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Revision 01

Sizewell C Project

CWDA Information Request Response Document

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REVISION HISTORY

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1 INFORMATION REQUEST RESPONSES

Table 1: Sizewell C response to EA request for information (Ref: EPR/RP3820SH/A001) for CWDA 19 Permit Application (24 May 2024)

Information Request Question Ref.	Question:	SZC Response:
1a	Please confirm if any (or no) pre-application engagement has been undertaken by SZC with Natural England and the local internal drainage board (IDB)/water management board (WMB) regarding your proposals under the CWDA18 permit application. For example, to assist you with the selection of relevant designated/protected receptors (i.e. habitats and species) that NE have recommended SZC incorporate within your Habitats Regulations/CRoW Act supporting information, or how you may have proposed to discharge based on the IDB/WMB's advice.	Whilst no formal pre-application engagement has been undertaken with Natural England specifically in relation to the CWDA/18 permit application; engagement was undertaken with Natural England in September 2023 to discuss the scope of the permit application as well as during development of the DCO sHRA. The selection of relevant designated / protected receptors identified in the DCO HRA remains applicable as no changes have been made since the DCO application (i.e., same site, same surrounding features to consider). We anticipate that further engagement with Natural England may be undertaken during the permit determination / consultation phase. Engagement is on-going with the IDB/WMB in relation to the permits / consents that will overlap or interface with the discharges proposed within the CWDA/18 application. Furthermore, Suffolk County Council and the IDB were involved during early discussions relating to proposed discharging activities, before formal pre-application with the EA commenced in Q3 2023.
1b	Please also confirm if and when the relevant applications will be submitted from SZC to the local IDB/WMB for the relevant permissions under their jurisdiction (and applicable byelaws) regarding the relevant inland discharges under CWDA18?	Discussions are on-going between the IDB/WMB and the SZC permitting team. Applications are expected to be submitted for relevant permissions (e.g., in relation to the construction of the outfalls required for the proposed discharges in CWDA/18) in approximately 2 months from now.

2	**Query relating to section 4.4. (discharge stream A – Outlet EO1 – TMO) of the main SZC technical supporting information document (101228245):** This section states: *The discharge flow rate from Outlet EO1 will be limited to a maximum of 200 l/s. This figure has been calculated on the design of the outfall itself (pipe diameter), which has taken into consideration the 24-hour half-drain time requirement for attenuation structures, such as lagoons, which are expected to be constructed in the MCA as required to hold and aid settlement of run-off prior to discharge. The discharge from the TMO will be intermittent, dependent upon rainfall and dewatering activities. The flow rate will be controlled from the treatment plant system(s) that will be incorporated as part of the discharge treatment train.* Please clarify how the maximum rate of 200l/s was derived, and what the proposed storage volume/capacity (in m^3) of the required attenuation structures/settlement lagoons will be.	200 l/s is the discharge rate agreed during the DCO Basic Design stage and can be found in the SZC Drainage Strategy Annex 2A.5 Explanatory Technical Note Table 8-7 as submitted with this response. This value was derived by splitting the contributing area into different land uses and assigning runoff co-efficient values appropriate to the land use. The run-off was modelled for a 1 in 100 year + 20% climate change storm event and a catchment area discharge rate was calculated to allow a maximum half-drain down time of 24 hours for the attenuation structures. Added to this rate were contributions from other parts of the site that were assumed to be needed at the time. The current project design proposes two attenuation lagoons with capacities of 2750m^3 and 450m^3.
3a	**Queries relating to section 4.6 (discharge stream C – Outlet O5 – Northern TCA) of the main SZC technical supporting information document (101228245) in relation to:** This section states: *The maximum discharge flow rate from Outlet O5 will be restricted to 35 l/s via a headwall. This has been designed so as not to exceed the greenfield run-off rate agreed at the DCO stage. This will be managed by pipe size selection, flow control (such as a hydro brake) or similar. The maximum volume that therefore could be discharged in a 24-hour period is 3,024 m^3 from Outlet O5.* Please clarify which greenfield run-off rate was agreed at the DCO stage for this outlet (1l/s/ha or 2l/s/ha) and provide a calculation to demonstrate how the rate of 35l/s was derived.	Due to the natural soils having high permeability, greenfield run-off rates for regular rainfall events are very low and use of such rates would result in impractical storage requirements. SZC have therefore proposed to restrict discharge rates to 1l/s/ha or QBAR, whichever is greater, with acknowledgement of the sensitive surrounding environments and following EA guidance for minimum discharge rates (Rainfall Runoff Management for Developments Rev E). It should be noted this is a peak discharge rate and discharges from regular rainfall events will likely be lower than this. For Outlet O5 a greenfield run-off rate of 1 l/s/ha has been used. The catchment area is 35.216 ha and this results in a max discharge rate of 35.2 l/s (rounded to 35 l/s).
3b	When stating 'Marsh Harrier Habitat', please confirm if this relates to the Marsh Harrier Lagoon?	Yes.

3c	Please confirm if this is a sealed/lined lagoon, or does the lagoon allow percolation into the surrounding groundwater?	The Marsh Harrier Habitat is a groundwater fed lagoon and is therefore not lined. WMZ 5 will be lined (which is where the rainfall-dependent surface water run-off will be captured prior to discharge). Treated surface water from WMZ 5 is proposed to outfall into the Marsh Harrier Habitat at 35 l/s (as described above). The Marsh Harrier Habitat then has a 35 l/s (peak) overflow into the adjacent watercourse. The purpose of this is to provide a source of water to the Marsh Harrier Habitat if water levels drop. The Marsh Harrier Habitat will maintain a level of water at all times and therefore the discharge of the treated surface water run-off from WMZ 5 is not considered to constitute a separate groundwater activity. The small amount of surface water that will be discharged from WMZ5 is therefore not expected to be groundwater percolation.
3d	Please confirm the storage capacity/volume (in cubic metres (m^3)) of the Marsh Harrier Habitat/Lagoon.	The Marsh Harrier Habitat has a storage capacity of approximately 66,000m^3.
3e	Please provide a site plan to demonstrate the interaction between WMZ 5 basin/lagoons (as displayed in the site plan provided as Appendix E (WMZ 5 drawing)) and the outfall into carrier drain (CD) to demonstrate the route of the carrier drain and discharge point into the Marsh Harrier lagoon/habitat (as displayed and provided in the site plan provided as Appendix F (Outlet O5 drawing)).	Two site plans have been provided as part of the permit application (Appendix E and F). Appendix E shows the WMZ 5 basin (adjacent to a water resource storage area) which will capture surface water run-off from the northern Temporary Construction Area (as described in Section 3.2.3 of the main technical supporting document). Appendix F shows the connection into the Marsh Harrier Habitat and the location of Outlet O5, which provides the overflow outfall into the receiving receptor (this constitutes the proposed discharge activity). It has been discussed and acknowledged with the EA (on a call with the Permitting Officer dated 21/05/2024) that these are currently the only design drawings which are available to be shared publicly (i.e., not protectively marked); however SZC have requested an additional drawing to be produced showing the interaction between the WMZ 5 basin and Marsh Harrier Habitat. This will be provided within 4 weeks of this response.
3f	The site plan provided as Appendix F (Outlet O5 drawing) does not display the entire extent and boundary of the Marsh Harrier habitat/lagoon to the south. Please provide a site plan to provide this clarification.	As above - a site plan showing the entire extent of the Marsh Harrier Habitat will be provided within 4 weeks of this response.

3g	Is this restriction provided on the outlet at O5 (TM 46424 65825), or the carrier drain outlet from WMZ5 into the Marsh Harrier Habitat/Lagoon (as shown via the site plan within Appendix F?)	The restriction relates to the discharge from both WMZ 5 to the Marsh Harrier Habitat and then also from Outlet O5 to the receiving watercourse. Either a hydro brake or pump flow control will be used to restrict the flow, as stated in Section 5 of the main technical supporting document.
3h	This section states: *The discharge from the overflow Outlet O5 will therefore be intermittent and should only occur when water levels are higher.* Please clarify and confirm what constitutes a 'high level'?	The WMZ 5 basin will be connected to the Marsh Harrier Habitat, to assist in maintaining water levels in the Habitat. A high level overflow from the Marsh Harrier Habitat will discharge through Outlet O5 to the receiving watercourse. The level of the overflow from the Marsh Harrier Habitat is currently under design review therefore this information is still to be clarified; it can however be provided at a later date once final designs have been approved.
4a	Section 4.7 Discharge Stream D (Outlet O6a) Section 4.8 Discharge Stream E (Outlet O6b) Section 4.9 Discharge Stream F (Outlet O6c) Section 4.11 Discharge Stream H (Outlet O8a) It is stated that maximum discharge rates have been defined by greenfield run-off rates, defined by catchment area. Please confirm what the greenfield run-off rates for the relevant catchments (please also confirm the proposed catchment area size) for each discharge stream.	See detailed explanation in Section 2 of this document.

4b	We need to be able to understand how the proposed maximum discharge rates (l/s) and volumes (m^3/day) have been derived, and how they interact (as it is not immediately apparent how the maximum volumes relate to the proposed maximum discharge rates, as per the example below). We also need to understand which volume is proposed to be permitted to provide you with operational flexibility. Therefore, please provide explanation and clear calculation breakdowns of proposed maximum volumes and rates to support your application for discharge streams D, E, F and H. Example based on data in table 10 (for discharge steam D – AD6 outlet O6a) Requested maximum discharge flow rates: •Discharge rate of 5l/s (construction run-off only): this would equate to an assumed maximum discharge volume of 432m^3/day •Discharge rate of 216l/s (construction, WMZ6 and highway run-off based on worst case 1 in 100-year storm + 40% climate change allowance): this would equate to an assumed maximum discharge volume of 18,662.4m^3/day Requested maximum discharge volumes (which differ from the assumed volumes calculated above): •972m^3/day (construction run-off only): this would equate to an assumed discharge rate of 11.25l/s •4,992m^3/day (combined construction, highway and WMZ6 based on 1 in 5-year storm event): this would equate to an assumed discharge rate of 57.8l/s •9,859m^3/day (combined construction, highway and WMZ6 based on 1 in 100-year storm event): this would equate to an assumed discharge rate of 114.1l/s The information and clarification above are required for duly making to allow us to begin our risk assessment processes (e.g. for water quality, HRA, CROW Act assessment purposes), and for clarity when we consult the general public on the application during the publication phase	See detailed explanation in Section 2 of this document.

5a	**Query relating to section 4.10 (Discharge stream G (Outlet O7 – ACA) and table 13) of the main SZC technical supporting information document (101228245):** a.) This section (4.10.1) states "*ACA has an area of approximately 30 ha…flow rates have been calculated using the greenfield runoff rate (2 l/s/ha) agreed at DCO stage. Flows from the WMZ 7 basin at Outlet O7 will therefore be restricted to 62 l/s. The maximum volume of effluent that could be discharged via Outlet O7 in a 24-hour period is 5,357 m³*". Please clarify how a rate of 62l/s was derived to provide a volume of 5,357m³. For example, based on the information provided, from an area of 30ha it is assumed that a (30ha x 2l/s/ha) x 86,400 = 5,184,000 litres or 5,184m³.	The exact catchment area for Outlet O7 is 25.535 ha. As using 1 l/s/ha provides a runoff rate that is less than QBAR it is proposed to use the QBAR value for the area that drains directly into WMZ 7. The QBAR value for this area is 62 l/s. This can be found in the DCO Drainage Strategy, Annex 2A.5 Explanatory Technical Note, Table 8-7 where WMZ7 is referred to as ACA East. An approximate catchment area of 30 ha was used in the permit application as this information was and still is under-going final design approval; proposed volumes and flow rates provided in the application will not however change while designs are finalised. Note that Annex 2A.5 from the DCO Drainage Strategy has been submitted with this response document (the full Drainage Strategy is a publicly available document and the reference / link has been included as a footnote in the main technical supporting document to the permit application).
5b	This section also states: *"Run-off from the area of land forming the ACA will be captured in swales and diverted to the WMZ basins. WMZ 9 will then be pumped to WMZ 7*". Please clarify what the proposed pumping rate of WMZ 9 into WMZ 7 will be? What will the storage capacities of WMZ 7 and WMZ 9 (in m³) be?	The pumping rate from WMZ 9 to WMZ 7 will be 10.25 l/s based on the QBAR value for the area draining into WMZ 9. This can be found in the DCO Drainage Strategy, Annex 2A.5 Explanatory Technical Note (submitted alongside this response), Table 8-7 where WMZ 9 is referred to as ACA West. The storage capacity for WMZ 9 is proposed to be 4,300m³, and the storage capacity for WMZ 7 is proposed to be 21,100m³. These values are subject to design changes however (as stated in the main technical supporting document, some detailed design information is still subject to finalisation).
6	**Query relating to section 4.12 Discharge stream I (WMZ 8 outlet O8) and table 15) of the main SZC technical supporting information document (101228245):** Please provide a breakdown and clarification of how the maximum discharge rate of 10.6l/s (producing a maximum daily discharge volume of 916m³/day) was derived.	For Outlet O8 a greenfield run-off rate of 1 l/s/ha has been used. The catchment area draining into WMZ 8 is approximately 10.6ha. The maximum discharge rate from WMZ 8 will be limited to 10.6l/s, which is based on 1l/s/ha. This can be found in the DCO Drainage Strategy, Annex 2A.5 Explanatory Technical Note (submitted alongside this response), Table 8-7 (provided separately to support this response document).

