692.072	117468.566	Required	
SW50	448649.153	117478.918	448649.153	117478.918	Required	
SW51	448659.038	117522.838	448659.038	117522.838	Required	
SW52	448686.440	117563.286	448686.440	117563.286	Required	
SW53	448667.933	117570.973	448667.933	117570.973	Required	
SW54	448740.800	117645.495	448740.800	117645.495	Required	
SW55	448690.259	117628.922	448690.259	117628.922	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW56	448676.094	117502.534	448676.094	117502.534	Required	
SW57	448684.913	117518.780	448684.913	117518.780	Required	
SW58	448718.191	117550.099	448718.191	117550.099	Required	
SW59	448694.797	117559.816	448694.797	117559.816	Required	
SW60	448731.401	117614.056	448731.401	117614.056	Required	
SW61	448705.862	117605.757	448705.862	117605.757	Required	
SW62	448696.196	117608.085	448696.196	117608.085	Required	
SW63	448692.600	117618.646	448692.600	117618.646	Required	
SW64	448680.042	117629.735	448680.042	117629.735	Required	
SW65	448661.163	117668.900	448661.163	117668.900	Required	
	448650.593	117673.297			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

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	225	SW01	28.150	27.025	0.900	Open Manhole	1200
1.001	o	225	SW02	28.140	26.691	1.224	Open Manhole	1200
2.000	o	225	SW03	29.250	27.900	1.125	Open Manhole	1200
1.002	o	300	SW04	28.800	26.351	2.149	Open Manhole	1200
1.003	o	300	SW05	28.280	26.298	1.682	Open Manhole	1200
1.004	o	300	SW06	28.400	26.205	1.895	Open Manhole	1200
1.005	o	300	SW07	27.800	26.114	1.386	Open Manhole	1200
3.000	o	150	SW08	29.550	28.500	0.900	Open Manhole	1200
1.006	o	300	SW09	27.800	25.984	1.516	Open Manhole	1200
1.007	o	450	SW10	27.714	25.700	1.564	Open Manhole	1350
1.008	o	450	SW11	27.250	25.600	1.200	Open Manhole	1350
4.000	o	150	SW12	28.900	27.850	0.900	Open Manhole	1200
4.001	o	150	SW13	28.274	27.224	0.900	Open Manhole	1200
4.002	o	150	SW14	27.856	26.806	0.900	Open Manhole	1200

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	33.393	100.0	SW02	28.140	26.691	1.224	Open Manhole	1200
1.001	26.487	100.0	SW04	28.800	26.426	2.149	Open Manhole	1200
2.000	19.856	13.5	SW04	28.800	26.426	2.149	Open Manhole	1200
1.002	12.562	238.0	SW05	28.280	26.298	1.682	Open Manhole	1200
1.003	22.102	238.0	SW06	28.400	26.205	1.895	Open Manhole	1200
1.004	21.710	238.0	SW07	27.800	26.114	1.386	Open Manhole	1200
1.005	10.061	77.4	SW09	27.800	25.984	1.516	Open Manhole	1200
3.000	31.151	13.2	SW09	27.800	26.134	1.516	Open Manhole	1200
1.006	31.931	238.3	SW10	27.714	25.850	1.564	Open Manhole	1350
1.007	18.101	181.0	SW11	27.250	25.600	1.200	Open Manhole	1350
1.008	32.223	62.9	SW15	27.255	25.088	1.717	Open Manhole	1350
4.000	18.608	29.7	SW13	28.274	27.224	0.900	Open Manhole	1200
4.001	39.795	95.2	SW14	27.856	26.806	0.900	Open Manhole	1200
4.002	23.120	16.3	SW15	27.255	25.388	1.717	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

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)
1.009	o	450	SW15	27.255	25.088	1.717	Open Manhole	1350
1.010	o	450	SW16	27.325	24.750	2.125	Open Manhole	1350
1.011	o	450	SW17	26.700	24.595	1.655	Open Manhole	1350
1.012	o	450	SW18	24.735	23.025	1.260	Open Manhole	1350
5.000	o	225	SW19	25.980	24.855	0.900	Open Manhole	1200
5.001	o	225	SW20	25.741	24.398	1.118	Open Manhole	1200
6.000	o	225	SW21	27.500	26.075	1.200	Open Manhole	1200
6.001	o	300	SW22	26.560	25.060	1.200	Open Manhole	1200
6.002	o	300	SW23	26.001	24.774	0.927	Open Manhole	1200
6.003	o	300	SW24	26.238	24.360	1.578	Open Manhole	1200
6.004	o	300	SW25	26.025	24.111	1.614	Open Manhole	1200
5.002	o	300	SW26	25.615	23.831	1.484	Open Manhole	1200
5.003	o	300	SW27	25.700	23.694	1.706	Open Manhole	1200
5.004	o	300	SW28	25.200	23.374	1.526	Open Manhole	1200
5.005	o	300	SW29	25.075	23.250	1.525	Open Manhole	1200

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)
1.009	54.210	160.4	SW16	27.325	24.750	2.125	Open Manhole	1350
1.010	24.816	160.0	SW17	26.700	24.595	1.655	Open Manhole	1350
1.011	49.556	31.6	SW18	24.735	23.025	1.260	Open Manhole	1350
1.012	14.491	36.2	SW32	24.422	22.625	1.347	Open Manhole	1500
5.000	33.355	73.0	SW20	25.741	24.398	1.118	Open Manhole	1200
5.001	35.422	72.0	SW26	25.615	23.906	1.484	Open Manhole	1200
6.000	27.113	28.8	SW22	26.560	25.135	1.200	Open Manhole	1200
6.001	15.747	55.1	SW23	26.001	24.774	0.927	Open Manhole	1200
6.002	22.785	55.0	SW24	26.238	24.360	1.578	Open Manhole	1200
6.003	62.881	252.5	SW25	26.025	24.111	1.614	Open Manhole	1200
6.004	15.300	54.6	SW26	25.615	23.831	1.484	Open Manhole	1200
5.002	20.763	151.6	SW27	25.700	23.694	1.706	Open Manhole	1200
5.003	47.913	149.7	SW28	25.200	23.374	1.526	Open Manhole	1200
5.004	18.197	146.8	SW29	25.075	23.250	1.525	Open Manhole	1200
5.005	27.235	147.0	SW31	25.112	23.065	1.747	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

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	225	SW30	25.950	24.825	0.900	Open Manhole	1200
5.006	o	450	SW31	25.112	22.915	1.747	Open Manhole	1350
1.013	o	525	SW32	24.422	22.550	1.347	Open Manhole	1500
1.014	o	525	SW33	24.100	22.270	1.305	Open Manhole	1500
1.015		-1	SW34	23.192	21.700	0.892	Junction	
8.000	o	225	SW35	23.896	22.850	0.821	Open Manhole	1200
8.001	o	225	SW36	23.261	22.156	0.880	Open Manhole	1200
1.016		-1	SW37	23.200	21.520	1.080	Junction	
1.017	o	525	SW38	23.119	21.500	1.094	Junction	
9.000	o	225	SW39	24.000	22.875	0.900	Open Manhole	1200
9.001	o	300	SW40	24.150	22.667	1.183	Open Manhole	1200
10.000	o	150	SW41	27.300	25.950	1.200	Open Manhole	1200
10.001	o	225	SW42	26.100	24.675	1.200	Open Manhole	1200
10.002	o	300	SW43	26.010	24.470	1.240	Open Manhole	1200

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	45.653	27.1	SW31	25.112	23.140	1.747	Open Manhole	1350
5.006	49.555	354.0	SW32	24.422	22.775	1.197	Open Manhole	1500
1.013	28.046	100.2	SW33	24.100	22.270	1.305	Open Manhole	1500
1.014	30.256	53.1	SW34	23.192	21.700	0.967	Junction	
1.015	32.775	182.1	SW37	23.200	21.520	1.080	Junction	
8.000	57.575	83.0	SW36	23.261	22.156	0.880	Open Manhole	1200
8.001	6.752	10.6	SW37	23.200	21.520	1.455	Junction	
1.016	7.853	392.7	SW38	23.119	21.500	1.019	Junction	
1.017	11.238#	112.4	SW65	22.500	21.400	0.575	Open Manhole	1500
9.000	13.307	100.1	SW40	24.150	22.742	1.183	Open Manhole	1200
9.001	52.049	99.7	SW50	23.796	22.145	1.351	Open Manhole	1350
10.000	19.028	15.9	SW42	26.100	24.750	1.200	Open Manhole	1200
10.001	13.003	100.0	SW43	26.010	24.545	1.240	Open Manhole	1200
10.002	38.209	68.0	SW44	26.238	23.908	2.030	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

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)
10.003	o	300	SW44	26.238	23.908	2.030	Open Manhole	1200
10.004	o	450	SW45	26.039	23.196	2.393	Open Manhole	1350
11.000	o	225	SW46	24.750	23.625	0.900	Open Manhole	1200
11.001	o	225	SW47	25.354	23.446	1.683	Open Manhole	1200
11.002	o	225	SW48	25.253	23.147	1.881	Open Manhole	1200
10.005	o	450	SW49	25.089	22.737	1.902	Open Manhole	1350
9.002	o	450	SW50	23.796	21.995	1.351	Open Manhole	1350
9.003	o	450	SW51	23.344	21.878	1.016	Open Manhole	1350
12.000	o	150	SW52	23.715	22.665	0.900	Open Manhole	1200
9.004	o	525	SW53	22.821	21.676	0.620	Open Manhole	1500
13.000	o	225	SW54	23.950	22.825	0.900	Open Manhole	1200
13.001	o	225	SW55	23.497	22.293	0.979	Open Manhole	1200
14.000	o	150	SW56	24.230	22.880	1.200	Open Manhole	1200

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)
10.003	38.209	68.0	SW45	26.039	23.346	2.393	Open Manhole	1350
10.004	31.319	68.2	SW49	25.089	22.737	1.902	Open Manhole	1350
11.000	18.366	102.6	SW47	25.354	23.446	1.683	Open Manhole	1200
11.001	49.906	166.9	SW48	25.253	23.147	1.881	Open Manhole	1200
11.002	30.989	167.5	SW49	25.089	22.962	1.902	Open Manhole	1350
10.005	44.150	59.5	SW50	23.796	21.995	1.351	Open Manhole	1350
9.002	45.019	384.8	SW51	23.344	21.878	1.016	Open Manhole	1350
9.003	48.950	385.4	SW53	22.821	21.751	0.620	Open Manhole	1500
12.000	20.040	32.6	SW53	22.821	22.051	0.620	Open Manhole	1500
9.004	59.996	265.5	SW64	23.044	21.450	1.069	Open Manhole	1500
13.000	53.189	100.0	SW55	23.497	22.293	0.979	Open Manhole	1200
13.001	10.249	18.9	SW64	23.044	21.750	1.069	Open Manhole	1500
14.000	18.485	99.9	SW57	24.125	22.695	1.280	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

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)
14.001	o	225	SW57	24.125	22.620	1.280	Open Manhole	1200
15.000	o	150	SW58	24.900	23.550	1.200	Open Manhole	1200
14.002	o	300	SW59	23.872	22.210	1.362	Open Manhole	1200
16.000	o	300	SW60	24.700	23.200	1.200	Open Manhole	1200
14.003	o	300	SW61	23.685	21.925	1.460	Open Manhole	1200
14.004	o	300	SW62	23.452	21.883	1.269	Open Manhole	1200
14.005	o	300	SW63	23.326	21.836	1.190	Open Manhole	1200
9.005	o	525	SW64	23.044	21.450	1.069	Open Manhole	1500
1.018	o	300	SW65	22.500	21.250	0.950	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)
14.001	42.209	126.0	SW59	23.872	22.285	1.362	Open Manhole	1200
15.000	25.332	21.3	SW59	23.872	22.360	1.362	Open Manhole	1200
14.002	47.255	165.8	SW61	23.685	21.925	1.460	Open Manhole	1200
16.000	26.853	21.1	SW61	23.685	21.925	1.460	Open Manhole	1200
14.003	9.942	236.7	SW62	23.452	21.883	1.269	Open Manhole	1200
14.004	11.157	237.4	SW63	23.326	21.836	1.190	Open Manhole	1200
14.005	16.753	104.1	SW64	23.044	21.675	1.069	Open Manhole	1500
9.005	15.753#	315.1	SW65	22.500	21.400	0.575	Open Manhole	1500
1.018	11.448	6.5		21.230	19.480	1.450	Open Manhole	0

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Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW65, DS/PN: 1.018, Volume (m³): 7.6

Unit Reference	MD-SHE-0225-2730-1200-2730
Design Head (m)	1.200
Design Flow (l/s)	27.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	225
Invert Level (m)	21.250
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	27.3
Flush-Flo™	0.399	27.3
Kick-Flo®	0.854	23.2
Mean Flow over Head Range	-	23.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.5	1.200	27.3	3.000	42.4	7.000	63.9
0.200	22.4	1.400	29.4	3.500	45.7	7.500	66.1
0.300	26.9	1.600	31.3	4.000	48.7	8.000	68.2
0.400	27.3	1.800	33.1	4.500	51.6	8.500	70.2
0.500	27.1	2.000	34.9	5.000	54.3	9.000	72.2
0.600	26.6	2.200	36.5	5.500	56.8	9.500	74.1
0.800	24.6	2.400	38.1	6.000	59.3		
1.000	25.0	2.600	39.6	6.500	61.6		

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Storage Structures for Storm

Cellular Storage Manhole: SW06, DS/PN: 1.004

Invert Level (m) 26.205 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	207.0	0.0	0.501	0.0	0.0
0.500	207.0	0.0			

Cellular Storage Manhole: SW10, DS/PN: 1.007

Invert Level (m) 25.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	0.0	0.501	0.0	0.0
0.500	150.0	0.0			

Cellular Storage Manhole: SW25, DS/PN: 6.004

Invert Level (m) 24.115 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	0.501	0.0	0.0
0.500	100.0	0.0			

Cellular Storage Manhole: SW26, DS/PN: 5.002

Invert Level (m) 23.835 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	0.501	0.0	0.0
0.500	100.0	0.0			