7	**Query relating to Appendix K (Section 3.2.1.2, page 9):** This section states that where surface water is proposed to be infiltrated to ground, suitable infiltration rates have been confirmed through on-site testing. Can you please confirm what these rates and provide a summary of the testing results?	Infiltration testing has been undertaken to support wider project requirements alongside helping to identify where positive discharge outlets (to watercourse) are likely to be required. A number of infiltration tests have been carried out over the history of the project. These results have been provided in separate tabs of this spreadsheet: Infiltration Test Locations - A map with test locations shown as red dots. Infiltration Test Results 1 – Contains the results from historic ground investigation (GI)campaigns. The methodologies used are variable and are stated in column C. A confidence value has been assigned to each test result indicating its suitability for use. The higher the confidence value the more reliable the results are considered to be. Infiltration Test Results 2 – Results from the latest (and ongoing) infiltration testing campaign. These tests are fully BRE365 compliant so can be considered suitable for use above others that have been obtained. If further questions arise or further discussion is required in relation to the infiltration testing data provided, it is assumed this will be addressed during the permit determination period. We note that this question is raised in relation to Appendix K (which constitutes the sHRA) supporting the application. More detail is provided in the main technical supporting document with regards to background infiltration testing and the wider project drainage strategy. It is therefore advised that the sHRA is read in conjunction with the main technical supporting document, particularly Section 4 which summarises in detail the proposed discharging activities.

8	**Query relating to Appendix K (Section 3.2.1.5, page 9):** It is stated in this section that flow control systems will constrain the rate of discharge. Please clarify how this will be achieved? (for example what type of system(s) is/are proposed to be utilised and how is it operated and maintained?	As above, this information (contained in Appendix K - HRA) is elaborated on in more detail within the main technical supporting document. In summary, flow control systems are still subject to final design. The main technical supporting document refers to the types of system that are anticipated to be used in Section 7.2.3. These are typical construction methods for controlling flow rates used in water discharge activities. Sections 4.1.3, 4.6.1 and 4.11.1 include reference to specific flow control systems where these are known. Section 8 of the main supporting document, the EMS, clarifies what operation and maintenance measures are anticipated to be in place in relation to equipment. Further information can be provided in relation to flow control systems, if required, during determination or upon permit issue (when contractors have been appointed and systems confirmed).
9	**Query relating to Appendix K (Section 3.3.1.5, page 10):** This section states that limiting values have been proposed for pH, suspended solids (SS) and visible oil and grease and that these parameters broadly align with CIRIA guidance. Are these limiting values applied as standard practice or as mitigation? Have the values been selected with the needs of the site in mind?	The limiting values proposed are explained in more detail in Appendix P to the environmental permit application which comprises the Surface Water Baselining Assessment. The values are applied as standard practice for construction water discharge activities. CIRIA is standard construction practice for managing water on construction / urban sites, therefore the guidance has been utilised, alongside the specific site characteristics and surface water characteristics, to propose the limiting values. The values proposed are also done so with similar sites in mind based on experience of the project team.

10	**Query relating to Appendix M (Section 4.8, page 25) and section 4.5.1 of main support document (page 59):** Paragraph 2 of App M's section 4.8, and section 4.5.1 of the main support document states a risk factor of 1.1 is considered appropriate to incorporate possible changes to construction method that may be chosen at a later stage. Please provide clarification within an update version of Appendix M to explain how the value of 1.1 was derived and why is that value considered appropriate?	As discussed with the EA Permitting Officer on 21/05/2024, we are not proposing to update the documents already submitted as part of the application as this would require a formal approval process which would take longer than the 5 working days provided by the EA to respond to these queries. This applies to all questions relating to supporting Appendices. The risk factor was selected based upon professional judgement and confidence in the conceptual site model (CSM) / uncertainty in the construction method. It is noted that there is a conservative assumption that pile caps for both sides of the bridge will be excavated/constructed simultaneously, which doubles the abstraction volume compared to progressing each in turn. This adds a level of conservatism in the flow rate.
11	**Query relating to Appendix N (Section 3.4, page 9):** Within table 3-1, it is unclear what column labelled '*Level*' is. Is that depth at which samples were taken? Please provide clarification on this and confirm what the units represent.	Level refers to the ground level of the borehole recorded in metres above ordnance datum.
12a	**Query relating to Appendix O (Section 5.1.1, page 13):** This section states that '*A calculation to derive the average runoff flows are presented in Table 5-1, which indicates that 398 cubic metres per day (m^3/day) would be discharged on average.*' a.) We are unable to identify the calculation in table 5-1, nor an indication as to where the value of 398 m^3/day is stated. Please provide clarification on this within an updated version of Appendix O.	398 m^3 as stated in the text is a typographic error. 423 m^3, as shown in table 5-1, is correct. it is calculated by multiplying area of Main Construction Area by standard average annual rainfall - inputs and sources are shown in the table.
12b	b). There is no indication as to where the maximum flow rate calculation has come from or how that compares to the volume of 398 m3/day in a. above. Please provide clarification on this.	Maximum flow rate is derived based upon the pump dewatering capacity.
13a	**Query relating to Appendix O (Section 5.1.2, page 16):** a.) Please clarify and explain how the additional risk factor of 1.25 has been derived for the upper envelop total groundwater dewatering volume of 450.5m^3 (360.4m^3 x 1.25 = 450.5m^3). Please clarify and provide this explanation within an amended version of Appendix O.	The risk factor selected is based upon professional judgement and confidence in CSM / uncertainty in the construction method. In this case the construction method involves an open shaft for a period of time, and therefore the risk factor covers potential for additional rainwater ingress during this period, or some early dewatering prior to full sealing of the shaft, leading to greater overall inflow

13b	b.) Within Appendix M (101222451), a risk factor of 1.1 has been utilised. Please provide clarification why these risk factors are different?	Risk factors differ due to different proposed construction methods. In Appendix O the shaft construction method involves an open shaft for a period of time, and therefore the risk factor covers potential for additional rainwater ingress during this period, or some early dewatering prior to full sealing of the shaft, leading to greater overall inflow. in Appendix M it is noted that there is a conservative assumption that pile caps for both sides of the bridge will be excavated/constructed simultaneously, which doubles the abstraction volume compared to progressing each in turn. This adds a level of conservatism in the flow rate.
13c	c.) A calculation of 0.058 m^3 x 9 months x 30 days is calculated to estimate maximum total leakage. Please provide clarification/explanation as to why the calculation includes multiplying by 30 days.	30 days taken as average days in a calendar month. 0.058 m^3 is the daily allowable groundwater leakage rate in the design specification, therefore this is multiplied by the number of days over the 9 month construction period to give a total volume.
14	**Query relating to Appendix O (Section 5.1.2, page 13):** For the desalination intake, please clarify if there is one or multiple shafts that will be constructed. This clarification is required as "shaft" and "shafts" are used within this section (as well as within sections 5.2.3, 6.2, 7.2.2 (title and paragraph 3), 7.3.2 (title), 10 (paragraph 2), table 6-5, for example: *The TMO will also discharge relatively small volumes of groundwater from dewatering during the construction of the Desalination Intake Shaft. The shafts are to be constructed using a wet caisson excavation technique…* If multiple shafts are required, please also confirm the total number required and confirm their proposed locations displayed on a site plan (along with corresponding 10 figure national grid reference (NGR) in the format AB 12345 67890).	There is only one desalination plant intake shaft to be installed within the MCA. This is a typographical error.

15	**Query relating to Appendix O (Section 5.2.1, page 16):** Two documents are referenced in support of the application. However, copies of the two documents do not seem to be included in the application. Therefore, please provide electronic/PDF copies of the two documents: • EW0302 Early Drainage Strategy Technical Note (EDS) (Atkins, March 2020) • EW0320 Surface Water Discharges Report (Atkins ltd, May 2020).	The documents referenced here are internal project design documents. Information considered relevant to support the environmental permit application has been extracted from these and incorporated where necessary specifically to support the discharge activity assessment. It was discussed during Pre-Application with the EA that we will share background design reports where they are considered to be relevant to the proposed discharging activity but only where the information has not already been included in the main technical supporting document for the permit application. The two reports referenced here have been used to inform Appendix O and parts of Section 4 of the main technical supporting document that was submitted as part of the permit application. They are not considered to provide any further benefit to the understanding of the proposed discharge activity. We can provide the reports as not protectively marked documents upon request. As discussed with the EA Permitting Officer on 21/05/2024, this will be subject to internal approval procedure which will take longer than the 5 working day response time.
16	**Query regarding Appendix O (Section 7.2.2, page 29):** This section states *"Fluoranthene presence in groundwater appears isolated and not widespread, and as such it is not generally expected to be present in groundwater abstracted for the shaft construction".* Please provide clarification in the text of this or other relevant section of Appendix O to confirm where the isolated presence of Fluoranthene was detected from the background groundwater borehole quality monitoring. This will be of benefit for any publication of the permit application and allow members of the public/interested parties to understand quickly and easily which is the relevant borehole sample location (as opposed to having to review the appendices within appendix O to identify the relevant sample result).	Please refer to Section 5.2.3 (pages 20 and 21) of Appendix O which provides discussion on fluoranthene sources, locations and distances from the proposed desalination plant intake shaft. P.20 states '*Across the wider SZC groundwater monitoring network, fluoranthene, a polycyclic aromatic hydrocarbon (PAH), has been detected in only three out of 497 groundwater samples collected between 2014 and 2023, and anthracene, another PAH, in one of them. The three affected samples were all collected on 17 November 2021, from boreholes DCBH2019_5, PZ5 and PZ7 (all in the MCA), and were analysed as part of the same laboratory batch. Groundwater from DCBH2019_5 has been analysed on two occasions, with no PAHs detected, while sampling and PZ5 and PZ7 has not been repeated as these are not part of the routine monitoring network'.* Figure 3 shows the location of the boreholes. This information above has been provided within Appendix O. This document can be amended upon request if clarification is required, however as discussed with the EA Permitting Officer on 21/05/2024, this will be subject to internal approval procedure which will take longer than the 5 working day response time.

17	**Query regarding Appendix O (section 8.4, page 35)** This section states: "*Any direct discharge would occur within the wave breaker zone, which means that details of the mixing process will be very dependent on weather conditions (wind strength and direction) and prevailing swell present over a wider sea area. It can be assumed that mixing will be rapid but to quantitatively model it exactly would be potentially impossible".* Please provide further explanation and clarification regarding why it is potentially impossible to quantitatively model the mixing. During the joint SZC/EA level 4 pre-application feedback meeting held on the 08/02/2024 for CWDA/18 (TMO specific meeting), it was discussed (and recorded via SZC action A2) that SZC would elaborate on the quantitative assessment undertaken, and that explanation would be provided following discussions with consultants at Cefas as to why modelling via CORMIX/GETM would not be possible for the TMO discharge at this location. Please provide this additional information/explanation within a revised version of Appendix O.	The Sizewell C standard approach to discharge modelling, which has been accepted by the Environment Agency previously, has been to use the CORMIX model to represent the processes taking place in the initial dilution phase of the mixing process for a discharge from a submerged outfall and the GETM 3D model to assess subsequent dilution and dispersion. CORMIX is a steady state model, producing an instantaneous plume for a particular set of tidal conditions. Therefore, to assess behaviour of the effluent plume over a tidal cycle it is often necessary to undertake multiple model runs, each representing a particular part of the tidal cycle (for example, depending on location, these may include: rising (flood) tide, falling (ebb) tide, high tide level, high tide slack water, low tide level, low tide slack water etc) in order to identify the worst-case which is then examined further. CORMIX also provides a subsystem (Cormix 3) for examination of buoyant discharges entering at the surface of the receiving water but again this is a steady state model and depends on the ability to describe the velocity and density distribution in the receiving water in steady state terms for a period consistent with the time taken for initial dilution to take place and to provide input data on the discharge including its physical geometry (pipe/channel dimensions and angle relative to the receiving water flow) as well as its momentum flux and buoyancy flux. As detailed in Appendix O of the application, Outlet EO1 (the temporary marine outfall) will comprise a 0.561 m diameter pipe with an invert at 1.664 m AOD, discharging onto an apron comprising a porous reno mattress furnished with gabion baffle blocks to break up the discharge flow, thus facilitating flow via the beach material to groundwater, while preventing erosion. The apron will extend for 14.85 m down the beach from the pipe outlet, ending approximately 15 m from the spring high tide mark (MHWS). Its top surface is at 1.484 m AOD, compared with the level of MHWS at 1.230 m AOD and of highest astronomical tide (HAT) of approximately 1.745 m AOD. Thus, the very highest tides will result in sea water covering the apron for short periods with a still-water depth of up to a maximum of 0.261 m. Based on tide gauge data over an eight year period, CEFAS has estimated that the Temporary Marine Outfall apron will be inundated 0.53% of the time, representing 279 hours spread over 171 days in the eight year period (an average of 35 hours a year spread over 21 days). The maximum water level would be 0.081 m above the invert of the 0.561 m diameter pipe; therefore, the pipe will not be submerged even at HAT water level.