Cellular Storage Manhole: SW48, DS/PN: 11.002

Invert Level (m) 23.148 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: SW48, DS/PN: 11.002

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	132.0	0.0	0.501	0.0	0.0
0.500	132.0	0.0			

Cellular Storage Manhole: SW57, DS/PN: 14.001

Invert Level (m) 22.620 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	180.0	0.0	0.501	0.0	0.0
0.500	180.0	0.0			

Cellular Storage Manhole: SW62, DS/PN: 14.004

Invert Level (m) 21.883 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	102.0	0.0	0.501	0.0	0.0
0.500	102.0	0.0			

Tank or Pond Manhole: SW65, DS/PN: 1.018

Invert Level (m) 21.250

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	2012.0	0.600	2602.0	0.900	3213.0	1.500	3526.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Winter	1	+0%	100/15 Summer				27.055
1.001	SW02	15 Winter	1	+0%	100/15 Summer				26.738
2.000	SW03	15 Winter	1	+0%					27.934
1.002	SW04	15 Winter	1	+0%	30/15 Summer				26.468
1.003	SW05	15 Winter	1	+0%	30/15 Summer				26.427
1.004	SW06	60 Winter	1	+0%	100/15 Summer				26.283
1.005	SW07	60 Winter	1	+0%	100/15 Summer				26.183
3.000	SW08	15 Summer	1	+0%					28.527
1.006	SW09	60 Winter	1	+0%	100/15 Summer				26.077
1.007	SW10	15 Winter	1	+0%					25.793

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.195	0.000	0.04			2.1	OK	
1.001	SW02	-0.178	0.000	0.09			4.5	OK	
2.000	SW03	-0.191	0.000	0.06			7.3	OK	
1.002	SW04	-0.183	0.000	0.31			18.2	OK	
1.003	SW05	-0.172	0.000	0.38			24.1	OK	
1.004	SW06	-0.222	0.000	0.15		39	9.6	OK	
1.005	SW07	-0.232	0.000	0.12			10.7	OK	
3.000	SW08	-0.123	0.000	0.08			3.6	OK	
1.006	SW09	-0.207	0.000	0.21			13.7	OK	
1.007	SW10	-0.357	0.000	0.10		17	17.1	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	SW11	15 Winter	1	+0%					25.674
4.000	SW12	15 Summer	1	+0%					27.875
4.001	SW13	15 Winter	1	+0%	100/15 Summer				27.268
4.002	SW14	15 Winter	1	+0%	100/15 Summer				26.849
1.009	SW15	15 Winter	1	+0%	100/15 Summer				25.217
1.010	SW16	15 Winter	1	+0%	100/15 Summer				24.900
1.011	SW17	15 Winter	1	+0%					24.694
1.012	SW18	15 Winter	1	+0%	100/15 Summer				23.150
5.000	SW19	15 Winter	1	+0%					24.888
5.001	SW20	15 Winter	1	+0%					24.450
6.000	SW21	15 Winter	1	+0%	100/15 Winter				26.121
6.001	SW22	15 Winter	1	+0%	100/15 Summer				25.126
6.002	SW23	15 Winter	1	+0%	100/15 Summer				24.839
6.003	SW24	15 Winter	1	+0%	30/15 Summer				24.481
6.004	SW25	30 Winter	1	+0%	100/15 Summer				24.188
5.002	SW26	30 Winter	1	+0%	100/15 Summer				23.932
5.003	SW27	60 Winter	1	+0%	100/15 Summer				23.798
5.004	SW28	60 Winter	1	+0%	30/30 Winter				23.486
5.005	SW29	60 Winter	1	+0%	100/15 Summer				23.362
7.000	SW30	15 Winter	1	+0%					24.854
5.006	SW31	60 Winter	1	+0%	100/15 Summer				23.042
1.013	SW32	15 Winter	1	+0%	100/15 Summer				22.717
1.014	SW33	15 Winter	1	+0%	100/15 Summer				22.411
1.015	SW34	15 Winter	1	+0%	100/15 Summer				21.898
8.000	SW35	15 Winter	1	+0%					22.905
8.001	SW36	15 Winter	1	+0%	100/15 Summer				22.205
1.016	SW37	15 Winter	1	+0%	100/15 Summer				21.762
1.017	SW38	15 Winter	1	+0%	30/15 Summer				21.724
9.000	SW39	15 Summer	1	+0%	100/15 Summer				22.928
9.001	SW40	15 Winter	1	+0%	100/15 Summer				22.731
10.000	SW41	15 Winter	1	+0%					25.985
10.001	SW42	15 Summer	1	+0%	100/15 Summer				24.726
10.002	SW43	15 Winter	1	+0%	100/15 Summer				24.537
10.003	SW44	15 Winter	1	+0%	100/15 Summer				24.002
10.004	SW45	15 Winter	1	+0%	100/15 Summer				23.287
11.000	SW46	15 Summer	1	+0%	100/15 Summer				23.685
11.001	SW47	15 Winter	1	+0%	100/15 Summer				23.527
11.002	SW48	60 Winter	1	+0%	100/15 Summer				23.208
10.005	SW49	15 Winter	1	+0%	100/15 Summer				22.832
9.002	SW50	15 Winter	1	+0%	30/15 Summer				22.180
9.003	SW51	15 Winter	1	+0%	30/15 Summer				22.065
12.000	SW52	15 Summer	1	+0%	100/15 Summer				22.711
9.004	SW53	15 Winter	1	+0%	100/15 Summer				21.840
13.000	SW54	15 Winter	1	+0%					22.877
13.001	SW55	15 Winter	1	+0%					22.337
14.000	SW56	15 Winter	1	+0%	30/15 Summer				22.946
14.001	SW57	120 Winter	1	+0%					22.666

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	SW11	-0.376	0.000	0.06			22.4	OK	
4.000	SW12	-0.125	0.000	0.07			2.0	OK	
4.001	SW13	-0.106	0.000	0.19			3.3	OK	
4.002	SW14	-0.107	0.000	0.18			7.6	OK	
1.009	SW15	-0.321	0.000	0.18			41.8	OK	
1.010	SW16	-0.300	0.000	0.24			51.5	OK	
1.011	SW17	-0.350	0.000	0.11			57.8	OK	
1.012	SW18	-0.325	0.000	0.17			61.2	OK	
5.000	SW19	-0.192	0.000	0.05			3.0	OK	
5.001	SW20	-0.173	0.000	0.12			6.8	OK	
6.000	SW21	-0.179	0.000	0.09			8.3	OK	
6.001	SW22	-0.234	0.000	0.11			14.0	OK	
6.002	SW23	-0.235	0.000	0.10			13.9	OK	
6.003	SW24	-0.179	0.000	0.33			21.6	OK	
6.004	SW25	-0.223	0.000	0.15		15	19.0	OK	
5.002	SW26	-0.199	0.000	0.25		20	19.5	OK	
5.003	SW27	-0.196	0.000	0.26			22.4	OK	
5.004	SW28	-0.188	0.000	0.30			23.6	OK	
5.005	SW29	-0.188	0.000	0.30			24.5	OK	
7.000	SW30	-0.196	0.000	0.04			3.9	OK	
5.006	SW31	-0.322	0.000	0.18			27.7	OK	
1.013	SW32	-0.358	0.000	0.22			88.5	OK	
1.014	SW33	-0.384	0.000	0.16			89.9	OK	
1.015	SW34	-0.402	0.000	0.09			88.9	OK	
8.000	SW35	-0.170	0.000	0.13			7.3	OK	
8.001	SW36	-0.176	0.000	0.10			11.6	OK	
1.016	SW37	-0.358	0.000	0.16			94.3	OK	
1.017	SW38	-0.301	0.000	0.38			94.0	OK*	
9.000	SW39	-0.172	0.000	0.12			5.6	OK	
9.001	SW40	-0.236	0.000	0.10			10.5	OK	
10.000	SW41	-0.115	0.000	0.12			5.2	OK	
10.001	SW42	-0.174	0.000	0.12			5.2	OK	
10.002	SW43	-0.233	0.000	0.11			13.9	OK	
10.003	SW44	-0.206	0.000	0.22			26.9	OK	
10.004	SW45	-0.359	0.000	0.09			30.7	OK	
11.000	SW46	-0.165	0.000	0.16			7.4	OK	
11.001	SW47	-0.144	0.000	0.28			10.7	OK	
11.002	SW48	-0.164	0.000	0.16		33	6.1	OK	
10.005	SW49	-0.355	0.000	0.10			37.9	OK	
9.002	SW50	-0.265	0.000	0.35			51.2	OK	
9.003	SW51	-0.263	0.000	0.35			52.1	OK	
12.000	SW52	-0.104	0.000	0.21			6.1	OK	
9.004	SW53	-0.361	0.000	0.21			56.9	OK	
13.000	SW54	-0.173	0.000	0.12			5.9	OK	
13.001	SW55	-0.181	0.000	0.08			8.3	OK	
14.000	SW56	-0.084	0.000	0.41			6.7	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
14.001	SW57	-0.179	0.000	0.09		57	4.1	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
15.000	SW58	15 Summer	1	+0%	100/15 Summer				23.590
14.002	SW59	15 Winter	1	+0%	100/15 Summer				22.284
16.000	SW60	15 Summer	1	+0%					23.222
14.003	SW61	15 Winter	1	+0%	30/15 Summer				22.040
14.004	SW62	60 Winter	1	+0%	100/15 Summer				21.964
14.005	SW63	60 Winter	1	+0%	100/15 Summer				21.900
9.005	SW64	15 Winter	1	+0%	100/15 Summer				21.656
1.018	SW65	960 Winter	1	+0%	30/60 Winter				21.447

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
15.000	SW58	-0.110	0.000	0.16			5.9	OK	
14.002	SW59	-0.226	0.000	0.13			10.9	OK	
16.000	SW60	-0.278	0.000	0.02			3.4	OK	
14.003	SW61	-0.185	0.000	0.31			17.5	OK	
14.004	SW62	-0.219	0.000	0.17		40	9.5	OK	
14.005	SW63	-0.236	0.000	0.10			9.5	OK	
9.005	SW64	-0.319	0.000	0.33			65.6	OK	
1.018	SW65	-0.103	0.000	0.07			21.9	OK	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Winter	30	+0%	100/15 Summer				27.080
1.001	SW02	15 Winter	30	+0%	100/15 Summer				26.791
2.000	SW03	15 Winter	30	+0%					27.964
1.002	SW04	15 Winter	30	+0%	30/15 Summer				26.752
1.003	SW05	15 Winter	30	+0%	30/15 Summer				26.672
1.004	SW06	30 Winter	30	+0%	100/15 Summer				26.380
1.005	SW07	30 Winter	30	+0%	100/15 Summer				26.263
3.000	SW08	15 Winter	30	+0%					28.550
1.006	SW09	30 Winter	30	+0%	100/15 Summer				26.199
1.007	SW10	30 Winter	30	+0%					25.879

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.170	0.000	0.14			6.7	OK	
1.001	SW02	-0.125	0.000	0.34			16.4	OK	
2.000	SW03	-0.161	0.000	0.18			23.2	OK	
1.002	SW04	0.101	0.000	1.08			63.3	SURCHARGED	
1.003	SW05	0.074	0.000	1.35			85.5	SURCHARGED	
1.004	SW06	-0.125	0.000	0.64		20	40.3	OK	
1.005	SW07	-0.151	0.000	0.49			44.1	OK	
3.000	SW08	-0.100	0.000	0.24			11.4	OK	
1.006	SW09	-0.085	0.000	0.85			55.6	OK	
1.007	SW10	-0.271	0.000	0.33		7	59.3	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	SW11	15 Winter	30	+0%					25.739
4.000	SW12	15 Winter	30	+0%					27.896
4.001	SW13	15 Summer	30	+0%	100/15 Summer				27.314
4.002	SW14	15 Winter	30	+0%	100/15 Summer				26.898
1.009	SW15	15 Winter	30	+0%	100/15 Summer				25.353
1.010	SW16	15 Winter	30	+0%	100/15 Summer				25.074
1.011	SW17	15 Winter	30	+0%					24.793
1.012	SW18	15 Winter	30	+0%	100/15 Summer				23.283
5.000	SW19	15 Winter	30	+0%					24.917
5.001	SW20	15 Winter	30	+0%					24.502
6.000	SW21	15 Winter	30	+0%	100/15 Winter				26.158
6.001	SW22	15 Winter	30	+0%	100/15 Summer				25.189
6.002	SW23	15 Summer	30	+0%	100/15 Summer				24.901
6.003	SW24	15 Winter	30	+0%	30/15 Summer				24.772
6.004	SW25	15 Winter	30	+0%	100/15 Summer				24.285
5.002	SW26	30 Winter	30	+0%	100/15 Summer				24.071
5.003	SW27	30 Winter	30	+0%	100/15 Summer				23.961
5.004	SW28	30 Winter	30	+0%	30/30 Winter				23.685
5.005	SW29	30 Winter	30	+0%	100/15 Summer				23.550
7.000	SW30	15 Winter	30	+0%					24.879
5.006	SW31	30 Winter	30	+0%	100/15 Summer				23.177
1.013	SW32	15 Winter	30	+0%	100/15 Summer				22.914
1.014	SW33	15 Winter	30	+0%	100/15 Summer				22.563
1.015	SW34	15 Winter	30	+0%	100/15 Summer				22.111
8.000	SW35	15 Winter	30	+0%					22.954
8.001	SW36	15 Winter	30	+0%	100/15 Summer				22.250
1.016	SW37	15 Winter	30	+0%	100/15 Summer				22.065
1.017	SW38	15 Winter	30	+0%	30/15 Summer				22.053
9.000	SW39	15 Winter	30	+0%	100/15 Summer				22.973
9.001	SW40	15 Summer	30	+0%	100/15 Summer				22.792
10.000	SW41	15 Winter	30	+0%					26.015
10.001	SW42	15 Summer	30	+0%	100/15 Summer				24.769
10.002	SW43	15 Summer	30	+0%	100/15 Summer				24.605
10.003	SW44	15 Winter	30	+0%	100/15 Summer				24.118
10.004	SW45	15 Winter	30	+0%	100/15 Summer				23.380
11.000	SW46	15 Winter	30	+0%	100/15 Summer				23.739
11.001	SW47	15 Winter	30	+0%	100/15 Summer				23.623
11.002	SW48	30 Winter	30	+0%	100/15 Summer				23.283
10.005	SW49	15 Winter	30	+0%	100/15 Summer				22.938
9.002	SW50	15 Winter	30	+0%	30/15 Summer				22.568
9.003	SW51	15 Winter	30	+0%	30/15 Summer				22.393
12.000	SW52	15 Winter	30	+0%	100/15 Summer				22.755
9.004	SW53	15 Winter	30	+0%	100/15 Summer				22.075
13.000	SW54	15 Winter	30	+0%					22.922
13.001	SW55	15 Winter	30	+0%					22.375
14.000	SW56	15 Winter	30	+0%	30/15 Summer				23.132
14.001	SW57	30 Winter	30	+0%					22.721

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	SW11	-0.311	0.000	0.20			71.7	OK	
4.000	SW12	-0.104	0.000	0.21			6.4	OK	
4.001	SW13	-0.060	0.000	0.65			11.4	OK	
4.002	SW14	-0.058	0.000	0.69			28.8	OK	
1.009	SW15	-0.185	0.000	0.63			147.0	OK	
1.010	SW16	-0.126	0.000	0.86			184.1	OK	
1.011	SW17	-0.252	0.000	0.40			208.2	OK	
1.012	SW18	-0.192	0.000	0.62			220.9	OK	
5.000	SW19	-0.163	0.000	0.17			9.7	OK	
5.001	SW20	-0.121	0.000	0.43			25.0	OK	
6.000	SW21	-0.142	0.000	0.30			26.6	OK	
6.001	SW22	-0.171	0.000	0.39			49.2	OK	
6.002	SW23	-0.173	0.000	0.37			49.3	OK	
6.003	SW24	0.112	0.000	1.14			75.9	SURCHARGED	
6.004	SW25	-0.126	0.000	0.63		8	80.3	OK	
5.002	SW26	-0.060	0.000	0.91		12	71.4	OK	
5.003	SW27	-0.033	0.000	0.94			80.4	OK	
5.004	SW28	0.011	0.000	1.05			82.5	SURCHARGED	
5.005	SW29	0.000	0.000	1.02			84.2	OK	
7.000	SW30	-0.171	0.000	0.13			12.5	OK	
5.006	SW31	-0.188	0.000	0.62			96.3	OK	
1.013	SW32	-0.161	0.000	0.81			324.8	OK	
1.014	SW33	-0.232	0.000	0.60			332.2	OK	
1.015	SW34	-0.189	0.000	0.33			320.3	OK	
8.000	SW35	-0.121	0.000	0.43			23.5	OK	
8.001	SW36	-0.131	0.000	0.36			40.8	OK	
1.016	SW37	-0.055	0.000	0.52			298.4	OK	
1.017	SW38	0.028	0.000	1.20			299.2	SURCHARGED*	
9.000	SW39	-0.127	0.000	0.40			17.9	OK	
9.001	SW40	-0.175	0.000	0.36			37.4	OK	
10.000	SW41	-0.085	0.000	0.39			16.5	OK	
10.001	SW42	-0.131	0.000	0.37			16.5	OK	
10.002	SW43	-0.165	0.000	0.42			52.0	OK	
10.003	SW44	-0.090	0.000	0.82			103.0	OK	
10.004	SW45	-0.266	0.000	0.35			117.5	OK	
11.000	SW46	-0.111	0.000	0.51			23.6	OK	
11.001	SW47	-0.048	0.000	0.94			36.0	OK	
11.002	SW48	-0.089	0.000	0.67		17	25.3	OK	
10.005	SW49	-0.249	0.000	0.41			152.8	OK	
9.002	SW50	0.123	0.000	1.24			183.0	SURCHARGED	
9.003	SW51	0.065	0.000	1.25			186.0	SURCHARGED	
12.000	SW52	-0.060	0.000	0.67			19.5	OK	
9.004	SW53	-0.126	0.000	0.70			187.3	OK	
13.000	SW54	-0.128	0.000	0.38			19.0	OK	
13.001	SW55	-0.143	0.000	0.28			28.5	OK	
14.000	SW56	0.102	0.000	1.23			20.5	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
14.001	SW57	-0.124	0.000	0.42		22	18.3	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
15.000	SW58	15 Winter	30	+0%	100/15 Summer				23.626
14.002	SW59	15 Winter	30	+0%	100/15 Summer				22.370
16.000	SW60	15 Winter	30	+0%					23.243
14.003	SW61	15 Winter	30	+0%	30/15 Summer				22.240
14.004	SW62	30 Winter	30	+0%	100/15 Summer				22.068
14.005	SW63	15 Winter	30	+0%	100/15 Summer				22.018
9.005	SW64	15 Winter	30	+0%	100/15 Summer				21.975
1.018	SW65	480 Winter	30	+0%	30/60 Winter				21.716

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
15.000	SW58	-0.074	0.000	0.51			18.9	OK	
14.002	SW59	-0.140	0.000	0.53			42.8	OK	
16.000	SW60	-0.257	0.000	0.05			10.8	OK	
14.003	SW61	0.015	0.000	1.04			58.6	SURCHARGED	
14.004	SW62	-0.115	0.000	0.70		20	39.9	OK	
14.005	SW63	-0.118	0.000	0.38			35.0	OK	
9.005	SW64	0.000	0.000	1.10			221.3	OK	
1.018	SW65	0.166	0.000	0.08			27.3	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Winter	100	+40%	100/15 Summer				27.594
1.001	SW02	15 Winter	100	+40%	100/15 Summer				27.565
2.000	SW03	15 Winter	100	+40%					27.996
1.002	SW04	15 Winter	100	+40%	30/15 Summer				27.473
1.003	SW05	15 Winter	100	+40%	30/15 Summer				27.201
1.004	SW06	30 Winter	100	+40%	100/15 Summer				26.605
1.005	SW07	30 Winter	100	+40%	100/15 Summer				26.512
3.000	SW08	15 Winter	100	+40%					28.576
1.006	SW09	30 Winter	100	+40%	100/15 Summer				26.387
1.007	SW10	30 Winter	100	+40%					25.941

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	0.344	0.000	0.30			14.7	SURCHARGED	
1.001	SW02	0.649	0.000	0.72			34.6	SURCHARGED	
2.000	SW03	-0.129	0.000	0.38			49.3	OK	
1.002	SW04	0.822	0.000	2.16			126.5	SURCHARGED	
1.003	SW05	0.603	0.000	2.71			171.1	SURCHARGED	
1.004	SW06	0.100	0.000	1.06		21	66.6	SURCHARGED	
1.005	SW07	0.098	0.000	0.81			72.8	SURCHARGED	
3.000	SW08	-0.074	0.000	0.51			24.3	OK	
1.006	SW09	0.103	0.000	1.35			88.5	SURCHARGED	
1.007	SW10	-0.209	0.000	0.56		11	99.8	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	SW11	15 Winter	100	+40%					25.880
4.000	SW12	15 Winter	100	+40%					27.969
4.001	SW13	15 Winter	100	+40%	100/15 Summer				27.913
4.002	SW14	15 Winter	100	+40%	100/15 Summer				27.504
1.009	SW15	15 Winter	100	+40%	100/15 Summer				25.803
1.010	SW16	15 Winter	100	+40%	100/15 Summer				25.387
1.011	SW17	15 Winter	100	+40%					24.878
1.012	SW18	15 Winter	100	+40%	100/15 Summer				23.952
5.000	SW19	15 Winter	100	+40%					24.948
5.001	SW20	15 Winter	100	+40%					24.570
6.000	SW21	15 Winter	100	+40%	100/15 Winter				26.333
6.001	SW22	15 Winter	100	+40%	100/15 Summer				26.063
6.002	SW23	15 Winter	100	+40%	100/15 Summer				25.902
6.003	SW24	15 Winter	100	+40%	30/15 Summer				25.733
6.004	SW25	15 Winter	100	+40%	100/15 Summer				24.603
5.002	SW26	15 Winter	100	+40%	100/15 Summer				24.506
5.003	SW27	15 Winter	100	+40%	100/15 Summer				24.382
5.004	SW28	15 Winter	100	+40%	30/30 Winter				24.044
5.005	SW29	15 Winter	100	+40%	100/15 Summer				23.897
7.000	SW30	15 Winter	100	+40%					24.905
5.006	SW31	15 Winter	100	+40%	100/15 Summer				23.659
1.013	SW32	15 Winter	100	+40%	100/15 Summer				23.570
1.014	SW33	15 Winter	100	+40%	100/15 Summer				23.103
1.015	SW34	15 Winter	100	+40%	100/15 Summer				22.537
8.000	SW35	15 Winter	100	+40%					23.023
8.001	SW36	15 Winter	100	+40%	100/15 Summer				22.571
1.016	SW37	15 Winter	100	+40%	100/15 Summer				22.483
1.017	SW38	15 Winter	100	+40%	30/15 Summer				22.463
9.000	SW39	15 Winter	100	+40%	100/15 Summer				23.710
9.001	SW40	15 Winter	100	+40%	100/15 Summer				23.616
10.000	SW41	15 Winter	100	+40%					26.088
10.001	SW42	15 Winter	100	+40%	100/15 Summer				25.448
10.002	SW43	15 Winter	100	+40%	100/15 Summer				25.362
10.003	SW44	15 Winter	100	+40%	100/15 Summer				25.074
10.004	SW45	15 Winter	100	+40%	100/15 Summer				23.893
11.000	SW46	15 Winter	100	+40%	100/15 Summer				24.509
11.001	SW47	15 Winter	100	+40%	100/15 Summer				24.348
11.002	SW48	15 Winter	100	+40%	100/15 Summer				23.549
10.005	SW49	15 Winter	100	+40%	100/15 Summer				23.687
9.002	SW50	15 Winter	100	+40%	30/15 Summer				23.461
9.003	SW51	15 Winter	100	+40%	30/15 Summer				23.044
12.000	SW52	15 Winter	100	+40%	100/15 Summer				23.262
9.004	SW53	15 Winter	100	+40%	100/15 Summer				22.538
13.000	SW54	15 Winter	100	+40%					22.982
13.001	SW55	15 Winter	100	+40%					22.421
14.000	SW56	15 Winter	100	+40%	30/15 Summer				23.955
14.001	SW57	15 Winter	100	+40%					22.830

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	SW11	-0.170	0.000	0.37			131.4	OK	
4.000	SW12	-0.031	0.000	0.44			13.6	OK	
4.001	SW13	0.539	0.000	1.06			18.7	SURCHARGED	
4.002	SW14	0.548	0.000	1.09			45.8	SURCHARGED	
1.009	SW15	0.265	0.000	1.09			255.1	SURCHARGED	
1.010	SW16	0.187	0.000	1.50			321.2	SURCHARGED	
1.011	SW17	-0.167	0.000	0.71			370.6	OK	
1.012	SW18	0.477	0.000	1.07			380.7	SURCHARGED	
5.000	SW19	-0.132	0.000	0.36			20.7	OK	
5.001	SW20	-0.053	0.000	0.91			52.8	OK	
6.000	SW21	0.033	0.000	0.61			54.8	SURCHARGED	
6.001	SW22	0.703	0.000	0.70			88.8	SURCHARGED	
6.002	SW23	0.828	0.000	0.67			89.3	FLOOD RISK	
6.003	SW24	1.073	0.000	2.19			145.6	SURCHARGED	
6.004	SW25	0.192	0.000	0.83		12	104.8	SURCHARGED	
5.002	SW26	0.375	0.000	1.11		20	87.9	SURCHARGED	
5.003	SW27	0.388	0.000	1.14			96.8	SURCHARGED	
5.004	SW28	0.370	0.000	1.31			103.0	SURCHARGED	
5.005	SW29	0.347	0.000	1.29			106.4	SURCHARGED	
7.000	SW30	-0.145	0.000	0.28			26.4	OK	
5.006	SW31	0.294	0.000	0.94			145.5	SURCHARGED	
1.013	SW32	0.495	0.000	1.40			561.0	SURCHARGED	
1.014	SW33	0.308	0.000	0.98			548.9	SURCHARGED	
1.015	SW34	0.237	0.000	0.54			529.8	SURCHARGED*	
8.000	SW35	-0.052	0.000	0.91			50.0	OK	
8.001	SW36	0.190	0.000	0.70			78.6	SURCHARGED	
1.016	SW37	0.363	0.000	0.99			571.1	SURCHARGED*	
1.017	SW38	0.438	0.000	2.30			572.6	SURCHARGED*	
9.000	SW39	0.610	0.000	0.69			31.2	FLOOD RISK	
9.001	SW40	0.649	0.000	0.57			60.1	SURCHARGED	
10.000	SW41	-0.012	0.000	0.81			34.2	OK	
10.001	SW42	0.548	0.000	0.69			30.8	SURCHARGED	
10.002	SW43	0.592	0.000	0.75			93.9	SURCHARGED	
10.003	SW44	0.866	0.000	1.51			188.1	SURCHARGED	
10.004	SW45	0.247	0.000	0.59			200.8	SURCHARGED	
11.000	SW46	0.659	0.000	0.94			43.5	FLOOD RISK	
11.001	SW47	0.677	0.000	1.73			66.4	SURCHARGED	
11.002	SW48	0.177	0.000	1.38		13	51.7	SURCHARGED	
10.005	SW49	0.500	0.000	0.56			210.8	SURCHARGED	
9.002	SW50	1.016	0.000	1.90			280.7	SURCHARGED	
9.003	SW51	0.716	0.000	1.98			294.7	SURCHARGED	
12.000	SW52	0.447	0.000	1.23			36.1	SURCHARGED	
9.004	SW53	0.337	0.000	1.25			336.4	FLOOD RISK	
13.000	SW54	-0.068	0.000	0.81			40.3	OK	
13.001	SW55	-0.097	0.000	0.60			60.5	OK	
14.000	SW56	0.925	0.000	2.43			40.5	FLOOD RISK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
14.001	SW57	-0.015	0.000	0.94		12	41.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
15.000	SW58	15 Winter	100	+40%	100/15 Summer				23.899
14.002	SW59	15 Winter	100	+40%	100/15 Summer				22.756
16.000	SW60	15 Winter	100	+40%					23.264
14.003	SW61	15 Winter	100	+40%	30/15 Summer				22.446
14.004	SW62	30 Winter	100	+40%	100/15 Summer				22.343
14.005	SW63	30 Winter	100	+40%	100/15 Summer				22.280
9.005	SW64	15 Winter	100	+40%	100/15 Summer				22.168
1.018	SW65	960 Winter	100	+40%	30/60 Winter				22.155