17 cont.	As above cell.	With a maximum still water depth over the apron of only 0.261 m when the apron is inundated, wave action even on a relatively calm day will result in regular rise and fall of the water level over the apron and breaking waves will introduce circular currents along a horizontal longshore axis. The wave climate across the apron will also be influenced by wind direction and strength and by any swell present. In many cases this will result in inundation of the apron being periodic. The reflection of larger waves by the headwall will introduce a further complication. Under these conditions, it is not possible to describe a steady state condition for the receiving surface water to feed into a model, even covering a short period. Similarly, the presence of baffle blocks in the effluent outflow and the porous apron means that it will not be possible to derive realistic input in terms of simple discharge geometry and momentum flux of the discharge that would be suitable for input to a model such as CORMIX. The same constraints would apply for any other similar model. A further consideration is that, with mitigation described on page 35 of Appendix O, it will be possible to ensure that ERA Test 1 for discharges to marine waters (EQS compliance at the release point) is complied with. In this case, the substances of concern can be screened out without the requirement for modelling. With respect to the TMO modelling, CEFAS fed back that the standing tide is not expected to reach the TMO, though historical records show that with surges it may reach it approx. 0.5% of the time. Cormix is a simple “end of pipe” model for aquatic discharges and because of this and the points raised above, it was determined that it was not possible to quantitatively model the mixing.
18	**Query regarding Appendix O (References)**: Please provide an electronic (PDF) copy of the following reference report: Atkins Ltd. (August 2023). SZC-EW0400-ATK-XX-000-XXXXXX-NOT-CIV-000011: Desalination Intake Shaft Dewatering. Draft Technical Note. If you consider that the relevant and appropriate sections of this report have already been incorporated into the supporting information, please provide confirmation of the relevant sections of your application and provide justification why the remaining sections are not relevant.	Sections 3.2.1, 4.4 and 5.4 of the main technical supporting document, submitted as part of the permit application, incorporate the relevant information required to support the application from the Desalination Intake Shaft Dewatering Technical Note. Appendix O also contains relevant information. Therefore, a separate copy of the report has not been provided as there is no additional information of relevance to the CWDA permit application in this source document. Remaining sections of the document include high level information on the design of the intake shaft itself (from an engineering perspective) such as material of the shaft and dimensions which are not relevant to the proposed groundwater dewatering during installation of the shaft. The source document can be provided upon request, however, as discussed with the EA Permitting Officer on 21/05/2024, this will be subject to internal approval procedure which will take longer than the 5 working day response time.

19	Appendix O (Drawings) The notes of drawing 1 state that the design of the TMO is subject to change depending on the results of infiltration testing. Please clarify when these test results will be available, and the design finalised.	Information has been provided on infiltration testing (see additional tabs). The drawing and associated commentary is progressing. The draft version was included prior to the H1 assessment being completed. The assessment and proposed discharge rates / volumes will not change based upon results of infiltration testing or any future design changes.
20	**General comment when referring to SZC's DCO:** When referencing anything from SZC's DCO, please provide confirmation of the specific/relevant section, paragraph, and/or page(s). Please provide clarifications for the following six instances to confirm where this agreement is confirmed: a) Main supporting report – Section 4.1.6, page 48 (paragraph 1): Discharge volumes and flow rates have been calculated based on the greenfield run-off rates provided for the catchment areas, where applicable, which was agreed at the DCO stage of the proposed development. b) Main supporting report – Section 4.6.1, page 60 (paragraph 2): This has been designed so as not to exceed the greenfield run-off rate agreed at the DCO stage. c) Main supporting report – Section 4.10.1, page 67 (paragraph 2): Flow rates have been calculated using the greenfield runoff rate (2 l/s/ha) agreed at DCO stage. d) Main supporting report – Section 5.1.1, page 75: All run-off will be restricted to greenfield rates where this requirement applies (as agreed at DCO stage). e) Appendix K – Section 3.2.1.2, page 9: Maximum discharge rates have been defined by the greenfield run-off rates, defined by catchment areas (as agreed at the DCO submission stage). f) Appendix K – Section 5 (table 5-1) page 21: Discharge rates are in accordance with the greenfield run-off rates approved within the DCO application (2 l/s/ha).	As explained in the permit application, it was proposed in the Drainage Strategy (as part of the DCO application which has since been approved and is therefore active) that run-off rates would be in accordance with greenfield run-off rates, where applicable. Reference is made to this throughout the Drainage Strategy (Appendix Q) and elsewhere within the DCO submission (all of which is publicly available information). There is no reference, in the Drainage Strategy, to the specific rates used therefore exact rates are not included in Appendix Q. Rather reference is made throughout to the use of greenfield run-off rates being incorporated. Further information in relation to the specific rates used has been provided however in Annex 2A.5 Explanatory Technical Note submitted as part of this response document. See below for an indication of where rates are referenced elsewhere in the DCO Drainage Strategy: a) DCO Drainage Strategy Annex 2A.3 Paragraph 2.5.1 b) DCO Drainage Strategy Annex 2A.5 Table 8-2 & Table 8-7 c) DCO Drainage Strategy Annex 2A.5 Tables 8-2 & 8-7 d) DCO Drainage Strategy Annex 2A.5 Tables 8-5 & 8-6 e) DCO Drainage Strategy Annex 2A.5 Tables 8-5 & 8-6 f) DCO Drainage Strategy Annex 2A.5 Tables 8-5, 8-6 & 8-7 g) DCO Drainage Strategy Annex 2A.24: AD6 Drainage Design Note

21	**Question 21: 1, 2, 3, 5, 6, 7, 8, 10, 11** We require electronic versions of underpinning calculations, raw data and data analysis you have used to complete the surface water H1 risk assessment screening tests/steps to support the CWDA18 permit application. This information is required to ensure that we can audit and repeat the calculations you have completed to demonstrate clearance through the various H1 screening tests (to ensure that we can review the data, replicate the same outcomes you have reported, and ensure that the same/correct background data/numbers have been utilised).	The below excel spreadsheets, that were provided as pdf versions in the Appendices submitted as part of the original permit application, have been provided as part of this response: **Q21 1) and 2)** Appendix M SSSI Crossing Appendix C1 - m-BAT assessment, Appendix M SSSI Crossing Appendix C2 - Freshwater EQS Screening Sheet **Q21 2) and 3)** Appendix M SSSI Crossing Appendix E.F - Upstream Surface Water Quality H1 Screening **Q21 5)** Appendix N AD6 App C AND D - GW and SW Data H1 Leiston Bridge **Q21 6)** As above. **Q21 7)** Appendix N AD6 - Appendix E H1 Assessment Issue **Q21 8)** Appendix N ADG - Appendix G m-Bat assessment V2 and Appendix G Final Pb Screening Tool **Q21 10)** Appendix O TMO Assessment - App D Groundwater Quality Screening **Q21 11)** Appendix O TMO Assessment - App E Groundwater discharge coastal H1 assessment Please remember to check all tabs on the spreadsheets provided as they often contain more than one data set.

21	**Appendix M SSSI H1** 4.) Please also address the following issues within a revised version of App M and the electronic versions of supporting data: a) Page 165: the SW H1 risk assessment is labelled as the Phase 1, Part A screening tests, when this page actually appears to represent the Phase 1, Part B annual significant load screening tests for PHSs (priority hazardous substances). Please re-label this section of your application for clarification (which will be of benefit for publication of the application so that members of the public and interested parties have clarification about the data and outputs being presented). b) Page 165: Although Anthracene, Hexachlorobenzene, Hexachlorobutadiene, Mercury, Benzo(a)pyrene and the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3cd)pyrene are listed in the screening, no data has been included to demonstrate that these substances screening out of the risk assessment process. This screening test must be completed using any less than values at face value (given the LODs utilised for the analysis of the groundwater samples from the five boreholes ((C3S, C3D, C4S, C4D and P10) are all above the relevant EQSs for the substances, for example: • Anthracene: • Hexachlorobenzene: • Hexachlorobutadiene: • Mercury: • Benzo(a)pyrene: • Sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3cd)pyrene	As noted above, we are not proposing to issue fully revised versions of Appendices as this will take longer than the 5 day response timeframe however we acknowledge there are some errors in printing of the PDF appendix spreadsheets: a) A typographic error, the page title should indeed be "Phase 1, Part B annual significant load screening tests for PHSs (priority hazardous substances)". Refer to updated PDF's submitted with this response (Appendix M - Revised Appendix F - H1 Screening Tests and Appendix N - Revised Appendix E H1 Assessment Issue Rev 2.1). b) The mean concentration used in the calculated has been included correctly, but the value was inadvertently rounded to zero decimal places, so appears as 0. The individual sample results are included in the appendix F Phase 1, Part A screening tests on pages 161 to 164, and the excel data file of appendix F Part A screening tests. They are not used as part of the load calculation, so were not included in this sheet. For the substances listed (Anthracene, Hexachlorobenzene, Hexachlorobutadiene, Mercury, Benzo(a)pyrene and Sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3cd)pyrene) there are no results above the detection limit in the dataset, and so the load has been calculated from the detection limit, which is included in the assessment sheet on page 165.

21	**Appendix N AD6 H1** 9.) Please also address the following issues within a revised version of App N and the electronic versions of supporting data: a.) The annual significant load test (Phase 1, Part B test) for PHSs (priority hazardous substances) does not appear to have been included within the permit application (Appendix N, section 4.4.2 states that the annual significant load test has been completed and indicates that none of the PHSs would exceed the respective significant load thresholds (for cadmium (dissolved), anthracene, hexachlorobenzene, hexachlorobutadiene, dissolved mercury low level, benzo[a]pyrene and the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3cd)pyrene). However, the annual significant load test is not actually provided within the supporting information report of Appendix N or within its Appendix E. We require the assessment evidence for the Phase 1, Part B test (annual significant load test) to be provided with the permit application at submission to support the outcome states within section 4.4.2 of your report.	The Part B annual significant load screening tests for PHSs (priority hazardous substances) is included in the electronic submission of Appendix N AD6 Appendix E - H1 Assessment Issue (see Tab 2 within this spreadsheet). However it was inadvertently missed from binding into the appendices of the PDF report.
21	**Appendix O TMO Groundwater Assessment** 12.) Please clarify the following query regarding the number of groundwater samples used (query relates to Appendix O, Section 5.2.3 (Groundwater quality): The first paragraph of section 5.3.2 states that twenty-two (22) groundwater samples were screened from seven (7) different borehole locations, which are summarised within table 5-4 (page 18). However, Appendix D (Groundwater Screening Data, provided on pages 325 to 333) and Appendix E (Groundwater discharge coastal and estuarine waters H1 screening assessment, provided on pages 334 to 341) reference a total of twenty-one (21) groundwater samples. Table 5-5 (pages 19 and 20) also only reference 21 samples (within column “no. of exceedances”). Please clarify in 22 or 21 groundwater samples are used within your screening assessment and update your supporting document’s wording accordingly.	We can confirm that a total of 21 samples were collected and included in the screening process.

2 RESPONSE TO QUESTIONS 4A AND 4B:

This section has been written as part of the response to the Environment Agency's Request for Information that was issued for the construction water discharge activity (CWDA) permit application referred to as CWDA/18. This document seeks to provide a response to questions 4a and 4b on the Request for Information which relate to the following discharge streams and outlets:

- Discharge Stream D (Outlet O6a)
- Discharge Stream E (Outlet O6b)
- Discharge Stream F (Outlet O6c)
- Discharge Stream H (Outlet O8a)

2.1 Summary Response to Question 4a:

It was proposed in the Main Drainage Strategy, that accompanied the DCO, that greenfield run-off rates would be used to calculate estimated discharge volumes and flow rates. The DCO has been approved and greenfield run-off rates identified during later design stages. These have been used to provide the discharge volumes and flow rates in the permit application.

For AD6, there are two aspects to the discharge volumes and rates provided:

For the highway run-off volumes, the greenfield run-off rates and catchment area sizes used are included in the table below.

The construction run-off volumes have been calculated using UK CIRIA SUDs guidance; they are also shown in the Table 2 below. These were based on an estimate of water ingress derived from a ground investigation (i.e., estimated ground water levels and subsoil make up) and the required dig levels for the bridge's pile caps as per the current proposed construction methodology (i.e., the use of sheet piles). This is still subject to finalisation following contractor appointment, as explained in the main technical supporting document of the permit application.

Calculations and QBAR rates are shown in Appendix A of this document.

2.2 Summary Response to Question 4b:

For the discharge streams D, E, F, and H the provided volumes and flow rates take into account both construction-related surface water run-off and groundwater **and** average and worst-case volumes of anticipated highway run-off (for the 1 in 5 year and 1 in 100-year storm events, respectively). This is because the construction-related surface water run-off and groundwater is being proposed to be discharged via the permanent highway drainage system that will be constructed first as part of the scheme. As stated in the permit application supporting document, final discharge volumes and flow rates for AD6 are to be agreed with other regulators as required, therefore these may change however they are not expected to increase.

This is explained in Sections 3.2.4, 3.2.5, 3.2.6 and 3.2.8, 4.7, 4.8, 4.9 and 4.11 of the main technical supporting document. Therefore, it was discussed with the EA Permitting Officer that the highest potential volume of discharge (m^3/day) would likely be the one to require permitting. Refer to the Table 2 below.

2.3 Correction to Discharge Volume Outlet O6b (Discharge Stream E)

Note that a minor error has been identified with regards to one of the figures provided for the 1 in 5-year discharge volume at Outlet O6b in the original permit application supporting document. This has been amended and the correct figure included in Table 2 below. This minor change will not affect the Surface Water Pollution Risk Assessment that has been undertaken in relation to the AD6 discharge outlets as this only looked at the construction related discharge of groundwater to surface water; not the additional highway run-off (which is not anticipated to contain any specific substances) which is to what the figure relates.