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
15.000	SW58	0.199	0.000	0.98			36.1	SURCHARGED	
14.002	SW59	0.246	0.000	1.01			82.0	SURCHARGED	
16.000	SW60	-0.236	0.000	0.10			22.9	OK	
14.003	SW61	0.221	0.000	2.30			129.5	SURCHARGED	
14.004	SW62	0.160	0.000	1.37		24	78.7	SURCHARGED	
14.005	SW63	0.144	0.000	0.86			79.4	SURCHARGED	
9.005	SW64	0.193	0.000	1.97			396.8	SURCHARGED	
1.018	SW65	0.605	0.000	0.08			27.3	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
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

Network Design Table for Storm

- Indicates pipe length does not match coordinates

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	33.393	0.334	100.0	0.020	4.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	26.487	0.265	100.0	0.030	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.000	19.856	1.474	13.5	0.069	4.00	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)
1.000	50.00	4.43	27.025	0.020	0.0	0.0	0.0	1.31	52.0	3.0
1.001	50.00	4.76	26.691	0.050	0.0	0.0	0.0	1.31	52.0	7.6
2.000	50.00	4.09	27.900	0.069	0.0	0.0	0.0	3.58	142.5	10.5

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Network Design Table for Storm

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
1.002	12.562	0.053	238.0	0.080	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.003	22.102	0.093	238.0	0.069	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.004	21.710	0.091	238.0	0.068	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.005	10.061	0.130	77.4	0.038	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.000	31.151	2.366	13.2	0.034	4.00	0.0	0.600		o	150	Pipe/Conduit	
1.006	31.931	0.134	238.3	0.053	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.007	18.101	0.100	181.0	0.062	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.008	32.223	0.512	62.9	0.066	0.00	0.0	0.600		o	450	Pipe/Conduit	
4.000	18.608	0.626	29.7	0.019	4.00	0.0	0.600		o	150	Pipe/Conduit	
4.001	39.795	0.418	95.2	0.016	0.00	0.0	0.600		o	150	Pipe/Conduit	
4.002	23.120	1.418	16.3	0.052	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.009	54.210	0.338	160.4	0.154	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.010	24.816	0.155	160.0	0.125	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.011	49.556	1.570	31.6	0.084	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.012	14.491	0.400	36.2	0.045	0.00	0.0	0.600		o	450	Pipe/Conduit	
5.000	33.355	0.457	73.0	0.029	4.00	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)
1.002	50.00	4.97	26.351	0.199	0.0	0.0	0.0	1.01	71.7	30.2
1.003	50.00	5.33	26.298	0.268	0.0	0.0	0.0	1.01	71.7	40.6
1.004	49.59	5.69	26.205	0.336	0.0	0.0	0.0	1.01	71.7	50.5
1.005	49.11	5.78	26.114	0.374	0.0	0.0	0.0	1.79	126.5	55.7
3.000	50.00	4.19	28.500	0.034	0.0	0.0	0.0	2.79	49.3	5.2
1.006	46.63	6.31	25.984	0.461	0.0	0.0	0.0	1.01	71.7	65.2
1.007	45.77	6.51	25.700	0.523	0.0	0.0	0.0	1.51	239.8	72.6
1.008	44.91	6.72	25.600	0.589	0.0	0.0	0.0	2.57	408.1	80.2
4.000	50.00	4.17	27.850	0.019	0.0	0.0	0.0	1.85	32.8	2.9
4.001	50.00	4.81	27.224	0.035	0.0	0.0	0.0	1.03	18.2	5.3
4.002	50.00	4.96	26.806	0.087	0.0	0.0	0.0	2.51	44.3	13.2
1.009	42.80	7.28	25.088	0.830	0.0	0.0	0.0	1.60	254.9	107.8
1.010	41.92	7.54	24.750	0.955	0.0	0.0	0.0	1.60	255.2	121.4
1.011	41.19	7.77	24.595	1.039	0.0	0.0	0.0	3.63	577.2	129.8
1.012	40.96	7.84	23.025	1.084	0.0	0.0	0.0	3.39	538.6	134.7
5.000	50.00	4.36	24.855	0.029	0.0	0.0	0.0	1.53	60.9	4.4

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Network Design Table for Storm

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
5.001	35.422	0.492	72.0	0.046	0.00	0.0	0.600		o	225	Pipe/Conduit	
6.000	27.113	0.940	28.8	0.079	4.00	0.0	0.600		o	225	Pipe/Conduit	
6.001	15.747	0.286	55.1	0.067	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.002	22.785	0.414	55.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.003	62.881	0.249	252.5	0.104	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.004	15.300	0.280	54.6	0.077	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.002	20.763	0.137	151.6	0.051	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.003	47.913	0.320	149.7	0.085	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.004	18.197	0.124	146.8	0.034	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.005	27.235	0.185	147.0	0.027	0.00	0.0	0.600		o	300	Pipe/Conduit	
7.000	45.653	1.685	27.1	0.037	4.00	0.0	0.600		o	225	Pipe/Conduit	
5.006	49.555	0.140	354.0	0.058	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.013	28.046	0.280	100.2	0.083	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.014	30.256	0.570	53.1	0.024	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.015	32.775	0.180	182.1	0.000	0.00	0.0		0.050		-1	Pipe/Conduit	
8.000	57.575	0.694	83.0	0.072	4.00	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)
5.001	50.00	4.75	24.398	0.075	0.0	0.0	0.0	1.54	61.4	11.4
6.000	50.00	4.18	26.075	0.079	0.0	0.0	0.0	2.45	97.2	12.0
6.001	50.00	4.31	25.060	0.146	0.0	0.0	0.0	2.12	150.1	22.1
6.002	50.00	4.49	24.774	0.146	0.0	0.0	0.0	2.12	150.1	22.1
6.003	50.00	5.55	24.360	0.250	0.0	0.0	0.0	0.98	69.6	37.9
6.004	49.68	5.67	24.111	0.327	0.0	0.0	0.0	2.13	150.7	49.3
5.002	48.31	5.94	23.831	0.453	0.0	0.0	0.0	1.27	90.1	66.4
5.003	45.53	6.57	23.694	0.538	0.0	0.0	0.0	1.28	90.7	74.3
5.004	44.59	6.80	23.374	0.572	0.0	0.0	0.0	1.30	91.6	77.4
5.005	43.27	7.15	23.250	0.599	0.0	0.0	0.0	1.29	91.5	78.6
7.000	50.00	4.30	24.825	0.037	0.0	0.0	0.0	2.52	100.3	5.6
5.006	40.71	7.92	22.915	0.694	0.0	0.0	0.0	1.07	170.9	85.7
1.013	40.09	8.13	22.550	1.861	0.0	0.0	0.0	2.24	484.5	226.3
1.014	39.61	8.29	22.270	1.885	0.0	0.0	0.0	3.08	666.6	226.5
1.015	37.56	9.07	21.700	1.885	0.0	0.0	0.0	0.71	973.0	226.5
8.000	50.00	4.67	22.850	0.072	0.0	0.0	0.0	1.44	57.1	10.9

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Network Design Table for Storm

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
8.001	6.752	0.636	10.6	0.052	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.016	7.853	0.020	392.7	0.000	0.00	0.0		0.050		-1	Pipe/Conduit	
1.017	11.238#	0.100	112.4	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	
9.000	13.307	0.133	100.1	0.053	4.00	0.0	0.600		o	225	Pipe/Conduit	
9.001	52.049	0.522	99.7	0.061	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.000	19.028	1.200	15.9	0.049	4.00	0.0	0.600		o	150	Pipe/Conduit	
10.001	13.003	0.130	100.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
10.002	38.209	0.562	68.0	0.106	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.003	38.209	0.562	68.0	0.155	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.004	31.319	0.459	68.2	0.045	0.00	0.0	0.600		o	450	Pipe/Conduit	
11.000	18.366	0.179	102.6	0.070	4.00	0.0	0.600		o	225	Pipe/Conduit	
11.001	49.906	0.299	166.9	0.042	0.00	0.0	0.600		o	225	Pipe/Conduit	
11.002	30.989	0.185	167.5	0.072	0.00	0.0	0.600		o	225	Pipe/Conduit	
10.005	44.150	0.742	59.5	0.075	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.002	45.019	0.117	384.8	0.050	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.003	48.950	0.127	385.4	0.045	0.00	0.0	0.600		o	450	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)
8.001	50.00	4.70	22.156	0.124	0.0	0.0	0.0	4.04	160.6	18.8
1.016	36.90	9.34	21.520	2.009	0.0	0.0	0.0	0.48	662.6	226.5
1.017	36.69	9.43	21.500	2.009	0.0	0.0	0.0	2.11	457.3	226.5
9.000	50.00	4.17	22.875	0.053	0.0	0.0	0.0	1.31	52.0	8.0
9.001	50.00	4.72	22.667	0.114	0.0	0.0	0.0	1.57	111.3	17.3
10.000	50.00	4.12	25.950	0.049	0.0	0.0	0.0	2.54	44.9	7.4
10.001	50.00	4.29	24.675	0.049	0.0	0.0	0.0	1.31	52.0	7.4
10.002	50.00	4.62	24.470	0.155	0.0	0.0	0.0	1.91	135.0	23.5
10.003	50.00	4.96	23.908	0.310	0.0	0.0	0.0	1.91	135.0	47.0
10.004	50.00	5.17	23.196	0.355	0.0	0.0	0.0	2.46	391.9	53.8
11.000	50.00	4.24	23.625	0.070	0.0	0.0	0.0	1.29	51.3	10.6
11.001	50.00	5.06	23.446	0.112	0.0	0.0	0.0	1.01	40.1	17.0
11.002	50.00	5.57	23.147	0.184	0.0	0.0	0.0	1.01	40.1	27.9
10.005	48.75	5.85	22.737	0.614	0.0	0.0	0.0	2.64	419.8	90.8
9.002	45.46	6.58	21.995	0.778	0.0	0.0	0.0	1.03	163.9	107.3
9.003	42.48	7.37	21.878	0.823	0.0	0.0	0.0	1.03	163.7	107.3

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Network Design Table for Storm

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
12.000	20.040	0.614	32.6	0.058	4.00	0.0	0.600		o	150	Pipe/Conduit	
9.004	59.996	0.226	265.5	0.043	0.00	0.0	0.600		o	525	Pipe/Conduit	
13.000	53.189	0.532	100.0	0.058	4.00	0.0	0.600		o	225	Pipe/Conduit	
13.001	10.249	0.543	18.9	0.029	0.00	0.0	0.600		o	225	Pipe/Conduit	
14.000	18.485	0.185	99.9	0.064	4.00	0.0	0.600		o	150	Pipe/Conduit	
14.001	42.209	0.335	126.0	0.096	0.00	0.0	0.600		o	225	Pipe/Conduit	
15.000	25.332	1.190	21.3	0.056	4.00	0.0	0.600		o	150	Pipe/Conduit	
14.002	47.255	0.285	165.8	0.055	0.00	0.0	0.600		o	300	Pipe/Conduit	
16.000	26.853	1.275	21.1	0.032	4.00	0.0	0.600		o	300	Pipe/Conduit	
14.003	9.942	0.042	236.7	0.043	0.00	0.0	0.600		o	300	Pipe/Conduit	
14.004	11.157	0.047	237.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
14.005	16.753	0.161	104.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
9.005	15.753#	0.050	315.1	0.000	0.00	0.0	0.600		o	525	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)
12.000	50.00	4.19	22.665	0.058	0.0	0.0	0.0	1.77	31.2	8.8
9.004	40.16	8.10	21.676	0.924	0.0	0.0	0.0	1.37	296.6	112.5
13.000	50.00	4.68	22.825	0.058	0.0	0.0	0.0	1.31	52.0	8.8
13.001	50.00	4.73	22.293	0.087	0.0	0.0	0.0	3.03	120.3	13.2
14.000	50.00	4.31	22.880	0.064	0.0	0.0	0.0	1.01	17.8	9.7
14.001	50.00	4.91	22.620	0.160	0.0	0.0	0.0	1.16	46.3	24.3
15.000	50.00	4.19	23.550	0.056	0.0	0.0	0.0	2.19	38.7	8.5
14.002	50.00	5.56	22.210	0.271	0.0	0.0	0.0	1.22	86.1	41.1
16.000	50.00	4.13	23.200	0.032	0.0	0.0	0.0	3.44	243.2	4.9
14.003	49.42	5.72	21.925	0.346	0.0	0.0	0.0	1.02	71.9	51.9
14.004	48.51	5.90	21.883	0.346	0.0	0.0	0.0	1.02	71.8	51.9
14.005	47.64	6.08	21.836	0.346	0.0	0.0	0.0	1.54	108.9	51.9
9.005	39.55	8.31	21.450	1.357	0.0	0.0	0.0	1.26	272.0	162.8

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Network Design Table for Storm

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
1.018	11.448	1.770	6.5	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)
1.018	36.62	9.46	21.250	3.366	0.0	0.0	0.0	6.22	439.7	373.9

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW01	28.150	1.125	Open Manhole	1200	1.000	27.025	225				
SW02	28.140	1.449	Open Manhole	1200	1.001	26.691	225	1.000	26.691	225	
SW03	29.250	1.350	Open Manhole	1200	2.000	27.900	225				
SW04	28.800	2.449	Open Manhole	1200	1.002	26.351	300	1.001	26.426	225	
								2.000	26.426	225	
SW05	28.280	1.982	Open Manhole	1200	1.003	26.298	300	1.002	26.298	300	
SW06	28.400	2.195	Open Manhole	1200	1.004	26.205	300	1.003	26.205	300	
SW07	27.800	1.686	Open Manhole	1200	1.005	26.114	300	1.004	26.114	300	
SW08	29.550	1.050	Open Manhole	1200	3.000	28.500	150				
SW09	27.800	1.816	Open Manhole	1200	1.006	25.984	300	1.005	25.984	300	
								3.000	26.134	150	
SW10	27.714	2.014	Open Manhole	1350	1.007	25.700	450	1.006	25.850	300	
SW11	27.250	1.650	Open Manhole	1350	1.008	25.600	450	1.007	25.600	450	
SW12	28.900	1.050	Open Manhole	1200	4.000	27.850	150				
SW13	28.274	1.050	Open Manhole	1200	4.001	27.224	150	4.000	27.224	150	
SW14	27.856	1.050	Open Manhole	1200	4.002	26.806	150	4.001	26.806	150	
SW15	27.255	2.167	Open Manhole	1350	1.009	25.088	450	1.008	25.088	450	
								4.002	25.388	150	
SW16	27.325	2.575	Open Manhole	1350	1.010	24.750	450	1.009	24.750	450	
SW17	26.700	2.105	Open Manhole	1350	1.011	24.595	450	1.010	24.595	450	
SW18	24.735	1.710	Open Manhole	1350	1.012	23.025	450	1.011	23.025	450	
SW19	25.980	1.125	Open Manhole	1200	5.000	24.855	225				
SW20	25.741	1.343	Open Manhole	1200	5.001	24.398	225	5.000	24.398	225	
SW21	27.500	1.425	Open Manhole	1200	6.000	26.075	225				
SW22	26.560	1.500	Open Manhole	1200	6.001	25.060	300	6.000	25.135	225	
SW23	26.001	1.227	Open Manhole	1200	6.002	24.774	300	6.001	24.774	300	
SW24	26.238	1.878	Open Manhole	1200	6.003	24.360	300	6.002	24.360	300	
SW25	26.025	1.914	Open Manhole	1200	6.004	24.111	300	6.003	24.111	300	
SW26	25.615	1.784	Open Manhole	1200	5.002	23.831	300	5.001	23.906	225	
								6.004	23.831	300	
SW27	25.700	2.006	Open Manhole	1200	5.003	23.694	300	5.002	23.694	300	
SW28	25.200	1.826	Open Manhole	1200	5.004	23.374	300	5.003	23.374	300	
SW29	25.075	1.825	Open Manhole	1200	5.005	23.250	300	5.004	23.250	300	
SW30	25.950	1.125	Open Manhole	1200	7.000	24.825	225				
SW31	25.112	2.197	Open Manhole	1350	5.006	22.915	450	5.005	23.065	300	
								7.000	23.140	225	
SW32	24.422	1.872	Open Manhole	1500	1.013	22.550	525	1.012	22.625	450	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								5.006	22.775	450	150
SW33	24.100	1.830	Open Manhole	1500	1.014	22.270	525	1.013	22.270	525	
SW34	23.192	1.492	Junction		1.015	21.700	-1	1.014	21.700	525	
SW35	23.896	1.046	Open Manhole	1200	8.000	22.850	225				
SW36	23.261	1.105	Open Manhole	1200	8.001	22.156	225	8.000	22.156	225	
SW37	23.200	1.680	Junction		1.016	21.520	-1	1.015	21.520	-1	
								8.001	21.520	225	
SW38	23.119	1.619	Junction		1.017	21.500	525	1.016	21.500	-1	
SW39	24.000	1.125	Open Manhole	1200	9.000	22.875	225				
SW40	24.150	1.483	Open Manhole	1200	9.001	22.667	300	9.000	22.742	225	
SW41	27.300	1.350	Open Manhole	1200	10.000	25.950	150				
SW42	26.100	1.425	Open Manhole	1200	10.001	24.675	225	10.000	24.750	150	
SW43	26.010	1.540	Open Manhole	1200	10.002	24.470	300	10.001	24.545	225	
SW44	26.238	2.330	Open Manhole	1200	10.003	23.908	300	10.002	23.908	300	
SW45	26.039	2.843	Open Manhole	1350	10.004	23.196	450	10.003	23.346	300	
SW46	24.750	1.125	Open Manhole	1200	11.000	23.625	225				
SW47	25.354	1.908	Open Manhole	1200	11.001	23.446	225	11.000	23.446	225	
SW48	25.253	2.106	Open Manhole	1200	11.002	23.147	225	11.001	23.147	225	
SW49	25.089	2.352	Open Manhole	1350	10.005	22.737	450	10.004	22.737	450	
								11.002	22.962	225	
SW50	23.796	1.801	Open Manhole	1350	9.002	21.995	450	9.001	22.145	300	
								10.005	21.995	450	
SW51	23.344	1.466	Open Manhole	1350	9.003	21.878	450	9.002	21.878	450	
SW52	23.715	1.050	Open Manhole	1200	12.000	22.665	150				
SW53	22.821	1.145	Open Manhole	1500	9.004	21.676	525	9.003	21.751	450	
								12.000	22.051	150	
SW54	23.950	1.125	Open Manhole	1200	13.000	22.825	225				
SW55	23.497	1.204	Open Manhole	1200	13.001	22.293	225	13.000	22.293	225	
SW56	24.230	1.350	Open Manhole	1200	14.000	22.880	150				
SW57	24.125	1.505	Open Manhole	1200	14.001	22.620	225	14.000	22.695	150	
SW58	24.900	1.350	Open Manhole	1200	15.000	23.550	150				
SW59	23.872	1.662	Open Manhole	1200	14.002	22.210	300	14.001	22.285	225	
								15.000	22.360	150	
SW60	24.700	1.500	Open Manhole	1200	16.000	23.200	300				
SW61	23.685	1.760	Open Manhole	1200	14.003	21.925	300	14.002	21.925	300	
								16.000	21.925	300	
SW62	23.452	1.569	Open Manhole	1200	14.004	21.883	300	14.003	21.883	300	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW63	23.326	1.490	Open Manhole	1200	14.005	21.836	300	14.004	21.836	300	
SW64	23.044	1.594	Open Manhole	1500	9.005	21.450	525	9.004	21.450	525	
								13.001	21.750	225	
								14.005	21.675	300	
SW65	22.500	1.250	Open Manhole	1500	1.018	21.250	300	1.017	21.400	525	375
								9.005	21.400	525	375
	21.230	1.750	Open Manhole	0		OUTFALL		1.018	19.480	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW01	448797.461	117345.007	448797.461	117345.007	Required	
SW02	448764.974	117352.734	448764.974	117352.734	Required	
SW03	448790.480	117373.836	448790.480	117373.836	Required	
SW04	448771.176	117378.485	448771.176	117378.485	Required	
SW05	448758.963	117381.426	448758.963	117381.426	Required	
SW06	448764.138	117402.913	448764.138	117402.913	Required	
SW07	448769.220	117424.020	448769.220	117424.020	Required	
SW08	448805.000	117425.155	448805.000	117425.155	Required	
SW09	448774.715	117432.448	448774.715	117432.448	Required	
SW10	448781.958	117463.547	448781.958	117463.547	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW11	448778.362	117481.286	448778.362	117481.286	Required	
SW12	448807.052	117449.155	448807.052	117449.155	Required	
SW13	448804.539	117467.592	448804.539	117467.592	Required	
SW14	448808.384	117507.201	448808.384	117507.201	Required	
SW15	448785.906	117512.614	448785.906	117512.614	Required	
SW16	448798.598	117565.317	448798.598	117565.317	Required	
SW17	448816.502	117582.500	448816.502	117582.500	Required	
SW18	448828.122	117630.675	448828.122	117630.675	Required	
SW19	448716.991	117469.733	448716.991	117469.733	Required	
SW20	448724.771	117502.168	448724.771	117502.168	Required	
SW21	448762.963	117432.090	448762.963	117432.090	Required	
SW22	448736.588	117438.371	448736.588	117438.371	Required	
SW23	448721.828	117443.857	448721.828	117443.857	Required	
SW24	448729.712	117465.234	448729.712	117465.234	Required	
SW25	448744.434	117526.368	448744.434	117526.368	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW26	448733.064	117536.606	448733.064	117536.606	Required	
SW27	448739.942	117556.197	448739.942	117556.197	Required	
SW28	448751.474	117602.701	448751.474	117602.701	Required	
SW29	448752.008	117620.891	448752.008	117620.891	Required	
SW30	448767.224	117584.988	448767.224	117584.988	Required	
SW31	448777.887	117629.378	448777.887	117629.378	Required	
SW32	448824.974	117644.820	448824.974	117644.820	Required	
SW33	448851.624	117653.560	448851.624	117653.560	Required	
SW34	448853.983	117683.724			No Entry	
SW35	448769.146	117655.010	448769.146	117655.010	Required	
SW36	448823.605	117673.692	448823.605	117673.692	Required	
SW37	448821.411	117680.079			No Entry	
SW38	448813.565	117679.752			No Entry	
SW39	448630.580	117416.279	448630.580	117416.279	Required	
SW40	448633.714	117429.212	448633.714	117429.212	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW41	448729.418	117370.747	448729.418	117370.747	Required	
SW42	448711.026	117375.624	448711.026	117375.624	Required	
SW43	448704.608	117386.933	448704.608	117386.933	Required	
SW44	448713.563	117424.078	448713.563	117424.078	Required	
SW45	448722.518	117461.223	448722.518	117461.223	Required	
SW46	448654.739	117394.614	448654.739	117394.614	Required	
SW47	448672.533	117390.068	448672.533	117390.068	Required	
SW48	448684.886	117438.421	448684.886	117438.421	Required	
SW49	448692.072	117468.566	448692.072	117468.566	Required	
SW50	448649.153	117478.918	448649.153	117478.918	Required	
SW51	448659.038	117522.838	448659.038	117522.838	Required	
SW52	448686.440	117563.286	448686.440	117563.286	Required	
SW53	448667.933	117570.973	448667.933	117570.973	Required	
SW54	448740.800	117645.495	448740.800	117645.495	Required	
SW55	448690.259	117628.922	448690.259	117628.922	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW56	448676.094	117502.534	448676.094	117502.534	Required	
SW57	448684.913	117518.780	448684.913	117518.780	Required	
SW58	448718.191	117550.099	448718.191	117550.099	Required	
SW59	448694.797	117559.816	448694.797	117559.816	Required	
SW60	448731.401	117614.056	448731.401	117614.056	Required	
SW61	448705.862	117605.757	448705.862	117605.757	Required	
SW62	448696.196	117608.085	448696.196	117608.085	Required	
SW63	448692.600	117618.646	448692.600	117618.646	Required	
SW64	448680.042	117629.735	448680.042	117629.735	Required	
SW65	448661.163	117668.900	448661.163	117668.900	Required	
	448650.593	117673.297			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

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	225	SW01	28.150	27.025	0.900	Open Manhole	1200
1.001	o	225	SW02	28.140	26.691	1.224	Open Manhole	1200
2.000	o	225	SW03	29.250	27.900	1.125	Open Manhole	1200
1.002	o	300	SW04	28.800	26.351	2.149	Open Manhole	1200
1.003	o	300	SW05	28.280	26.298	1.682	Open Manhole	1200
1.004	o	300	SW06	28.400	26.205	1.895	Open Manhole	1200
1.005	o	300	SW07	27.800	26.114	1.386	Open Manhole	1200
3.000	o	150	SW08	29.550	28.500	0.900	Open Manhole	1200
1.006	o	300	SW09	27.800	25.984	1.516	Open Manhole	1200
1.007	o	450	SW10	27.714	25.700	1.564	Open Manhole	1350
1.008	o	450	SW11	27.250	25.600	1.200	Open Manhole	1350
4.000	o	150	SW12	28.900	27.850	0.900	Open Manhole	1200
4.001	o	150	SW13	28.274	27.224	0.900	Open Manhole	1200
4.002	o	150	SW14	27.856	26.806	0.900	Open Manhole	1200

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	33.393	100.0	SW02	28.140	26.691	1.224	Open Manhole	1200
1.001	26.487	100.0	SW04	28.800	26.426	2.149	Open Manhole	1200
2.000	19.856	13.5	SW04	28.800	26.426	2.149	Open Manhole	1200
1.002	12.562	238.0	SW05	28.280	26.298	1.682	Open Manhole	1200
1.003	22.102	238.0	SW06	28.400	26.205	1.895	Open Manhole	1200
1.004	21.710	238.0	SW07	27.800	26.114	1.386	Open Manhole	1200
1.005	10.061	77.4	SW09	27.800	25.984	1.516	Open Manhole	1200
3.000	31.151	13.2	SW09	27.800	26.134	1.516	Open Manhole	1200
1.006	31.931	238.3	SW10	27.714	25.850	1.564	Open Manhole	1350
1.007	18.101	181.0	SW11	27.250	25.600	1.200	Open Manhole	1350
1.008	32.223	62.9	SW15	27.255	25.088	1.717	Open Manhole	1350
4.000	18.608	29.7	SW13	28.274	27.224	0.900	Open Manhole	1200
4.001	39.795	95.2	SW14	27.856	26.806	0.900	Open Manhole	1200
4.002	23.120	16.3	SW15	27.255	25.388	1.717	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

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)
1.009	o	450	SW15	27.255	25.088	1.717	Open Manhole	1350
1.010	o	450	SW16	27.325	24.750	2.125	Open Manhole	1350
1.011	o	450	SW17	26.700	24.595	1.655	Open Manhole	1350
1.012	o	450	SW18	24.735	23.025	1.260	Open Manhole	1350
5.000	o	225	SW19	25.980	24.855	0.900	Open Manhole	1200
5.001	o	225	SW20	25.741	24.398	1.118	Open Manhole	1200
6.000	o	225	SW21	27.500	26.075	1.200	Open Manhole	1200
6.001	o	300	SW22	26.560	25.060	1.200	Open Manhole	1200
6.002	o	300	SW23	26.001	24.774	0.927	Open Manhole	1200
6.003	o	300	SW24	26.238	24.360	1.578	Open Manhole	1200
6.004	o	300	SW25	26.025	24.111	1.614	Open Manhole	1200
5.002	o	300	SW26	25.615	23.831	1.484	Open Manhole	1200
5.003	o	300	SW27	25.700	23.694	1.706	Open Manhole	1200
5.004	o	300	SW28	25.200	23.374	1.526	Open Manhole	1200
5.005	o	300	SW29	25.075	23.250	1.525	Open Manhole	1200