2.4 Calculations of AD6 Highway Discharge Volumes and Flow Rates

For estimating rainfall-dependent run-off, there are two methods of calculation typically used: the Flood Studies Report (FSR) and the Flood Estimation Handbook (FEH). For the basis of the hydraulic calculations to support AD6 outlets, the FEH data (2013) has been used. This is because from the FEH data produces longer bell curves and therefore a more robust design. This assumes a uniform rainfall across a designated area (see below table).

The relevant FEH data is placed into MicroDrainage software which fundamentally uses the Colebrooke-White equation to derive the volume in the pipe from roughness, gradient and size. The software was deemed most suitable due to the large lengths of pipework involved in all networks across the AD6 scheme.

MicroDrainage modelling was utilised to provide the highway run-off discharge rates and volumes for the Outlets incorporated into the permit application as part of the AD6 scheme. A separate Technical Note is currently in development which elaborates on the full extent of design considerations incorporated into the AD6 water management strategy. This is being produced at the request of Suffolk County Council (SCC); it is currently under-going internal review and can be shared with the Environment Agency once finalised. This covers the entirety of works taking place across the AD6 scheme however so it will not be specific to the proposed water discharging activities in CWDA/18.

A full MicroDrainage model has been produced with the inputs of the rainfall events and two proprietary hydrographs for the watercourses where the discharges are proposed to be made, complete with a hydrobrake that limits flow to 5 l/s (as per the construction related discharge information summarised below). For the purpose of modelling anticipated discharge volumes, the assumption has been made that this flow rate will continually discharge at 5 l/s for a full 24 hours (which is worst-case scenario).

The total volume was derived from the MicroDrainage model for a 1440-minute storm to represent the worst case, as longer duration storms will have a lower daily peak but a higher overall volume of discharge. In the same way the maximum discharge rates in l/s may not be from the peak storm in terms of l/s but may be a lesser storm.

For the inputs and outputs incorporated the MicroDrainage model, please see Appendix C of this document.

Outlet O8a will discharge surface water run-off and highway run-off from the Main Development Site roundabout to the north of the AD6 scheme. This consists of the largest area of new and realigned areas of AD-6 and therefore the largest increase in impermeable area as part of the scheme. Separate discussions have been held with SCC in relation to the proposed discharge flow rates and it has been agreed with SCC that all discharge from this area would be limited to 5 l/s to comply with the SCC SuDS policies as referenced in Sustainable Drainage Systems (SuDS) a Local Design Guide Appendix A to the Suffolk Flood Risk Management Strategy, Suffolk County Council, May 2018 (https://www.suffolk.gov.uk/asset-library/imported/2018-10-01-sfrms-suds-guidance-appendix-

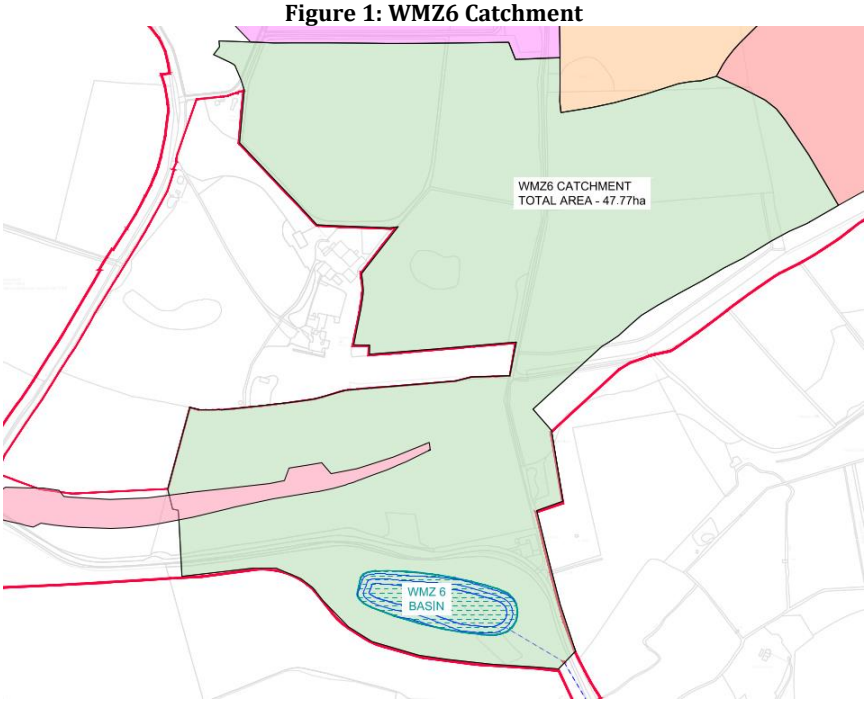
a.pdf). This is anticipated to be via two flow control chamber to ensure the 5 l/s is present for the main discharge.

For the cluster of discharge points O6a, O6b and O6c, the way in which the discharge flow rates and volumes have been calculated need to be reviewed individually.

The proposed discharge from Outlet O6a will comprise:

- Construction surface water (rainfall dependent) run-off and groundwater from dewatering at Leiston Drain Overbridge
- Highways surface water (rainfall dependent) run-off and
- Once operational and when required to be used, overflow construction surface water run-off captured in WMZ 6 (as shown in Figure 1). The maximum discharge from WMZ 6 to Outlet O6a is calculated using a greenfield run-off rate of 1 l/s/ha. The catchment area draining into WMZ 6 is approximately 47.77ha. The maximum discharge rate from Outlet O6a will be limited to 47.8l/s. This can be found in the DCO Drainage Strategy, Annex 2A.5 Explanatory Technical Note, Table 8-7, submitted as part of this response.

Figure 1: WMZ6 Catchment



The remainder of the discharge volume for Outlet O6a is then calculated using the existing hydraulic calculations from the MicroDrainage modelling as described above.

For Outlet O6b, there are no additional flows from external sources (e.g., WMZ basins). Therefore, the volumes here are calculated from the MicroDrainage modelling volumes combined with the proposed construction run-off volumes only (see below table). Here the volumes are simply from the natural catchment on the highway merged with the construction volumes.

Finally, Outlet O6c will comprise a realigned discharge point from the Household Waste Recycling Centre that runs down to the Leiston Drain watercourse. The volumes and rates provided here are from the MicroDrainage modelling (hydraulic highway run-off) plus the anticipated construction volume.

2.5 Construction Run-Off Calculations

Expected construction-related discharge flow rates and volumes have been provided through early contractor involvement (ECI). These are based on a specific draft construction methodology which assumes that discharge flow rates will be controlled by set pump capacities and number of pumps. This has been set at a maximum of 5 l/s (which roughly equates to 290 litres/minute), depending on the amount of time pumping is undertaken. Currently this is anticipated between 08:00 – 17:00 only.

It is not possible to provide exact catchment area sizes for the construction related discharges as the works will move as construction progresses. However, as described above, CIRIA SUDs guidance has been applied to enable an estimated volume to be provided based on restricting flow rates to 5 l/s. Therefore, the 5 l/s flow rate will not be exceeded, and this will represent the maximum flow rate regardless of the area size.

The overall discharge flow rates and volumes presented in the permit application are **worst-case scenario and** are not expected to be always experienced. The figures provided are repeated in Table 2 (with one amendment to the 1 in 5-year discharge volume at Outlet O6b, as described above in Section 2.3). Table 2 includes a summary of how each rate and volume has been calculated, including catchment area sizes (where applicable, e.g., to the highways run-off) and greenfield run-off rates, where applicable. There may be an overlap with some parts of the construction area and highway run-off (as the construction works will be mobile), therefore a worse-case scenario is taken. Overall, the highest rates and volumes comprise both construction-related run-off (from rainfall dependent surface water and groundwater) and highway surface water discharge (which has been calculated utilising 2013 FEH data and MicroDrainage modelling as described above). In the case of Outlet O6a, discharge from WMZ 6 is also included. As a worst-case scenario approach has been adopted, the figures provided for Outlet O6a assume WMZ 6 will be in operation continuously (which is unlikely).

These discharge streams (construction run-off and highway run-off) cannot be physically separated in the surface water drainage system that is proposed to be used to carry the discharge to the receiving receptor; this was discussed during pre-application discussions with the Environment Agency, and it was agreed that the rates and volumes provided in the application should therefore include the peak highway run-off too as an absolute worse-case scenario. It is expected that the absolute worst-case scenario (i.e. highest figures provided in the below table) will therefore be incorporated into the permit.

Table 2: Summary of rates and volumes for each outfall

Outlet	Greenfield Run-Off Rates and Catchment Area Sizes used for modelling / calculations*	Proposed Maximum Discharge Flow Rate**	Proposed Discharge Volumes
O6a	Total Highways Area Drained: 0.782 ha Greenfield run off rate for the 1 in 100 year event is calculated at 6.43 l/s. See Appendix B for more information. As described above, the exact catchment area of the construction works run-off is not definitive due to the fact the works will progress along parts of the highway. The flow rate will however be limited to 5 l/s (as per CIRIA SUDs guidance), which has been used to provide an estimated pumped discharge volume. This applies to all below discharge outlets.	216 l/s (47.1 l/s from WMZ 6, 5 l/s construction discharge to be restricted though set pump capacity with estimated maximum flow rate of 290 l/s minute, 2 pumps operating 08:00-17:00 for example, remainder is from highways run-off). This figure includes a 40% allowance to comply with requirements set out by SCC for the extreme rainfall events. This is part of the standards as set out in CG-501 in the DMRB.	972 m^3/day (432 m^3/day anticipated from construction surface water run-off and 540 m^3/day groundwater dewatering – refer to original permit application for description). Combined discharge (construction, highway, WMZ 6): 4,992 m^3/day (based on a 1 in 5-year storm event) **or** 9,859 m^3/day (based on a 1 in 100-year storm event) This is derived from the peak highways discharge of a 1440-minute storm with the 47 l/s

			included from WMZ 6. This is combined with the 972 m³/day construction volume provided by ECI.
O6b	Total Highways Area Drained: 0.511 ha Greenfield run off rate for the 1 in 100-year event is calculated at 4.2 l/s. See Appendix B for more information.	198 l/s (5 l/s from construction discharge which is to be restricted by a set pump capacity and remainder from highways run-off)	972 m³/day (as above) Combined: 1030 m³/day (*note this figure has been amended since the original permit application was submitted) (based on a 1 in 5-year event) **or** 1,110 m³/day (based on a 1 in 100-year event). The 1030 m³ consists of the 972 m³ construction run-off and peak discharge rate from the highway of 58m³ for the 1 in 5 year event, or plus 128m³ for the 1 in 100 year event.
O6c	Total Highways Area Drained: 0.099 ha Greenfield run off rate for the 1 in 100 is calculated at 0.5 l/s See Appendix B for more information.	64 l/s (5 l/s from construction discharge which is to be restricted by a set pump capacity and remainder from highways run-off).	432 m³/day (construction run-off only) Combined: 469 m³/day (based on a 1 in 5-year storm event) **or** 565 m³/day (based on a 1 in 100-year storm event) The 469 m³ is composed of a 432 m³ from construction and then the volume from the highway run-off at 37m³ for 5 year and 133m³ for the 1 in 100 year
O8a	Total Highways Area Drained 1.2 ha Greenfield run-off rate for the 1 in 100 is calculated at 0.67 l/s. See Appendix B for more information.	8.1 l/s (5 l/s from construction discharge which is to be restricted by a set pump capacity and remainder from highways run-off)	432 m³/day (construction run-off only) Combined: 883 m³/day (based on a 1 in 5-year storm event) **or** 908 m³/day (based on a 1 in 100-year storm event) The total volume here is 432m³ from construction and 451m³ from the highways run-off for the 5 year and plus 476m³ for the 1 in 100-year event. These are volumes are shown in the appendix below

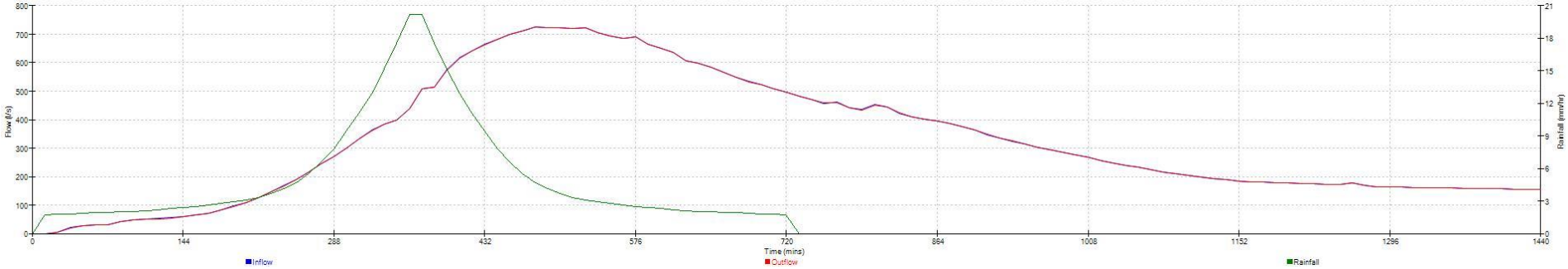
* *There is also some uncertainty in the catchment areas due to restriction of information with respect to its sensitive nature this could result in an increase in greenfield run off rates.*

** H*ighway drainage is increased in column 'Proposed Maximum Discharge Flow Rate' this is due the existing highway drainage becoming more formalised, meaning what would have previously discharged over the edge would now be channelled to the discharge points.*

Note that rates provided in the above table include **both** the construction related run-off combined with the highway drainage; therefore, they may be higher than those provided in the DCO Drainage Strategy. As highlighted in the main technical supporting document of the permit application, discussions are on-going with other regulators as required (namely SCC / WMB) in relation to proposed discharge flow rates and volumes therefore those provided in the permit application are absolute maximum volumes / rates and they are not anticipated to increase. If they do change, notification will be made to the Environment Agency during the permit determination process.