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)
1.009	54.210	160.4	SW16	27.325	24.750	2.125	Open Manhole	1350
1.010	24.816	160.0	SW17	26.700	24.595	1.655	Open Manhole	1350
1.011	49.556	31.6	SW18	24.735	23.025	1.260	Open Manhole	1350
1.012	14.491	36.2	SW32	24.422	22.625	1.347	Open Manhole	1500
5.000	33.355	73.0	SW20	25.741	24.398	1.118	Open Manhole	1200
5.001	35.422	72.0	SW26	25.615	23.906	1.484	Open Manhole	1200
6.000	27.113	28.8	SW22	26.560	25.135	1.200	Open Manhole	1200
6.001	15.747	55.1	SW23	26.001	24.774	0.927	Open Manhole	1200
6.002	22.785	55.0	SW24	26.238	24.360	1.578	Open Manhole	1200
6.003	62.881	252.5	SW25	26.025	24.111	1.614	Open Manhole	1200
6.004	15.300	54.6	SW26	25.615	23.831	1.484	Open Manhole	1200
5.002	20.763	151.6	SW27	25.700	23.694	1.706	Open Manhole	1200
5.003	47.913	149.7	SW28	25.200	23.374	1.526	Open Manhole	1200
5.004	18.197	146.8	SW29	25.075	23.250	1.525	Open Manhole	1200
5.005	27.235	147.0	SW31	25.112	23.065	1.747	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

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	225	SW30	25.950	24.825	0.900	Open Manhole	1200
5.006	o	450	SW31	25.112	22.915	1.747	Open Manhole	1350
1.013	o	525	SW32	24.422	22.550	1.347	Open Manhole	1500
1.014	o	525	SW33	24.100	22.270	1.305	Open Manhole	1500
1.015		-1	SW34	23.192	21.700	0.892	Junction	
8.000	o	225	SW35	23.896	22.850	0.821	Open Manhole	1200
8.001	o	225	SW36	23.261	22.156	0.880	Open Manhole	1200
1.016		-1	SW37	23.200	21.520	1.080	Junction	
1.017	o	525	SW38	23.119	21.500	1.094	Junction	
9.000	o	225	SW39	24.000	22.875	0.900	Open Manhole	1200
9.001	o	300	SW40	24.150	22.667	1.183	Open Manhole	1200
10.000	o	150	SW41	27.300	25.950	1.200	Open Manhole	1200
10.001	o	225	SW42	26.100	24.675	1.200	Open Manhole	1200
10.002	o	300	SW43	26.010	24.470	1.240	Open Manhole	1200

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	45.653	27.1	SW31	25.112	23.140	1.747	Open Manhole	1350
5.006	49.555	354.0	SW32	24.422	22.775	1.197	Open Manhole	1500
1.013	28.046	100.2	SW33	24.100	22.270	1.305	Open Manhole	1500
1.014	30.256	53.1	SW34	23.192	21.700	0.967	Junction	
1.015	32.775	182.1	SW37	23.200	21.520	1.080	Junction	
8.000	57.575	83.0	SW36	23.261	22.156	0.880	Open Manhole	1200
8.001	6.752	10.6	SW37	23.200	21.520	1.455	Junction	
1.016	7.853	392.7	SW38	23.119	21.500	1.019	Junction	
1.017	11.238#	112.4	SW65	22.500	21.400	0.575	Open Manhole	1500
9.000	13.307	100.1	SW40	24.150	22.742	1.183	Open Manhole	1200
9.001	52.049	99.7	SW50	23.796	22.145	1.351	Open Manhole	1350
10.000	19.028	15.9	SW42	26.100	24.750	1.200	Open Manhole	1200
10.001	13.003	100.0	SW43	26.010	24.545	1.240	Open Manhole	1200
10.002	38.209	68.0	SW44	26.238	23.908	2.030	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

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)
10.003	o	300	SW44	26.238	23.908	2.030	Open Manhole	1200
10.004	o	450	SW45	26.039	23.196	2.393	Open Manhole	1350
11.000	o	225	SW46	24.750	23.625	0.900	Open Manhole	1200
11.001	o	225	SW47	25.354	23.446	1.683	Open Manhole	1200
11.002	o	225	SW48	25.253	23.147	1.881	Open Manhole	1200
10.005	o	450	SW49	25.089	22.737	1.902	Open Manhole	1350
9.002	o	450	SW50	23.796	21.995	1.351	Open Manhole	1350
9.003	o	450	SW51	23.344	21.878	1.016	Open Manhole	1350
12.000	o	150	SW52	23.715	22.665	0.900	Open Manhole	1200
9.004	o	525	SW53	22.821	21.676	0.620	Open Manhole	1500
13.000	o	225	SW54	23.950	22.825	0.900	Open Manhole	1200
13.001	o	225	SW55	23.497	22.293	0.979	Open Manhole	1200
14.000	o	150	SW56	24.230	22.880	1.200	Open Manhole	1200

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)
10.003	38.209	68.0	SW45	26.039	23.346	2.393	Open Manhole	1350
10.004	31.319	68.2	SW49	25.089	22.737	1.902	Open Manhole	1350
11.000	18.366	102.6	SW47	25.354	23.446	1.683	Open Manhole	1200
11.001	49.906	166.9	SW48	25.253	23.147	1.881	Open Manhole	1200
11.002	30.989	167.5	SW49	25.089	22.962	1.902	Open Manhole	1350
10.005	44.150	59.5	SW50	23.796	21.995	1.351	Open Manhole	1350
9.002	45.019	384.8	SW51	23.344	21.878	1.016	Open Manhole	1350
9.003	48.950	385.4	SW53	22.821	21.751	0.620	Open Manhole	1500
12.000	20.040	32.6	SW53	22.821	22.051	0.620	Open Manhole	1500
9.004	59.996	265.5	SW64	23.044	21.450	1.069	Open Manhole	1500
13.000	53.189	100.0	SW55	23.497	22.293	0.979	Open Manhole	1200
13.001	10.249	18.9	SW64	23.044	21.750	1.069	Open Manhole	1500
14.000	18.485	99.9	SW57	24.125	22.695	1.280	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

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)
14.001	o	225	SW57	24.125	22.620	1.280	Open Manhole	1200
15.000	o	150	SW58	24.900	23.550	1.200	Open Manhole	1200
14.002	o	300	SW59	23.872	22.210	1.362	Open Manhole	1200
16.000	o	300	SW60	24.700	23.200	1.200	Open Manhole	1200
14.003	o	300	SW61	23.685	21.925	1.460	Open Manhole	1200
14.004	o	300	SW62	23.452	21.883	1.269	Open Manhole	1200
14.005	o	300	SW63	23.326	21.836	1.190	Open Manhole	1200
9.005	o	525	SW64	23.044	21.450	1.069	Open Manhole	1500
1.018	o	300	SW65	22.500	21.250	0.950	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)
14.001	42.209	126.0	SW59	23.872	22.285	1.362	Open Manhole	1200
15.000	25.332	21.3	SW59	23.872	22.360	1.362	Open Manhole	1200
14.002	47.255	165.8	SW61	23.685	21.925	1.460	Open Manhole	1200
16.000	26.853	21.1	SW61	23.685	21.925	1.460	Open Manhole	1200
14.003	9.942	236.7	SW62	23.452	21.883	1.269	Open Manhole	1200
14.004	11.157	237.4	SW63	23.326	21.836	1.190	Open Manhole	1200
14.005	16.753	104.1	SW64	23.044	21.675	1.069	Open Manhole	1500
9.005	15.753#	315.1	SW65	22.500	21.400	0.575	Open Manhole	1500
1.018	11.448	6.5		21.230	19.480	1.450	Open Manhole	0

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Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW65, DS/PN: 1.018, Volume (m³): 7.6

Unit Reference	MD-SHE-0225-2730-1200-2730
Design Head (m)	1.200
Design Flow (l/s)	27.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	225
Invert Level (m)	21.250
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	27.3
Flush-Flo™	0.399	27.3
Kick-Flo®	0.854	23.2
Mean Flow over Head Range	-	23.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.5	1.200	27.3	3.000	42.4	7.000	63.9
0.200	22.4	1.400	29.4	3.500	45.7	7.500	66.1
0.300	26.9	1.600	31.3	4.000	48.7	8.000	68.2
0.400	27.3	1.800	33.1	4.500	51.6	8.500	70.2
0.500	27.1	2.000	34.9	5.000	54.3	9.000	72.2
0.600	26.6	2.200	36.5	5.500	56.8	9.500	74.1
0.800	24.6	2.400	38.1	6.000	59.3		
1.000	25.0	2.600	39.6	6.500	61.6		

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Storage Structures for Storm

Cellular Storage Manhole: SW06, DS/PN: 1.004

Invert Level (m) 26.205 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	207.0	0.0	0.501	0.0	0.0
0.500	207.0	0.0			

Cellular Storage Manhole: SW10, DS/PN: 1.007

Invert Level (m) 25.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	0.0	0.501	0.0	0.0
0.500	150.0	0.0			

Cellular Storage Manhole: SW25, DS/PN: 6.004

Invert Level (m) 24.115 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	0.501	0.0	0.0
0.500	100.0	0.0			

Cellular Storage Manhole: SW26, DS/PN: 5.002

Invert Level (m) 23.835 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	0.501	0.0	0.0
0.500	100.0	0.0			

Cellular Storage Manhole: SW48, DS/PN: 11.002

Invert Level (m) 23.148 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: SW48, DS/PN: 11.002

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	132.0	0.0	0.501	0.0	0.0
0.500	132.0	0.0			

Cellular Storage Manhole: SW57, DS/PN: 14.001

Invert Level (m) 22.620 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	180.0	0.0	0.501	0.0	0.0
0.500	180.0	0.0			

Cellular Storage Manhole: SW62, DS/PN: 14.004

Invert Level (m) 21.883 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	102.0	0.0	0.501	0.0	0.0
0.500	102.0	0.0			

Tank or Pond Manhole: SW65, DS/PN: 1.018

Invert Level (m) 21.250

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	2012.0	0.600	2602.0	0.900	3213.0	1.500	3526.0

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Winter	100	+45%	100/15 Summer				27.664
1.001	SW02	15 Winter	100	+45%	100/15 Summer				27.634
2.000	SW03	15 Winter	100	+45%					27.998
1.002	SW04	15 Winter	100	+45%	100/15 Summer				27.537
1.003	SW05	15 Winter	100	+45%	100/15 Summer				27.248
1.004	SW06	30 Winter	100	+45%	100/15 Summer				26.623
1.005	SW07	30 Winter	100	+45%	100/15 Summer				26.528
3.000	SW08	15 Winter	100	+45%					28.578
1.006	SW09	30 Winter	100	+45%	100/15 Summer				26.400
1.007	SW10	15 Winter	100	+45%					25.948

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	0.414	0.000	0.31			15.1	SURCHARGED	
1.001	SW02	0.718	0.000	0.73			35.2	SURCHARGED	
2.000	SW03	-0.127	0.000	0.40			51.1	OK	
1.002	SW04	0.886	0.000	2.23			130.6	SURCHARGED	
1.003	SW05	0.650	0.000	2.79			176.7	SURCHARGED	
1.004	SW06	0.117	0.000	1.08		21	68.1	SURCHARGED	
1.005	SW07	0.114	0.000	0.83			74.5	SURCHARGED	
3.000	SW08	-0.072	0.000	0.53			25.2	OK	
1.006	SW09	0.116	0.000	1.38			90.7	SURCHARGED	
1.007	SW10	-0.202	0.000	0.58		9	104.2	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	SW11	15 Winter	100	+45%					25.901
4.000	SW12	15 Winter	100	+45%	100/15 Winter				28.044
4.001	SW13	15 Winter	100	+45%	100/15 Summer				27.984
4.002	SW14	15 Winter	100	+45%	100/15 Summer				27.593
1.009	SW15	15 Winter	100	+45%	100/15 Summer				25.816
1.010	SW16	15 Winter	100	+45%	100/15 Summer				25.402
1.011	SW17	15 Winter	100	+45%					24.883
1.012	SW18	15 Winter	100	+45%	100/15 Summer				24.079
5.000	SW19	15 Winter	100	+45%					24.950
5.001	SW20	15 Winter	100	+45%	100/15 Winter				24.723
6.000	SW21	15 Winter	100	+45%	100/15 Summer				26.430
6.001	SW22	15 Winter	100	+45%	100/15 Summer				26.142
6.002	SW23	15 Winter	100	+45%	100/15 Summer				25.971
6.003	SW24	15 Winter	100	+45%	100/15 Summer				25.796
6.004	SW25	15 Winter	100	+45%	100/15 Summer				24.856
5.002	SW26	15 Winter	100	+45%	100/15 Summer				24.717
5.003	SW27	15 Winter	100	+45%	100/15 Summer				24.502
5.004	SW28	15 Winter	100	+45%	100/15 Summer				24.122
5.005	SW29	15 Winter	100	+45%	100/15 Summer				23.996
7.000	SW30	15 Winter	100	+45%					24.907
5.006	SW31	15 Winter	100	+45%	100/15 Summer				23.777
1.013	SW32	15 Winter	100	+45%	100/15 Summer				23.661
1.014	SW33	15 Winter	100	+45%	100/15 Summer				23.129
1.015	SW34	15 Winter	100	+45%	100/15 Summer				22.571
8.000	SW35	15 Winter	100	+45%					23.051
8.001	SW36	15 Winter	100	+45%	100/15 Summer				22.614
1.016	SW37	15 Winter	100	+45%	100/15 Summer				22.515
1.017	SW38	15 Winter	100	+45%	100/15 Summer				22.495
9.000	SW39	15 Winter	100	+45%	100/15 Summer				23.787
9.001	SW40	15 Winter	100	+45%	100/15 Summer				23.692
10.000	SW41	15 Winter	100	+45%	100/15 Summer				26.172
10.001	SW42	15 Winter	100	+45%	100/15 Summer				25.572
10.002	SW43	15 Winter	100	+45%	100/15 Summer				25.485
10.003	SW44	15 Winter	100	+45%	100/15 Summer				25.190
10.004	SW45	15 Winter	100	+45%	100/15 Summer				23.957
11.000	SW46	15 Winter	100	+45%	100/15 Summer				24.578
11.001	SW47	15 Winter	100	+45%	100/15 Summer				24.416
11.002	SW48	15 Winter	100	+45%	100/15 Summer				23.575
10.005	SW49	15 Winter	100	+45%	100/15 Summer				23.750
9.002	SW50	15 Winter	100	+45%	100/15 Summer				23.525
9.003	SW51	15 Winter	100	+45%	100/15 Summer				23.091
12.000	SW52	15 Winter	100	+45%	100/15 Summer				23.339
9.004	SW53	15 Winter	100	+45%	100/15 Summer				22.566
13.000	SW54	15 Winter	100	+45%					22.986
13.001	SW55	15 Winter	100	+45%					22.423
14.000	SW56	15 Winter	100	+45%	100/15 Summer				24.022
14.001	SW57	15 Winter	100	+45%					22.841

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	SW11	-0.149	0.000	0.39			136.4	OK	
4.000	SW12	0.044	0.000	0.45			13.7	SURCHARGED	
4.001	SW13	0.610	0.000	1.10			19.4	FLOOD RISK	
4.002	SW14	0.637	0.000	1.11			46.8	FLOOD RISK	
1.009	SW15	0.278	0.000	1.10			256.1	SURCHARGED	
1.010	SW16	0.202	0.000	1.54			329.4	SURCHARGED	
1.011	SW17	-0.162	0.000	0.73			381.3	OK	
1.012	SW18	0.604	0.000	1.08			386.4	SURCHARGED	
5.000	SW19	-0.130	0.000	0.37			21.4	OK	
5.001	SW20	0.100	0.000	0.94			54.5	SURCHARGED	
6.000	SW21	0.130	0.000	0.63			56.6	SURCHARGED	
6.001	SW22	0.782	0.000	0.71			89.8	SURCHARGED	
6.002	SW23	0.897	0.000	0.69			91.7	FLOOD RISK	
6.003	SW24	1.136	0.000	2.25			149.4	SURCHARGED	
6.004	SW25	0.445	0.000	0.84		13	105.9	SURCHARGED	
5.002	SW26	0.586	0.000	1.26		20	99.3	SURCHARGED	
5.003	SW27	0.508	0.000	1.25			106.1	SURCHARGED	
5.004	SW28	0.448	0.000	1.39			109.8	SURCHARGED	
5.005	SW29	0.446	0.000	1.36			111.7	SURCHARGED	
7.000	SW30	-0.143	0.000	0.29			27.4	OK	
5.006	SW31	0.412	0.000	0.94			146.4	SURCHARGED	
1.013	SW32	0.586	0.000	1.41			567.5	SURCHARGED	
1.014	SW33	0.334	0.000	1.01			564.7	SURCHARGED	
1.015	SW34	0.271	0.000	0.56			541.6	SURCHARGED*	
8.000	SW35	-0.024	0.000	0.93			51.4	OK	
8.001	SW36	0.233	0.000	0.72			80.5	SURCHARGED	
1.016	SW37	0.395	0.000	1.01			586.0	SURCHARGED*	
1.017	SW38	0.470	0.000	2.37			588.2	SURCHARGED*	
9.000	SW39	0.687	0.000	0.69			31.1	FLOOD RISK	
9.001	SW40	0.725	0.000	0.58			61.4	SURCHARGED	
10.000	SW41	0.072	0.000	0.83			35.1	SURCHARGED	
10.001	SW42	0.672	0.000	0.73			32.7	SURCHARGED	
10.002	SW43	0.715	0.000	0.75			94.0	SURCHARGED	
10.003	SW44	0.982	0.000	1.53			191.1	SURCHARGED	
10.004	SW45	0.311	0.000	0.61			205.9	SURCHARGED	
11.000	SW46	0.728	0.000	0.97			44.7	FLOOD RISK	
11.001	SW47	0.745	0.000	1.78			68.3	SURCHARGED	
11.002	SW48	0.203	0.000	1.42		13	53.3	SURCHARGED	
10.005	SW49	0.563	0.000	0.56			209.3	SURCHARGED	
9.002	SW50	1.080	0.000	1.93			284.7	FLOOD RISK	
9.003	SW51	0.763	0.000	2.02			299.9	FLOOD RISK	
12.000	SW52	0.524	0.000	1.25			36.8	SURCHARGED	
9.004	SW53	0.365	0.000	1.28			343.9	FLOOD RISK	
13.000	SW54	-0.064	0.000	0.84			41.7	OK	
13.001	SW55	-0.095	0.000	0.62			62.7	OK	
14.000	SW56	0.992	0.000	2.51			41.7	FLOOD RISK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
14.001	SW57	-0.004	0.000	0.94		13	41.3	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
15.000	SW58	15 Winter	100	+45%	100/15 Summer				23.965
14.002	SW59	15 Winter	100	+45%	100/15 Summer				22.766
16.000	SW60	15 Winter	100	+45%					23.266
14.003	SW61	15 Winter	100	+45%	100/15 Summer				22.466
14.004	SW62	30 Winter	100	+45%	100/15 Summer				22.356
14.005	SW63	15 Winter	100	+45%	100/15 Summer				22.291
9.005	SW64	960 Winter	100	+45%	100/15 Summer				22.189
1.018	SW65	960 Winter	100	+45%	100/15 Summer				22.187

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
15.000	SW58	0.265	0.000	1.00			37.0	SURCHARGED	
14.002	SW59	0.256	0.000	1.02			82.3	SURCHARGED	
16.000	SW60	-0.234	0.000	0.11			23.7	OK	
14.003	SW61	0.241	0.000	2.36			132.5	SURCHARGED	
14.004	SW62	0.173	0.000	1.41		24	80.6	SURCHARGED	
14.005	SW63	0.155	0.000	0.74			68.7	SURCHARGED	
9.005	SW64	0.214	0.000	0.30			60.7	SURCHARGED	
1.018	SW65	0.637	0.000	0.08			27.3	SURCHARGED	

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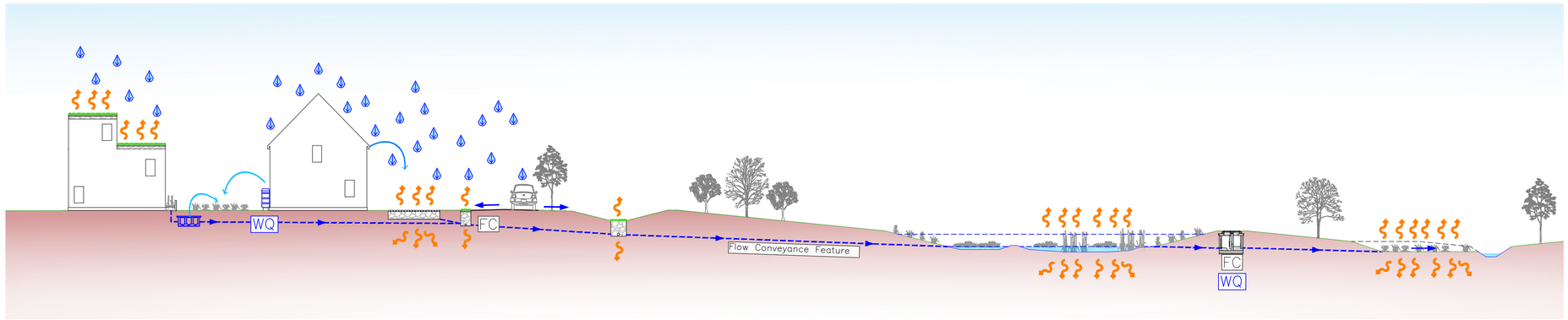
Appendix H SuDS Management Train Drawing

KEY

- Rainfall
- Interception Losses (Evapotranspiration / Infiltration)
- Water Reuse
- WQ — Water Quality Device (Oil Separator / Vortex Separator)
- FC — Flow Control Device (Orifice / Vortex Flow Control)
- Overland Flow
- Surface Water Sewer (connecting SuDS Features)



DEVELOPMENT TYPE	Commercial / Public	Residential	Private / Shared Parking	Public Highway	Conveyance Features		Green Infrastructure / Public Open Space	Watercourse Corridor
MANAGEMENT TRAIN	PREVENTION → SOURCE CONTROL → SITE / REGIONAL CONTROL							
SuDS FEATURE	Rainwater Harvesting (Reuse for irrigation e.g Rainwater Butts) Green Roofs Bioretention Areas / Rain Gardens Rills	Rainwater Harvesting (Reuse for irrigation e.g Rainwater Butts) Porous Paving Tanks Flow Control Devices		Swales Bioretention Areas Filter Strips Filter Drains			Strategic SuDS incorporating sediment forbays, wetland areas, micropools at the outlet Flow Control Devices Water Quality Devices	Outfall Swale
MAINTENANCE RESPONSIBILITY	Commercial or Public Tenants	Homeowners	Homeowners / Management Company	Highway Authority	Southern Water / Management Company		Southern Water / Management Company	Southern Water / Management Company

PFA consulting

Stratton Park House, Wanborough Road
Swindon, SN3 4HG

Telephone
01793 828000

Website
www.pfaplc.com

For Planning
This drawing is produced for the purposes of supporting a planning application and should not be relied upon for tender, pricing, or construction purposes.

NOTES

1. Drawing to be read in conjunction with Flood Risk Assessment and Water Management Strategy produced by PFA Consulting (Document Ref: G277–DOC01 Issue 2, Dated May 2021) and Preliminary Water Management Strategy Plan (Drawing No. G277/21 Rev C & G277/22 Rev C).
2. Future design of upstream Source Control & Site Control to take account of the principles established in in the Water Management Strategy and this drawing.

Rev	Date	Description	Drawn	Check
#	26.11.20	First Issue.	BF	MWS
A	21.05.21	Cross references updated	DAB	MWS

Status
FOR PLANNING

Client
Eastleigh Borough Council

Project
One Horton Heath
Hampshire

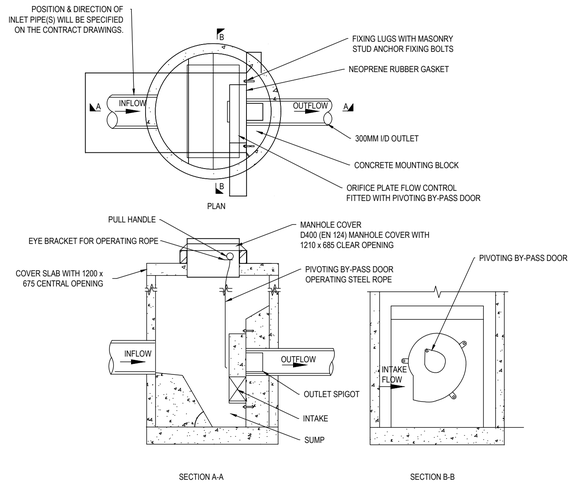
Drawing Title
SuDS Management Train

Drawing No. G277/24 Rev A

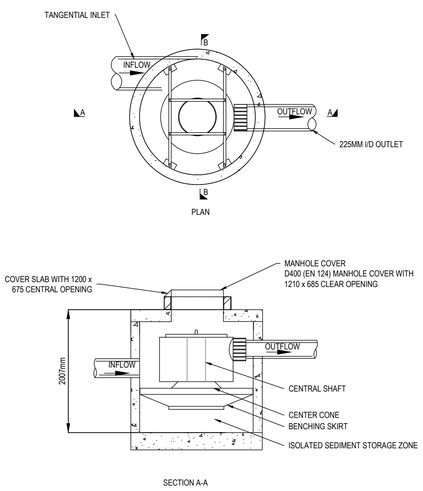
Date: November 2020 | Scale: NTS @ A1

E-Mail: bfox@pfaplc.com

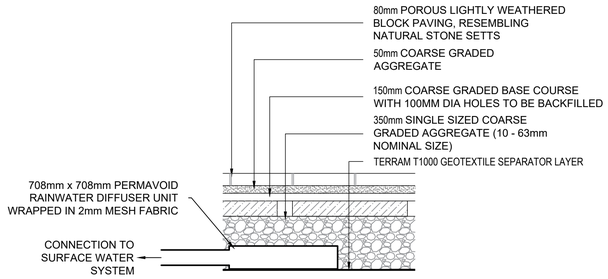
Appendix I Drainage Construction Details