Note for the highway discharges peak discharges are likely only to peak for a short period of time. Following hydraulic design theory the time to peak will be based around a bell curve and therefore will drop down the curve from the peak shown in Figure 2 below. The volumes above represent the peak rates of discharge including the 2 hydrographs for the 1440m duration storm and is included for the peak for a 24-hour duration. As the flow drops down to the curve the volume will decrease, however this will be impacted by attenuation features which may mean that the total flow in would not result in total flow out.

Figure 2: Rainfall (y-axis, right hand side) and discharge volume (y-axis, left hand side) hydrographs against time (x-axis)



APPENDIX A

PRINT Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	[redacted]
Site name:	Sizewell
Site location:	

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

Site Details

Latitude:	52.21440° N
Longitude:	1.59152° E
Reference:	1890046967
Date:	May 24 2024 08:36

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	0.782

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics

	Default	Edited
SAAR (mm):	581	581
Hydrological region:	5	5
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	2.45	2.45
Growth curve factor 100 years:	3.56	3.56
Growth curve factor 200 years:	4.21	4.21

Notes

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

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

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	1.81	1.81
1 in 1 year (l/s):	1.57	1.57
1 in 30 years (l/s):	4.43	4.43
1 in 100 year (l/s):	6.43	6.43
1 in 200 years (l/s):	7.61	7.61

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	[redacted]
Site name:	Sizewell
Site location:	

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

Site Details

Latitude:	52.21481° N
Longitude:	1.59139° E
Reference:	3492480233
Date:	May 24 2024 08:37

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.511

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics

	Default	Edited
SAAR (mm):	581	581
Hydrological region:	5	5
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	2.45	2.45
Growth curve factor 100 years:	3.56	3.56
Growth curve factor 200 years:	4.21	4.21

Notes

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

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

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	1.18	1.18
1 in 1 year (l/s):	1.03	1.03
1 in 30 years (l/s):	2.89	2.89
1 in 100 year (l/s):	4.2	4.2
1 in 200 years (l/s):	4.97	4.97

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	[redacted]
Site name:	Sizewell
Site location:	

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

Site Details

Latitude:	52.21478° N
Longitude:	1.59199° E
Reference:	2069844313
Date:	May 24 2024 08:51

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.1

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	1	1
HOST class:	N/A	N/A
SPR/SPRHOST:	0.1	0.1

Hydrological characteristics

	Default	Edited
SAAR (mm):	581	581
Hydrological region:	5	5
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	2.45	2.45
Growth curve factor 100 years:	3.56	3.56
Growth curve factor 200 years:	4.21	4.21

Notes

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

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

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	0.01	0.01
1 in 1 year (l/s):	0.01	0.01
1 in 30 years (l/s):	0.03	0.03
1 in 100 year (l/s):	0.05	0.05
1 in 200 years (l/s):	0.06	0.06

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hrwallingford

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	[redacted]
Site name:	Sizewell
Site location:	

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

Site Details

Latitude:	
Longitude:	
Reference:	2684097249
Date:	May 24 2024 08:06

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1.2

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	0	1
HOST class:	N/A	N/A
SPR/SPRHOST:	0.00	0.1

Hydrological characteristics

	Default	Edited
SAAR (mm):	0	582
Hydrological region:	1	1
Growth curve factor 1 year:	-	0.87
Growth curve factor 30 years:	-	2.45
Growth curve factor 100 years:	-	3.56
Growth curve factor 200 years:	-	4.21

Notes

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

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

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	0.19	0.19
1 in 1 year (l/s):	0.16	0.16
1 in 30 years (l/s):	0.46	0.46
1 in 100 year (l/s):	0.67	0.67
1 in 200 years (l/s):	0.8	0.8

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	[redacted]
Site name:	
Site location:	

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

Site Details

Latitude:	52.21459° N
Longitude:	1.59130° E
Reference:	86477176
Date:	Jun 03 2024 15:30

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 51

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics

	Default	Edited
SAAR (mm):	581	581
Hydrological region:	5	5
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	2.45	2.45
Growth curve factor 100 years:	3.56	3.56
Growth curve factor 200 years:	4.21	4.21

Notes

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

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

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	117.56	117.56
1 in 1 year (l/s):	102.27	102.27
1 in 30 years (l/s):	288.01	288.01
1 in 100 year (l/s):	418.5	418.5
1 in 200 years (l/s):	494.91	494.91

APPENDIX B

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	NET5-1-0	1440 minute 5 year Summer I+40%	14.316	12.824	-0.276	0.000	0.02		0.021	45.213	2.1	OK
2.000	NET5-2-0	1440 minute 5 year Summer I+40%	14.026	12.705	-0.295	0.000	0.00		0.000	12.045	0.5	OK
1.001	NET5-1-1	1440 minute 5 year Summer I+40%	13.765	12.339	-0.261	0.000	0.04		0.114	36.872	4.4	OK
3.000	NET5-3-0	1440 minute 5 year Summer I+40%	13.444	12.182	-0.288	0.000	0.01		0.019	14.404	0.7	OK
1.002	NET5-1-2	1440 minute 5 year Summer I+40%	13.548	12.127	-0.403	0.000	0.02		0.107	13.333	5.1	OK
1.003	NET5-1-3	1440 minute 5 year Summer I+40%	14.374	12.028	-2.062	0.000	0.03		0.213	36.131	6.2	OK
1.004	NET5-1-4	1440 minute 5 year Summer I+40%	14.552	11.674	-2.056	0.000	0.04		1.040	48.461	6.8	OK
1.005	NET5-1-5	1440 minute 5 year Summer I+40%	13.344	11.071	-0.259	0.000	0.05		1.570	48.290	6.8	OK
1.006	NET5-1-6	1440 minute 5 year Summer I+40%	12.847	10.665	-1.945	0.000	0.02		0.074	67.791	7.7	OK
1.007	NET5-1-7	1440 minute 5 year Summer I+40%	9.852	7.677	-1.943	0.000	0.02		0.159	85.854	8.5	OK
1.008	NET5-1-8	1440 minute 5 year Summer I+40%	6.317	4.164	-0.826	0.000	0.06		0.180	99.359	9.1	OK
1.009	NET5-1-9	1440 minute 5 year Summer I+40%	3.536	2.497	-0.233	0.000	0.12		0.303	59.258	9.1	OK
1.010	NET5-1-10	1440 minute 5 year Summer I+40%	3.152	2.391	-0.239	0.000	0.09		0.082	44.286	9.8	OK
1.011	NET5-1-11	1440 minute 5 year Summer I+40%	2.815	2.226	-0.221	0.000	0.16		0.099	40.119	11.0	OK
1.012	NET5-1-12	1440 minute 5 year Summer I+40%	2.960	2.127	-0.244	0.000	0.08		0.072	40.115	11.0	OK
1.013	NET5-1-14	1440 minute 5 year Summer I+40%	2.370	1.824	-0.546	0.000	0.02		0.054	40.111	11.0	OK
1.014	NET5-1-15	1440 minute 5 year Summer I+40%	2.070	1.800	-0.270	0.000	0.03		0.195	58.107	11.0	FLOOD RISK*
1.015	NET5-1-16	1440 minute 5 year Summer I+40%	2.032	1.768	-0.264	0.000	0.02		0.195	58.077	11.0	FLOOD RISK*

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
2.000	NT4-2-0	1440 minute 100 year Winter I+40%	12.925	11.816	-0.199	0.000	0.03		0.024	41.455	1.2	OK
2.001	NT4-2-1	1440 minute 100 year Winter I+40%	13.696	11.426	-0.166	0.000	0.16		0.205	170.862	5.0	OK
2.002	NT4-2-2	1440 minute 100 year Winter I+40%	13.242	11.108	-0.155	0.000	0.21		0.302	268.420	7.9	OK
3.000	NT4-3-0	1440 minute 100 year Winter I+40%	14.261	13.171	-1.090	0.000	0.05		0.169	130.324	3.8	OK
3.001	NT4-3-1	1440 minute 100 year Winter I+40%	14.405	12.405	-2.000	0.000	0.09		1.565	149.838	4.4	OK
4.000	NT4-4-0	1440 minute 100 year Winter I+40%	12.904	12.021	-0.883	0.000	0.01		0.018	8.468	0.2	OK
4.001	NT4-4-1	1440 minute 100 year Winter I+40%	13.852	11.578	-0.221	0.000	0.00		0.092	8.463	0.2	OK
3.002	NT4-3-2	1440 minute 100 year Winter I+40%	14.992	11.498	-3.494	0.000	0.08		0.672	208.540	6.2	OK
3.003	NT4-3-3	1440 minute 100 year Winter I+40%	14.814	11.280	-0.232	0.000	0.12		2.004	310.359	9.2	OK
5.000	NT4-5-0	1440 minute 100 year Winter I+40%	13.575	11.711	-0.214	0.000	0.01		0.007	19.243	0.6	OK
5.001	NT4-5-1	1440 minute 100 year Winter I+40%	13.297	11.499	-0.196	0.000	0.04		0.039	47.924	1.4	OK
3.004	NT4-3-4	1440 minute 100 year Winter I+40%	13.211	10.805	-0.226	0.000	0.14		0.182	358.274	10.6	OK
2.003	NT4-2-3	1440 minute 100 year Winter I+40%	13.300	10.679	-0.199	0.000	0.25		0.561	626.689	18.5	OK
2.004	NT4-2-4	1440 minute 100 year Winter I+40%	12.400	10.356	-0.218	0.000	0.17		0.215	626.693	18.5	OK
2.005	NT4-2-5	1440 minute 100 year Winter I+40%	11.000	9.393	-0.245	0.000	0.08		0.097	626.694	18.5	OK
2.006	NT4-2-6	1440 minute 100 year Winter I+40%	6.522	5.224	-0.239	0.000	0.09		0.072	626.792	18.5	OK
2.007	NT4-2-7	1440 minute 100 year Winter I+40%	4.964	3.803	-0.237	0.000	0.10		0.078	626.731	18.5	OK
2.008	NT4-2-8	1440 minute 100 year Winter I+40%	3.508	2.653	-0.088	0.000	0.18		0.375	626.502	18.5	OK
6.000	NT4-6-0	1440 minute 100 year Winter I+40%	14.853	13.840	-1.013	0.000	0.02		0.039	57.018	1.7	OK
6.001	NT4-6-1	1440 minute 100 year Winter I+40%	14.512	13.147	-0.194	0.000	0.05		0.318	80.724	2.4	OK
6.002	NT4-6-2	1440 minute 100 year Winter I+40%	14.453	12.294	-2.159	0.000	0.03		0.113	96.197	2.8	OK
6.003	NT4-6-3	1440 minute 100 year Winter I+40%	14.465	11.893	-0.194	0.000	0.05		0.816	96.062	2.8	OK
6.004	NT4-6-4	1440 minute 100 year Winter I+40%	13.071	11.603	-1.468	0.000	0.04		0.115	112.286	3.4	OK
6.005	NT4-6-5	1440 minute 100 year Winter I+40%	12.386	11.005	-1.381	0.000	0.04		1.975	123.298	3.8	OK
6.006	NT4-6-6	1440 minute 100 year Winter I+40%	12.233	10.243	-1.990	0.000	0.02		0.742	128.881	3.9	OK
6.007	NT4-6-7	1440 minute 100 year Winter I+40%	11.726	9.751	-1.376	0.000	0.05		0.222	141.154	4.3	OK
6.008	NT4-6-8	1440 minute 100 year Winter I+40%	10.636	9.111	-1.125	0.000	0.09		0.835	150.816	4.7	OK
6.009	NT4-6-9	1440 minute 100 year Winter I+40%	10.587	8.783	-1.497	0.000	0.07		1.505	164.250	5.1	OK
6.010	NT4-6-10	1440 minute 100 year Winter I+40%	9.857	8.328	-1.329	0.000	0.07		1.772	173.409	5.5	OK
6.011	NT4-6-11	1440 minute 100 year Winter I+40%	9.491	7.766	-1.725	0.000	0.03		1.255	194.439	6.1	OK
6.012	NT4-6-12	1440 minute 100 year Winter I+40%	5.963	4.252	-1.051	0.000	0.06		0.290	202.987	6.4	OK
6.013	NT4-6-13	1440 minute 100 year Winter I+40%	4.041	3.270	-0.771	0.000	0.43		1.216	8318.366	53.4	OK
6.014	NT4-6-14	1440 minute 100 year Winter I+40%	3.457	2.657	-0.800	0.000	0.28		1.308	8315.142	53.4	OK
2.009	NT4-2-9	1440 minute 100 year Winter I+40%	3.408	2.647	-0.225	0.000	0.71		1.478	8645.418	72.1	OK
2.010	NT4-2-10	1440 minute 100 year Winter I+40%	3.200	2.395	-0.197	0.000	0.33		3.202	8609.570	214.0	OK
2.011	NT4-2-11	1440 minute 100 year Winter I+40%	2.761	2.174	-0.304	0.000	0.18		1.072	8617.738	216.3	OK

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	NET5-1-0	1440 minute 5 year Summer I+40%	14.316	12.824	-0.276	0.000	0.02		0.021	45.213	2.1	OK
2.000	NET5-2-0	1440 minute 5 year Summer I+40%	14.026	12.705	-0.295	0.000	0.00		0.000	12.045	0.5	OK
1.001	NET5-1-1	1440 minute 5 year Summer I+40%	13.765	12.339	-0.261	0.000	0.04		0.114	36.872	4.4	OK
3.000	NET5-3-0	1440 minute 5 year Summer I+40%	13.444	12.182	-0.288	0.000	0.01		0.019	14.404	0.7	OK
1.002	NET5-1-2	1440 minute 5 year Summer I+40%	13.548	12.127	-0.403	0.000	0.02		0.107	13.333	5.1	OK
1.003	NET5-1-3	1440 minute 5 year Summer I+40%	14.374	12.028	-2.062	0.000	0.03		0.213	36.131	6.2	OK
1.004	NET5-1-4	1440 minute 5 year Summer I+40%	14.552	11.674	-2.056	0.000	0.04		1.040	48.461	6.8	OK
1.005	NET5-1-5	1440 minute 5 year Summer I+40%	13.344	11.071	-0.259	0.000	0.05		1.570	48.290	6.8	OK
1.006	NET5-1-6	1440 minute 5 year Summer I+40%	12.847	10.665	-1.945	0.000	0.02		0.074	67.791	7.7	OK
1.007	NET5-1-7	1440 minute 5 year Summer I+40%	9.852	7.677	-1.943	0.000	0.02		0.159	85.854	8.5	OK
1.008	NET5-1-8	1440 minute 5 year Summer I+40%	6.317	4.164	-0.826	0.000	0.06		0.180	99.359	9.1	OK
1.009	NET5-1-9	1440 minute 5 year Summer I+40%	3.536	2.497	-0.233	0.000	0.12		0.303	59.258	9.1	OK
1.010	NET5-1-10	1440 minute 5 year Summer I+40%	3.152	2.391	-0.239	0.000	0.09		0.082	44.286	9.8	OK
1.011	NET5-1-11	1440 minute 5 year Summer I+40%	2.815	2.226	-0.221	0.000	0.16		0.099	40.119	11.0	OK
1.012	NET5-1-12	1440 minute 5 year Summer I+40%	2.960	2.127	-0.244	0.000	0.08		0.072	40.115	11.0	OK
1.013	NET5-1-14	1440 minute 5 year Summer I+40%	2.370	1.824	-0.546	0.000	0.02		0.054	40.111	11.0	OK
1.014	NET5-1-15	1440 minute 5 year Summer I+40%	2.070	1.800	-0.270	0.000	0.03		0.195	58.107	11.0	FLOOD RISK*
1.015	NET5-1-16	1440 minute 5 year Summer I+40%	2.032	1.768	-0.264	0.000	0.02		0.195	58.077	11.0	FLOOD RISK*

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	NET5-1-0	1440 minute 100 year Winter I+40%	14.316	12.833	-0.267	0.000	0.03		0.032	115.633	3.4	OK
2.000	NET5-2-0	1440 minute 100 year Winter I+40%	14.026	12.708	-0.292	0.000	0.01		0.004	30.799	0.9	OK
1.001	NET5-1-1	1440 minute 100 year Winter I+40%	13.765	12.351	-0.249	0.000	0.07		0.154	247.749	7.3	OK
3.000	NET5-3-0	1440 minute 100 year Winter I+40%	13.444	12.190	-0.280	0.000	0.01		0.039	36.838	1.1	OK
1.002	NET5-1-2	1440 minute 100 year Winter I+40%	13.548	12.138	-0.392	0.000	0.04		0.134	289.840	8.5	OK
1.003	NET5-1-3	1440 minute 100 year Winter I+40%	14.374	12.058	-2.032	0.000	0.05		0.347	348.774	10.3	OK
1.004	NET5-1-4	1440 minute 100 year Winter I+40%	14.552	11.707	-2.023	0.000	0.06		1.526	382.049	11.4	OK
1.005	NET5-1-5	1440 minute 100 year Winter I+40%	13.344	11.085	-0.245	0.000	0.08		2.366	381.502	11.4	OK
1.006	NET5-1-6	1440 minute 100 year Winter I+40%	12.847	10.683	-1.927	0.000	0.03		0.100	431.264	12.8	OK
1.007	NET5-1-7	1440 minute 100 year Winter I+40%	9.852	7.696	-1.924	0.000	0.03		0.215	477.331	14.2	OK
1.008	NET5-1-8	1440 minute 100 year Winter I+40%	6.317	4.189	-0.801	0.000	0.10		0.244	512.144	15.2	OK
1.009	NET5-1-9	1440 minute 100 year Winter I+40%	3.536	2.519	-0.211	0.000	0.19		0.409	511.914	15.2	OK
1.010	NET5-1-10	1440 minute 100 year Winter I+40%	3.152	2.408	-0.222	0.000	0.15		0.107	138.352	16.3	OK
1.011	NET5-1-11	1440 minute 100 year Winter I+40%	2.815	2.251	-0.196	0.000	0.26		0.132	138.428	18.3	OK
1.012	NET5-1-12	1440 minute 100 year Winter I+40%	2.960	2.143	-0.228	0.000	0.13		0.095	138.418	18.3	OK
1.013	NET5-1-14	1440 minute 100 year Winter I+40%	2.370	1.841	-0.529	0.000	0.03		0.072	138.410	18.3	OK
1.014	NET5-1-15	1440 minute 100 year Winter I+40%	2.070	1.815	-0.255	0.000	0.05		0.267	138.402	18.3	FLOOD RISK*
1.015	NET5-1-16	1440 minute 100 year Winter I+40%	2.032	1.781	-0.251	0.000	0.04		0.273	138.370	18.3	FLOOD RISK*

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	NT-9-1-0	1440 minute 5 year Winter I+0%	8.796	7.891	-0.217	0.000	0.01		0.003	21.784	0.6	OK
1.001	NT-9-1-1	1440 minute 5 year Winter I+0%	7.700	6.659	-0.219	0.000	0.01		0.001	25.232	0.7	OK
1.002	NT-9-1-2	1440 minute 5 year Winter I+0%	5.299	4.518	-0.214	0.000	0.01		0.008	37.510	1.1	OK
1.003	NT-9-1-3	1440 minute 5 year Winter I+0%	4.800	3.942	-0.212	0.000	0.01		0.010	37.190	1.1	OK
1.004	NT-9-2-4	1440 minute 5 year Winter I+0%	3.430	2.477	-0.213	0.000	0.01		0.009	37.067	1.1	OK
1.005	NT-	1440 minute 5 year Winter I+0%	2.014	1.148	-0.541	0.000	0.00		0.000	37.112	1.1	OK

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	NT-9-1-0	1440 minute 100 year Winter I+40%	8.796	7.906	-0.202	0.000	0.02		0.016	69.661	2.0	OK
1.001	NT-9-1-1	1440 minute 100 year Winter I+40%	7.700	6.671	-0.207	0.000	0.02		0.018	80.711	2.4	OK
1.002	NT-9-1-2	1440 minute 100 year Winter I+40%	5.299	4.534	-0.198	0.000	0.03		0.027	123.153	3.6	OK
1.003	NT-9-1-3	1440 minute 100 year Winter I+40%	4.800	3.958	-0.196	0.000	0.04		0.029	123.141	3.6	OK
1.004	NT-9-2-4	1440 minute 100 year Winter I+40%	3.430	2.492	-0.198	0.000	0.03		0.030	133.121	3.6	OK
1.005	NT-	1440 minute 100 year Winter I+40%	2.014	1.152	-0.537	0.000	0.00		0.001	133.099	3.6	OK

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	NT-1-1-0	1440 minute 5 year Summer I+0%	18.512	17.477	-1.035	0.000	0.00
2.000	NT-1-2-0	1440 minute 5 year Summer I+0%	19.840	18.002	-0.298	0.000	0.00
2.001	NT-1-2-1	1440 minute 5 year Summer I+0%	19.740	17.376	-0.295	0.000	0.00
3.000	NT-1-3-0	1440 minute 5 year Summer I+0%	19.180	18.000	-0.300	0.000	0.00
3.001	NT-1-3-1	1440 minute 5 year Summer I+0%	19.180	17.931	-0.290	0.000	0.01
3.002	NT-1-3-2	1440 minute 5 year Summer I+0%	19.660	17.642	-0.281	0.000	0.01
3.003	NT-1-3-3	1440 minute 5 year Summer I+0%	20.125	17.532	-0.281	0.000	0.01
4.000	NT-1-4-0	1440 minute 5 year Summer I+0%	19.560	18.464	-0.296	0.000	0.00
4.001	NT-1-4-1	1440 minute 5 year Summer I+0%	19.860	18.311	-0.297	0.000	0.00
3.004	NT-1-3-4	1440 minute 5 year Summer I+0%	20.125	17.431	-0.273	0.000	0.02
3.005	NT-1-3-5	1440 minute 5 year Summer I+0%	20.060	17.353	-0.269	0.000	0.02
3.006	NT-1-3-6	1440 minute 5 year Summer I+0%	19.960	17.170	-0.269	0.000	0.02
5.000	NT-1-5-0	1440 minute 5 year Summer I+0%	20.060	17.621	-0.293	0.000	0.00
6.000	NT-1-6-0	1440 minute 5 year Summer I+0%	18.300	18.011	-0.289	0.000	0.00
6.001	NT-1-6-1	1440 minute 5 year Summer I+0%	18.076	17.459	-0.617	0.000	0.00
6.002	NT-1-6-2	1440 minute 5 year Summer I+0%	18.167	17.038	-0.408	0.000	0.02
7.000	NT-1-7-0	1440 minute 5 year Summer I+0%	18.919	18.425	-0.494	0.000	0.00
7.001	NT-1-7-1	1440 minute 5 year Summer I+0%	19.000	17.806	-1.194	0.000	0.00
7.002	NT-1-7-2	1440 minute 5 year Summer I+0%	18.800	17.704	-1.096	0.000	0.00
7.003	NT-1-7-3	1440 minute 5 year Summer I+0%	18.500	17.506	-0.247	0.000	0.07
8.000	NT-1-8-0	1440 minute 5 year Summer I+0%	18.300	17.825	-0.475	0.000	0.00
8.001	NT-1-8-1	1440 minute 5 year Summer I+0%	18.100	17.535	-0.565	0.000	0.00
8.002	NT-1-8-2	1440 minute 5 year Summer I+0%	18.000	17.253	-0.747	0.000	0.00
8.003	NT-1-8-3	1440 minute 5 year Summer I+0%	18.500	17.048	-1.452	0.000	0.00
7.004	NT-1-7-4	1440 minute 5 year Summer I+0%	18.500	16.951	-0.239	0.000	0.02
9.000	NT-1-9-0	1440 minute 5 year Summer I+0%	18.500	18.006	-0.494	0.000	0.00
9.001	NT-1-9-1	1440 minute 5 year Summer I+0%	18.500	17.803	-0.222	0.000	0.00
6.003	NT-1-6-3	1440 minute 5 year Summer I+0%	18.167	16.950	-0.390	0.000	0.03
6.004	NT-1-6-4	1440 minute 5 year Summer I+0%	18.283	16.934	-1.349	0.000	0.02
6.005	NT-1-6-5	1440 minute 5 year Summer I+0%	18.460	16.851	-1.609	0.000	0.02
6.006	NT-1-6-6	1440 minute 5 year Summer I+0%	18.600	16.823	-1.777	0.000	0.02
6.007	NT-1-6-7	1440 minute 5 year Summer I+0%	18.700	16.586	-2.114	0.000	0.02
6.008	NT-1-6-8	1440 minute 5 year Summer I+0%	18.700	16.542	-2.158	0.000	0.02
10.000	NT-1-10-0	1440 minute 5 year Summer I+0%	19.100	18.008	-0.292	0.000	0.01
10.001	NT-1-10-1	1440 minute 5 year Summer I+0%	19.000	17.742	-0.286	0.000	0.01
6.009	NT-1-6-9	1440 minute 5 year Summer I+0%	19.840	16.521	-3.319	0.000	0.02
6.010	NT-1-6-10	1440 minute 5 year Summer I+0%	19.840	16.427	-0.489	0.000	0.08
5.001	NT-1-5-1	1440 minute 5 year Summer I+0%	19.900	16.348	-0.365	0.000	0.06
3.007	NT-1-6-6	1440 minute 5 year Summer I+0%	19.820	16.294	-0.498	0.000	0.06
11.000	NT-1-11-0	1440 minute 5 year Summer I+0%	19.740	18.658	-0.207	0.000	0.02
11.001	NT-1-11-1	1440 minute 5 year Summer I+0%	19.974	18.402	-0.202	0.000	0.02
11.002	NT-1-11-2	1440 minute 5 year Summer I+0%	19.920	18.244	-0.200	0.000	0.03
11.003	NT-1-11-3	1440 minute 5 year Summer I+0%	19.621	18.008	-0.199	0.000	0.03
11.004	NT-1-11-4	1440 minute 5 year Summer I+0%	19.640	17.932	-0.205	0.000	0.02