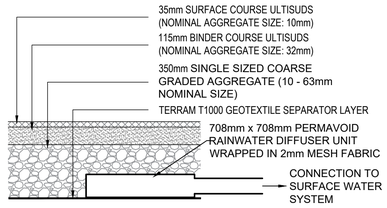
FLOW CONTROL CHAMBER HYDRO-BRAKE



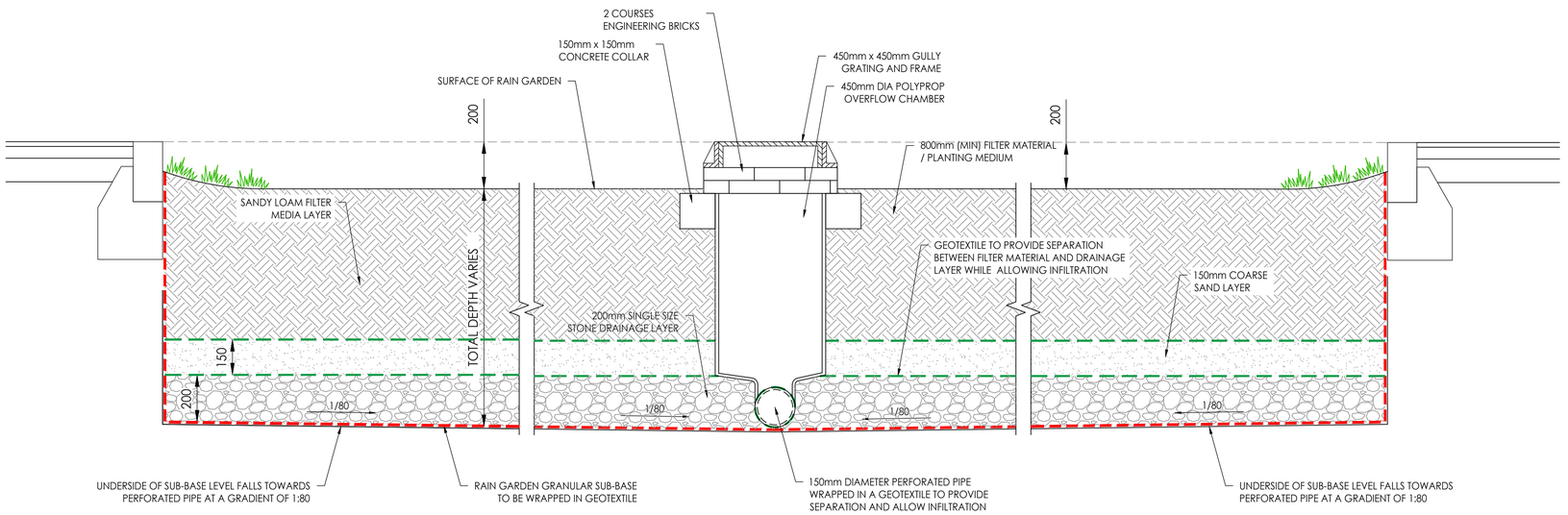
DOWNSTEAM DEFENDER



TYPICAL CONNECTION FROM PERMEABLE BLOCK PAVING TO SURFACE WATER SYSTEM



TYPICAL CONNECTION FROM PERMEABLE ASPHALT TO SURFACE WATER SYSTEM



TYPICAL SECTION THROUGH RAIN GARDEN

NOT TO SCALE

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P01 FIRST ISSUE		JLW	DH	2025.11.18
Issued/Revision		By	Appd	YYYY.MM.DD
	LG	JLW	DH	2025.11.18
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

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Client/Project Logo

EASTLEIGH BOROUGH COUNCIL

Client/Project

ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title

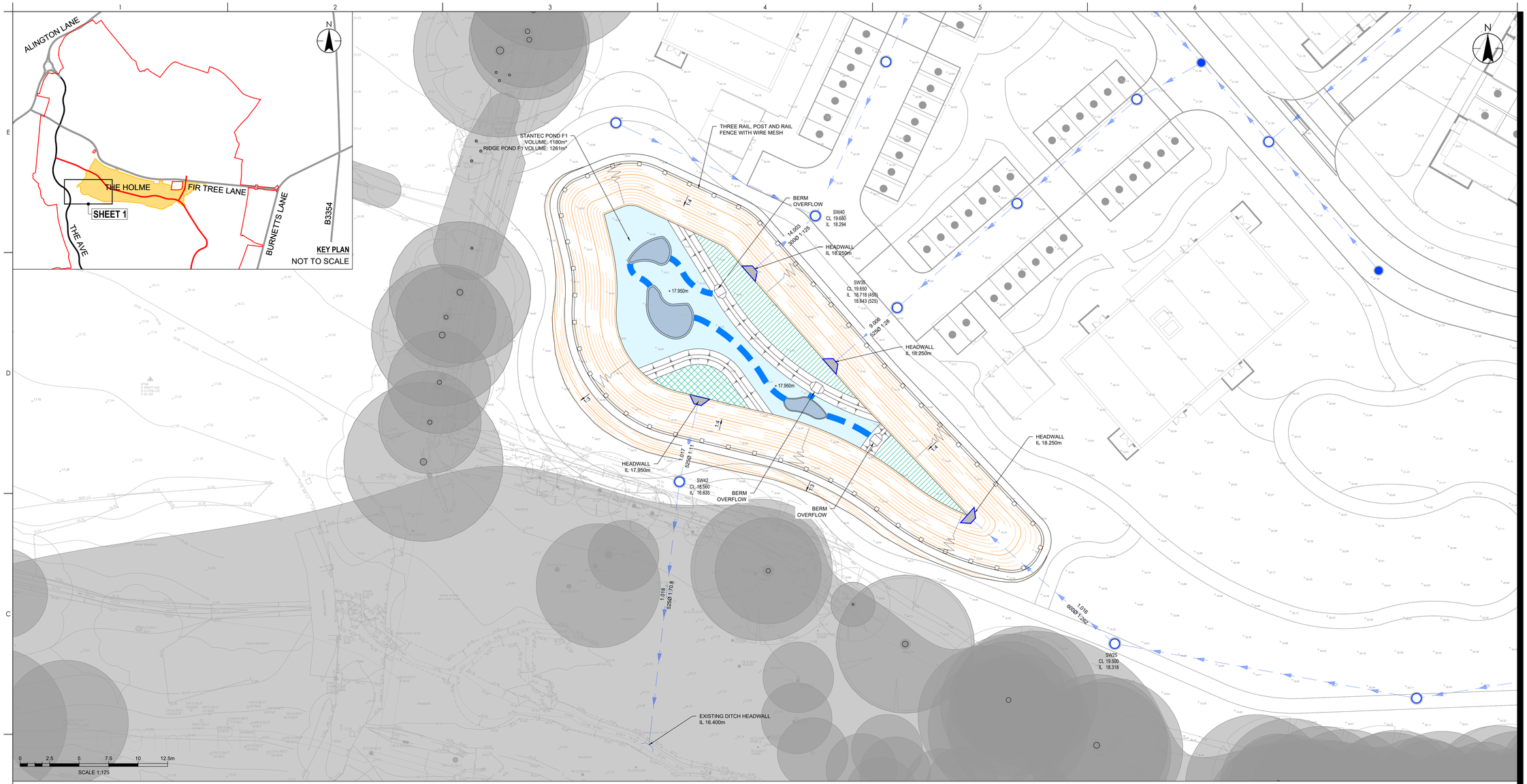
THE HOLME & HOMESTAL (PLOT 07 & 08)

DRAINAGE CONSTRUCTION DETAILS

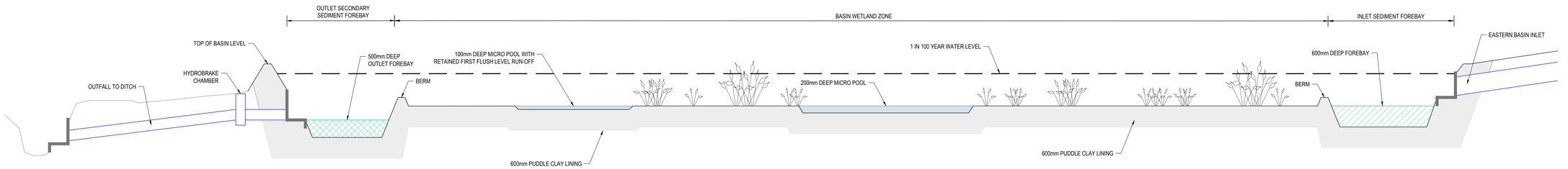
Project No.	A1 Scale
332612639	AS SHOWN
Revision	**Drawing No.**
P01	**332612639-STN-13-XX-DR-C-0531**

Plotted: 25.11.2025 2025.11.20 14:54:01 PM By: Wilson, Jude
DOCSHL-MEP-SDA1 - \\Cdn-hfx01-fs01\projects\332612639 - one horton heath\2000 - cad\01 design\cad\dwg\13 - the holme mrs\332612639-stn-13-xx-dr-c-0531

Appendix J SuDS Basin Layouts



CROSS SECTION THROUGH ATTENUATION BASIN
NOT TO SCALE



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6. TOPOGRAPHICAL SURVEY PROVIDED BY ENCOMPASS SURVEYS UNDERTAKEN ON SEPTEMBER 2024. ADDITIONAL SURVEY OF FIR TREE LANE PROVIDED BY ENCOMPASS GEOSPATIAL UNDERTAKEN ON JULY 2025.
7. TREE SURVEY BASED ON DRAWING 11705_P36 & 11705_P37 PROVIDED BY TYLER GRANGE UNDERTAKEN ON JUNE 2025.
8. THE HOLME AND HOMESTAL HOUSING LAYOUT BASED ON DRAWING 3423-PLB-ZZ-ZZ-M3-A-1020-ProposedSitePlan-P4 PROVIDED BY ARCHITECTURE PLB (RECEIVED 03.12.2025).
9. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION (DCG).

KEY

- PROPOSED MIRCO POOL
- PROPOSED INLET SEDIMENT FOREBAY
- PROPOSED OUTLET SECONDARY SEDIMENT FOREBAY
- PROPOSED BERM
- PROPOSED WETLAND ZONE
- PROPOSED LOW FLOW CHANNEL
- PROPOSED MAJOR CONTOUR AT 0.500m INTERVAL
- PROPOSED MINOR CONTOUR AT 0.100m INTERVAL

PROPOSED (S104 ADOPTABLE)

- PROPOSED SURFACE WATER SEWER AND
- PROPOSED HEADWALL

P03 BERM ADDED TO BASIN	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND BASIN DETAILS AMENDED TO SUIT	JLW	DH	2025.12.09
P01 FIRST ISSUE	JLW	DH	2025.11.18
Issued/Revision	By	Appd	YYYY.MM.DD
	WH	JLW	DH	2025.11.18
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title
THE HOLME (PLOT 08)

POND F1 ATTENUATION BASIN DETAILS

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	**332612639-STN-13-XX-DR-C-0521**

Plotted: 19.02.2026 20:52:49 BY BOLTON-SHAW, Amy
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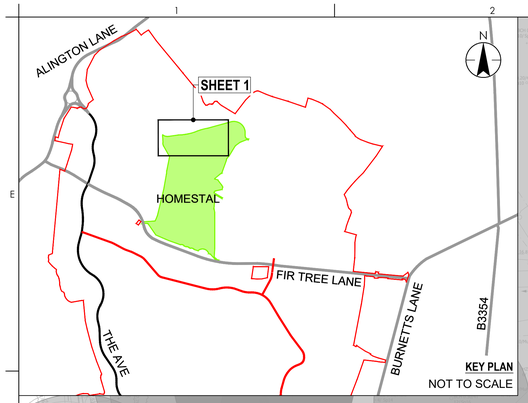


ATTENUATION BASIN
BED LEVEL = 21.250
BED AREA = 2.012m² WITH 1:3 SIDE SLOPES
COVER LEVEL = 22.900
AREA AT COVER LEVEL = 3,526m²
FREEBOARD = 300mm
TOP WATER LEVEL (1:100YR + 40% CLIMATE CHANGE) = 22.164

HEADWALL
IL 19.480m

HEADWALL
IL 21.250m

SW78
CL 22.500
IL 21.250

+21.250

HEADWALL
IL 21.400m

HEADWALL
SW38
IL 21.500m

HEADWALL
SW37
IL 21.520m

SWALE
1:150

DOWNSTREAM
DEFENDER

8.001
2250 1:10

SW36
CL 23.281
IL 22.156

DOWNSTREAM
DEFENDER

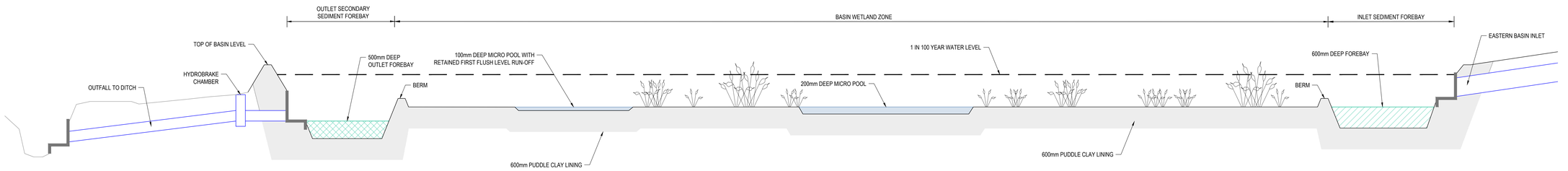
9.005
5250 1:300

SW77
CL 23.044
IL 21.750 (225)
21.675 (300)
21.450 (525)

HEADWALL
IL 21.400m

0 4 8 12 16 20m
SCALE 1:200

CROSS SECTION THROUGH ATTENUATION BASIN
NOT TO SCALE



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7. TREE SURVEY BASED ON DRAWING 11705_P36 & 11705_P37 PROVIDED BY TYLER GRANGE UNDERTAKEN ON JUNE 2025.
8. THE HOLME AND HOMESTAL HOUSING LAYOUT BASED ON DRAWING 3423-PLB-ZZ-ZZ-M3-A-1020-ProposedSitePlan-P4 PROVIDED BY ARCHITECTURE PLB (RECEIVED 03.12.2025).
9. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION (DCG).

KEY

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- PROPOSED INLET SEDIMENT FOREBAY
- PROPOSED OUTLET SECONDARY SEDIMENT FOREBAY
- PROPOSED BERM
- PROPOSED WETLAND ZONE
- PROPOSED LOW FLOW CHANNEL
- PROPOSED MAJOR CONTOUR AT 0.500m INTERVAL
- PROPOSED MINOR CONTOUR AT 0.100m INTERVAL

PROPOSED (S104 ADOPTABLE)

- PROPOSED SURFACE WATER SEWER AND
- PROPOSED HEADWALL

P02	MASTERPLAN LAYOUT UPDATED AND BASIN DETAILS AMENDED TO SUIT	JLW	DH	2025.12.09
P01	FIRST ISSUE	JLW	DH	2025.11.18
Issued/Revision		By	Appd	YYYY.MM.DD
		WH	JLW	DH	2025.12.11
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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Client/Project

ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title

HOMESTAL (PLOT 07)

ATTENUATION BASIN DETAILS

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P02	**332612639-STN-14-XX-DR-C-0521**

Plotted: 12.12.2025 20:12:12 BST | Plot By: William_Joffe
DrawingLocation: C:\Users\william.joffe\Documents\332612639 - one horton heath (2025) - civils\3D design\model\dwg\01.14 - homestal-mmc2026-0826-dm-14-xx-dr-c-0521