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
3.008	NT-1-3-7	1440 minute 5 year Summer I+0%	19.820	16.266	-0.346	0.000	0.11
2.002	NT-1-2-2	1440 minute 5 year Summer I+0%	18.401	16.224	-0.500	0.000	0.07
2.003	NT-1-2-3	1440 minute 5 year Summer I+0%	18.312	16.209	-0.491	0.000	0.04
12.000	NT-1-12-0	1440 minute 5 year Summer I+0%	18.330	17.246	-0.209	0.000	0.02
12.001	NT-1-12-1	1440 minute 5 year Summer I+0%	18.720	17.139	-0.202	0.000	0.02
12.002	NT-1-12-2	1440 minute 5 year Summer I+0%	18.760	17.101	-0.206	0.000	0.02
13.000	NT-1-13-0	1440 minute 5 year Summer I+0%	19.460	18.306	-0.219	0.000	0.01
13.001	NT-1-13-1	1440 minute 5 year Summer I+0%	19.140	18.214	-0.223	0.000	0.00
12.003	NT-1-13-3	1440 minute 5 year Summer I+0%	18.860	16.966	-0.199	0.000	0.03
14.000	NT-1-14-0	1440 minute 5 year Summer I+0%	18.530	17.341	-0.225	0.000	0.00
14.001	NT-1-14-1	1440 minute 5 year Summer I+0%	18.400	17.279	-0.449	0.000	0.00
12.004	NT-1-12-4	1440 minute 5 year Summer I+0%	17.566	16.631	-0.197	0.000	0.04
12.005	NT-1-12-5	1440 minute 5 year Summer I+0%	18.400	16.501	-0.426	0.000	0.01
2.004	NT-1-2-4	1440 minute 5 year Summer I+0%	18.118	16.209	-0.409	0.000	0.01
2.005	NT-1-2-5	1440 minute 5 year Summer I+0%	17.950	15.980	-0.260	0.000	0.04
15.000	NT-1-15-0	1440 minute 5 year Summer I+0%	19.600	18.502	-0.598	0.000	0.00
15.001	NT-1-15-1	1440 minute 5 year Summer I+0%	19.361	18.002	-0.598	0.000	0.00
15.002	NT-1-15-2	1440 minute 5 year Summer I+0%	19.000	16.621	-0.598	0.000	0.00
15.003	NT-15-3	1440 minute 5 year Summer I+0%	19.000	15.930	-0.598	0.000	0.00
2.006	NT-1-2-6	1440 minute 5 year Summer I+0%	19.000	15.269	-0.569	0.000	0.01
2.007	NT-1-2-7	1440 minute 5 year Summer I+0%	17.668	15.078	-0.569	0.000	0.01
2.008	NT-1-2-8	1440 minute 5 year Summer I+0%	16.952	14.840	-0.567	0.000	0.01
2.009	NT-1-2-9	1440 minute 5 year Summer I+0%	16.333	14.704	-1.629	0.000	0.02
2.010	NT-1-2-10	1440 minute 5 year Summer I+0%	16.300	14.508	-1.792	0.000	0.01
2.011	NT-1-2-11	1440 minute 5 year Summer I+0%	16.300	14.464	-0.244	0.000	0.00

Pipe Number	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	NT-1-1-0		0.000	10.686	0.5	OK
2.000	NT-1-2-0		0.000	6.056	0.3	OK
2.001	NT-1-2-1		0.000	12.258	0.6	OK
3.000	NT-1-3-0		0.000	0.000	0.0	OK
3.001	NT-1-3-1		0.006	13.176	0.6	OK
3.002	NT-1-3-2		0.033	20.693	0.9	OK
3.003	NT-1-3-3		0.038	20.692	0.9	OK
4.000	NT-1-4-0		0.000	4.803	0.2	OK
4.001	NT-1-4-1		0.000	9.728	0.4	OK
3.004	NT-1-3-4		0.060	30.420	1.4	OK
3.005	NT-1-3-5		0.061	40.271	1.8	OK
3.006	NT-1-3-6		0.070	49.350	2.2	OK
5.000	NT-1-5-0		0.002	9.671	0.4	OK
6.000	NT-1-6-0		0.006	12.962	0.6	FLOOD RISK*
6.001	NT-1-6-1		0.069	30.278	1.4	OK
6.002	NT-1-6-2		0.252	30.467	1.4	OK*
7.000	NT-1-7-0		0.020	39.213	1.8	OK
7.001	NT-1-7-1		0.022	41.254	1.9	OK
7.002	NT-1-7-2		0.018	45.225	2.1	OK
7.003	NT-1-7-3		0.217	45.439	2.1	OK*
8.000	NT-1-8-0		0.007	10.944	0.5	OK
8.001	NT-1-8-1		0.040	25.332	1.1	OK
8.002	NT-1-8-2		0.142	37.080	1.7	OK
8.003	NT-1-8-3		0.000	37.250	1.7	OK
7.004	NT-1-7-4		0.258	82.505	3.8	OK*
9.000	NT-1-9-0		0.001	8.649	0.4	OK
9.001	NT-1-9-1		0.000	8.716	0.4	OK
6.003	NT-1-6-3		1.840	120.337	5.5	OK*
6.004	NT-1-6-4		0.143	128.015	5.9	OK
6.005	NT-1-6-5		1.409	130.581	6.0	OK
6.006	NT-1-6-6		0.542	133.146	6.1	OK
6.007	NT-1-6-7		0.438	139.359	6.4	OK
6.008	NT-1-6-8		0.797	139.358	6.4	OK
10.000	NT-1-10-0		0.003	9.521	0.4	OK
10.001	NT-1-10-1		0.022	14.336	0.7	OK
6.009	NT-1-6-9		0.451	153.702	7.0	OK
6.010	NT-1-6-10		0.706	159.547	7.2	OK
5.001	NT-1-5-1		0.284	176.632	8.0	OK
3.007	NT-1-6-6		0.528	225.988	10.2	OK
11.000	NT-1-11-0		0.015	15.179	0.7	OK
11.001	NT-1-11-1		0.039	18.592	0.8	OK
11.002	NT-1-11-2		0.046	24.449	1.1	OK
11.003	NT-1-11-3		0.025	24.448	1.1	OK
11.004	NT-1-11-4		0.032	35.226	1.6	OK

Pipe Number	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
3.008	NT-1-3-7		0.295	261.213	11.7	OK
2.002	NT-1-2-2		0.397	273.473	12.3	OK
2.003	NT-1-2-3		0.320	273.472	12.3	OK
12.000	NT-1-12-0		0.013	12.075	0.5	OK
12.001	NT-1-12-1		0.040	14.245	0.6	OK
12.002	NT-1-12-2		0.024	14.245	0.6	OK
13.000	NT-1-13-0		0.002	4.817	0.2	OK
13.001	NT-1-13-1		0.000	4.815	0.2	OK
12.003	NT-1-13-3		0.025	27.905	1.3	OK
14.000	NT-1-14-0		0.000	0.000	0.0	OK
14.001	NT-1-14-1		0.000	4.970	0.2	OK
12.004	NT-1-12-4		0.050	32.874	1.5	OK
12.005	NT-1-12-5		0.057	32.875	1.5	OK
2.004	NT-1-2-4		164.693	291.873	3.9	OK
2.005	NT-1-2-5		0.201	291.842	3.9	OK
15.000	NT-1-15-0		0.000	8.116	0.4	OK
15.001	NT-1-15-1		0.000	13.786	0.6	OK
15.002	NT-1-15-2		0.000	13.786	0.6	OK
15.003	NT-15-3		0.000	13.787	0.6	OK
2.006	NT-1-2-6		0.072	311.105	4.4	OK
2.007	NT-1-2-7		0.130	317.258	4.6	OK
2.008	NT-1-2-8		0.141	321.568	4.8	OK
2.009	NT-1-2-9		0.356	327.931	5.0	OK
2.010	NT-1-2-10		1.658	335.660	4.9	OK
2.011	NT-1-2-11		14.435	451.571	4.4	OK

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	NT-1-1-0	1440 minute 100 year Winter I+40%	18.512	17.484	-1.028	0.000	0.00
2.000	NT-1-2-0	1440 minute 100 year Winter I+40%	19.840	18.006	-0.294	0.000	0.00
2.001	NT-1-2-1	1440 minute 100 year Winter I+40%	19.740	17.382	-0.289	0.000	0.01
3.000	NT-1-3-0	1440 minute 100 year Winter I+40%	19.180	18.000	-0.300	0.000	0.00
3.001	NT-1-3-1	1440 minute 100 year Winter I+40%	19.180	17.944	-0.277	0.000	0.02
3.002	NT-1-3-2	1440 minute 100 year Winter I+40%	19.660	17.658	-0.265	0.000	0.03
3.003	NT-1-3-3	1440 minute 100 year Winter I+40%	20.125	17.548	-0.266	0.000	0.03
4.000	NT-1-4-0	1440 minute 100 year Winter I+40%	19.560	18.469	-0.291	0.000	0.01
4.001	NT-1-4-1	1440 minute 100 year Winter I+40%	19.860	18.315	-0.293	0.000	0.01
3.004	NT-1-3-4	1440 minute 100 year Winter I+40%	20.125	17.444	-0.260	0.000	0.04
3.005	NT-1-3-5	1440 minute 100 year Winter I+40%	20.060	17.368	-0.254	0.000	0.06
3.006	NT-1-3-6	1440 minute 100 year Winter I+40%	19.960	17.184	-0.255	0.000	0.06
5.000	NT-1-5-0	1440 minute 100 year Winter I+40%	20.060	17.630	-0.284	0.000	0.01
6.000	NT-1-6-0	1440 minute 100 year Winter I+40%	18.300	18.017	-0.283	0.000	0.00
6.001	NT-1-6-1	1440 minute 100 year Winter I+40%	18.076	17.472	-0.604	0.000	0.00
6.002	NT-1-6-2	1440 minute 100 year Winter I+40%	18.167	17.057	-0.389	0.000	0.05
7.000	NT-1-7-0	1440 minute 100 year Winter I+40%	18.919	18.441	-0.478	0.000	0.01
7.001	NT-1-7-1	1440 minute 100 year Winter I+40%	19.000	17.824	-1.176	0.000	0.00
7.002	NT-1-7-2	1440 minute 100 year Winter I+40%	18.800	17.720	-1.080	0.000	0.00
7.003	NT-1-7-3	1440 minute 100 year Winter I+40%	18.500	17.535	-0.218	0.000	0.17
8.000	NT-1-8-0	1440 minute 100 year Winter I+40%	18.300	17.832	-0.468	0.000	0.00
8.001	NT-1-8-1	1440 minute 100 year Winter I+40%	18.100	17.547	-0.553	0.000	0.00
8.002	NT-1-8-2	1440 minute 100 year Winter I+40%	18.000	17.267	-0.733	0.000	0.00
8.003	NT-1-8-3	1440 minute 100 year Winter I+40%	18.500	17.050	-1.450	0.000	0.00
7.004	NT-1-7-4	1440 minute 100 year Winter I+40%	18.500	16.990	-0.200	0.000	0.05
9.000	NT-1-9-0	1440 minute 100 year Winter I+40%	18.500	18.014	-0.486	0.000	0.00
9.001	NT-1-9-1	1440 minute 100 year Winter I+40%	18.500	17.806	-0.219	0.000	0.01
6.003	NT-1-6-3	1440 minute 100 year Winter I+40%	18.167	16.987	-0.353	0.000	0.08
6.004	NT-1-6-4	1440 minute 100 year Winter I+40%	18.283	16.973	-1.310	0.000	0.05
6.005	NT-1-6-5	1440 minute 100 year Winter I+40%	18.460	16.889	-1.571	0.000	0.06
6.006	NT-1-6-6	1440 minute 100 year Winter I+40%	18.600	16.860	-1.740	0.000	0.05
6.007	NT-1-6-7	1440 minute 100 year Winter I+40%	18.700	16.780	-1.920	0.000	0.06
6.008	NT-1-6-8	1440 minute 100 year Winter I+40%	18.700	16.780	-1.920	0.000	0.05
10.000	NT-1-10-0	1440 minute 100 year Winter I+40%	19.100	18.018	-0.282	0.000	0.01
10.001	NT-1-10-1	1440 minute 100 year Winter I+40%	19.000	17.759	-0.269	0.000	0.02
6.009	NT-1-6-9	1440 minute 100 year Winter I+40%	19.840	16.780	-3.060	0.000	0.05
6.010	NT-1-6-10	1440 minute 100 year Winter I+40%	19.840	16.781	-0.135	0.000	0.18
5.001	NT-1-5-1	1440 minute 100 year Winter I+40%	19.900	16.779	0.066	0.000	0.13
3.007	NT-1-6-6	1440 minute 100 year Winter I+40%	19.820	16.778	-0.014	0.000	0.12
11.000	NT-1-11-0	1440 minute 100 year Winter I+40%	19.740	18.669	-0.196	0.000	0.04
11.001	NT-1-11-1	1440 minute 100 year Winter I+40%	19.974	18.412	-0.192	0.000	0.05
11.002	NT-1-11-2	1440 minute 100 year Winter I+40%	19.920	18.257	-0.187	0.000	0.07
11.003	NT-1-11-3	1440 minute 100 year Winter I+40%	19.621	18.022	-0.185	0.000	0.07
11.004	NT-1-11-4	1440 minute 100 year Winter I+40%	19.640	17.942	-0.195	0.000	0.04

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
3.008	NT-1-3-7	1440 minute 100 year Winter I+40%	19.820	16.775	0.163	0.000	0.24
2.002	NT-1-2-2	1440 minute 100 year Winter I+40%	18.401	16.774	0.050	0.000	0.15
2.003	NT-1-2-3	1440 minute 100 year Winter I+40%	18.312	16.773	0.073	0.000	0.08
12.000	NT-1-12-0	1440 minute 100 year Winter I+40%	18.330	17.257	-0.198	0.000	0.04
12.001	NT-1-12-1	1440 minute 100 year Winter I+40%	18.720	17.148	-0.193	0.000	0.05
12.002	NT-1-12-2	1440 minute 100 year Winter I+40%	18.760	17.111	-0.196	0.000	0.04
13.000	NT-1-13-0	1440 minute 100 year Winter I+40%	19.460	18.315	-0.210	0.000	0.01
13.001	NT-1-13-1	1440 minute 100 year Winter I+40%	19.140	18.216	-0.221	0.000	0.00
12.003	NT-1-13-3	1440 minute 100 year Winter I+40%	18.860	16.979	-0.186	0.000	0.07
14.000	NT-1-14-0	1440 minute 100 year Winter I+40%	18.530	17.341	-0.225	0.000	0.00
14.001	NT-1-14-1	1440 minute 100 year Winter I+40%	18.400	17.281	-0.447	0.000	0.00
12.004	NT-1-12-4	1440 minute 100 year Winter I+40%	17.566	16.773	-0.055	0.000	0.09
12.005	NT-1-12-5	1440 minute 100 year Winter I+40%	18.400	16.773	-0.154	0.000	0.03
2.004	NT-1-2-4	1440 minute 100 year Winter I+40%	18.118	16.773	0.155	0.000	0.02
2.005	NT-1-2-5	1440 minute 100 year Winter I+40%	17.950	15.981	-0.259	0.000	0.05
15.000	NT-1-15-0	1440 minute 100 year Winter I+40%	19.600	18.505	-0.595	0.000	0.00
15.001	NT-1-15-1	1440 minute 100 year Winter I+40%	19.361	18.003	-0.597	0.000	0.00
15.002	NT-1-15-2	1440 minute 100 year Winter I+40%	19.000	16.624	-0.595	0.000	0.00
15.003	NT-15-3	1440 minute 100 year Winter I+40%	19.000	15.933	-0.595	0.000	0.00
2.006	NT-1-2-6	1440 minute 100 year Winter I+40%	19.000	15.554	-0.284	0.000	0.01
2.007	NT-1-2-7	1440 minute 100 year Winter I+40%	17.668	15.553	-0.094	0.000	0.02
2.008	NT-1-2-8	1440 minute 100 year Winter I+40%	16.952	15.550	0.143	0.000	0.02
2.009	NT-1-2-9	1440 minute 100 year Winter I+40%	16.333	15.550	-0.783	0.000	0.03
2.010	NT-1-2-10	1440 minute 100 year Winter I+40%	16.300	15.547	-0.753	0.000	0.01
2.011	NT-1-2-11	1440 minute 100 year Winter I+40%	16.300	15.544	0.836	0.000	0.00

Pipe Number	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	NT-1-1-0		0.007	38.263	1.1	OK
2.000	NT-1-2-0		0.001	21.688	0.6	OK
2.001	NT-1-2-1		0.010	43.903	1.3	OK
3.000	NT-1-3-0		0.000	0.000	0.0	OK
3.001	NT-1-3-1		0.022	47.176	1.4	OK
3.002	NT-1-3-2		0.068	74.090	2.2	OK
3.003	NT-1-3-3		0.080	74.088	2.2	OK
4.000	NT-1-4-0		0.005	17.202	0.5	OK
4.001	NT-1-4-1		0.006	34.844	1.0	OK
3.004	NT-1-3-4		0.094	108.926	3.2	OK
3.005	NT-1-3-5		0.094	144.201	4.2	OK
3.006	NT-1-3-6		0.107	176.711	5.2	OK
5.000	NT-1-5-0		0.013	34.626	1.0	OK
6.000	NT-1-6-0		0.013	46.413	1.4	FLOOD RISK*
6.001	NT-1-6-1		0.127	108.426	3.2	OK
6.002	NT-1-6-2		0.385	109.091	3.2	OK*
7.000	NT-1-7-0		0.036	140.417	4.1	OK
7.001	NT-1-7-1		0.045	147.717	4.3	OK
7.002	NT-1-7-2		0.038	161.933	4.7	OK
7.003	NT-1-7-3		0.348	162.698	4.8	OK*
8.000	NT-1-8-0		0.014	39.190	1.1	OK
8.001	NT-1-8-1		0.075	90.713	2.7	OK
8.002	NT-1-8-2		0.258	132.786	3.9	OK
8.003	NT-1-8-3		0.000	133.401	3.9	OK
7.004	NT-1-7-4		0.306	295.919	8.7	OK*
9.000	NT-1-9-0		0.009	30.971	0.9	OK
9.001	NT-1-9-1		0.004	31.214	0.9	OK
6.003	NT-1-6-3		2.146	434.865	12.8	OK*
6.004	NT-1-6-4		0.240	462.397	13.6	OK
6.005	NT-1-6-5		2.309	471.573	13.8	OK
6.006	NT-1-6-6		0.866	480.751	14.1	OK
6.007	NT-1-6-7		1.105	502.695	15.8	OK
6.008	NT-1-6-8		4.721	502.112	14.6	OK
10.000	NT-1-10-0		0.014	34.090	1.0	OK
10.001	NT-1-10-1		0.064	51.332	1.5	OK
6.009	NT-1-6-9		2.811	552.445	20.5	OK
6.010	NT-1-6-10		6.636	571.718	16.9	OK
5.001	NT-1-5-1		4.745	630.600	17.6	SURCHARGED
3.007	NT-1-6-6		5.913	803.052	22.3	OK
11.000	NT-1-11-0		0.027	54.349	1.6	OK
11.001	NT-1-11-1		0.061	66.566	1.9	OK
11.002	NT-1-11-2		0.076	87.537	2.6	OK
11.003	NT-1-11-3		0.042	87.528	2.6	OK
11.004	NT-1-11-4		0.052	126.126	3.7	OK

Pipe Number	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
3.008	NT-1-3-7		4.198	926.650	25.8	SURCHARGED
2.002	NT-1-2-2		3.799	967.488	26.8	SURCHARGED
2.003	NT-1-2-3		3.599	964.988	26.7	SURCHARGED
12.000	NT-1-12-0		0.025	43.235	1.3	OK
12.001	NT-1-12-1		0.062	50.999	1.5	OK
12.002	NT-1-12-2		0.041	51.000	1.5	OK
13.000	NT-1-13-0		0.011	17.245	0.5	OK
13.001	NT-1-13-1		0.000	17.245	0.5	OK
12.003	NT-1-13-3		0.042	99.923	2.9	OK
14.000	NT-1-14-0		0.000	0.000	0.0	OK
14.001	NT-1-14-1		0.000	17.804	0.5	OK
12.004	NT-1-12-4		0.563	117.716	3.4	OK
12.005	NT-1-12-5		1.208	117.483	3.4	OK
2.004	NT-1-2-4		809.435	548.264	4.0	SURCHARGED
2.005	NT-1-2-5		0.205	547.990	4.0	OK
15.000	NT-1-15-0		0.000	29.076	0.9	OK
15.001	NT-1-15-1		0.000	49.404	1.4	OK
15.002	NT-1-15-2		0.000	49.402	1.4	OK
15.003	NT-15-3		0.000	49.402	1.4	OK
2.006	NT-1-2-6		1.007	416.892	5.9	OK
2.007	NT-1-2-7		8.799	438.775	6.5	OK
2.008	NT-1-2-8		14.564	453.997	6.6	SURCHARGED
2.009	NT-1-2-9		12.007	469.684	6.3	OK
2.010	NT-1-2-10		30.222	451.538	5.0	OK
2.011	NT-1-2-11		42.284	476.393	8.1	SURCHARGED

APPENDIX C

C.1 O6a

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Network 3-Lover's Lane Junction

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
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

Time Area Diagram for Network 3-Lover's Lane Junction

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.057	4-8	0.128	8-12	0.129	12-16	0.127	16-20	0.044

Total Area Contributing (ha) = 0.485

Total Pipe Volume (m³) = 114.177

Network Design Table for Network 3-Lover's Lane Junction

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
N3-1.000	94.978	0.976	97.3	0.000	15.00	0.0	1.500		o	225	Pipe/Conduit	
N3-2.000	93.727	1.132	82.8	0.063	15.00	0.0	0.045	4 \=/		200	1:4 Swale	
N3-2.001	1.102	0.200	5.5	0.000	0.00	0.0	0.045	4 \=/		200	1:4 Swale	
N3-1.001	96.619	3.772	25.6	0.000	0.00	0.0	1.500		o	225	Pipe/Conduit	
N3-3.000	95.808	3.795	25.2	0.076	15.00	0.0	0.045	4 \=/		200	1:4 Swale	
N3-3.001	1.227	0.150	8.2	0.000	0.00	0.0	0.045	4 \=/		200	1:4 Swale	

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)
N3-1.000	32.51	16.36	13.673	0.000	0.0	0.0	0.0	1.16	46.3	0.0
N3-2.000	30.84	17.82	15.154	0.063	0.0	0.0	0.0	0.55	110.9	5.2
N3-2.001	30.83	17.83	14.022	0.063	0.0	0.0	0.0	2.15	429.7	5.2
N3-1.001	30.09	18.53	12.697	0.063	0.0	0.0	0.0	2.27	90.4	5.2
N3-3.000	32.24	16.59	14.022	0.076	0.0	0.0	0.0	1.00	200.8	6.7
N3-3.001	32.22	16.60	10.227	0.076	0.0	0.0	0.0	1.76	352.8	6.7

Network Design Table for Network 3-Lover's Lane Junction

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
N3-1.002	33.175	1.322	25.1	0.000	0.00	0.0	1.500		o	225	Pipe/Conduit	
N3-4.000	95.145	1.095	86.9	0.000	15.00	0.0	1.500		o	225	Pipe/Conduit	
N3-5.000	94.173	1.010	93.2	0.092	15.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-5.001	1.548	0.200	7.7	0.000	0.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-4.001	96.127	3.595	26.7	0.000	0.00	0.0	1.500		o	225	Pipe/Conduit	
N3-6.000	95.020	3.667	25.9	0.105	15.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-6.001	1.576	0.200	7.9	0.000	0.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-4.002	36.386	1.282	28.4	0.000	0.00	0.0	1.500		o	225	Pipe/Conduit	
N3-7.000	34.923	1.254	27.8	0.084	15.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-7.001	1.757	0.200	8.8	0.000	0.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-4.003	17.151	0.160	107.2	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N3-8.000	32.015	1.189	26.9	0.065	15.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-8.001	1.433	0.200	7.2	0.000	0.00	0.0		0.045	4 \=/	200	1:4 Swale	
N3-1.003	14.818	0.778	19.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N3-1.004	1.521	0.100	15.2	0.000	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)
N3-1.002	29.84	18.78	8.925	0.139	0.0	0.0	0.0	2.30	91.3	11.2
N3-4.000	32.60	16.29	13.735	0.000	0.0	0.0	0.0	1.23	49.0	0.0
N3-5.000	30.64	18.00	14.975	0.092	0.0	0.0	0.0	0.52	104.5	7.6
N3-5.001	30.63	18.02	13.965	0.092	0.0	0.0	0.0	1.81	362.6	7.6
N3-4.001	29.88	18.74	12.640	0.092	0.0	0.0	0.0	2.22	88.5	7.6
N3-6.000	32.23	16.60	13.965	0.105	0.0	0.0	0.0	0.99	198.2	9.2
N3-6.001	32.21	16.61	10.298	0.105	0.0	0.0	0.0	1.80	359.4	9.2
N3-4.002	29.60	19.02	9.045	0.197	0.0	0.0	0.0	2.16	85.9	15.8
N3-7.000	33.44	15.61	10.298	0.084	0.0	0.0	0.0	0.96	191.2	7.6
N3-7.001	33.42	15.63	9.044	0.084	0.0	0.0	0.0	1.70	340.4	7.6
N3-4.003	29.45	19.17	7.538	0.281	0.0	0.0	0.0	1.96	312.2	22.4
N3-8.000	33.52	15.55	10.227	0.065	0.0	0.0	0.0	0.97	194.4	5.9
N3-8.001	33.50	15.56	9.038	0.065	0.0	0.0	0.0	1.88	376.9	5.9
N3-1.003	29.40	19.22	7.378	0.485	0.0	0.0	0.0	4.68	743.6	38.6
N3-1.004	29.40	19.22	6.600	0.485	0.0	0.0	0.0	5.23	832.4	38.6

Manhole Schedules for Network 3-Lover's Lane Junction

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N3-NT-4-1-0	15.154	1.481	Open Manhole	1200	N3-1.000	13.673	225				
N3-NT-4-2-0	15.354	0.200	Junction		N3-2.000	15.154	200				
N3-NT-4-2-1	14.222	0.200	Junction		N3-2.001	14.022	200	N3-2.000	14.022	200	
N3-NT-4-1-1	14.022	1.325	Open Manhole	1050	N3-1.001	12.697	225	N3-1.000	12.697	225	
								N3-2.001	13.822	200	1100
N3-NT-4-3-0	14.222	0.200	Junction		N3-3.000	14.022	200				
N3-NT-4-3-1	10.427	0.200	Junction		N3-3.001	10.227	200	N3-3.000	10.227	200	
N3-NT-4-1-2	10.277	1.352	Open Manhole	1050	N3-1.002	8.925	225	N3-1.001	8.925	225	
								N3-3.001	10.077	200	1127
N3-NT-4-4-0	14.975	1.240	Open Manhole	1050	N3-4.000	13.735	225				
N3-NT-4-5-0	15.175	0.200	Junction		N3-5.000	14.975	200				
N3-NT-4-5-1	14.165	0.200	Junction		N3-5.001	13.965	200	N3-5.000	13.965	200	
N3-NT-4-4-1	13.965	1.325	Open Manhole	1050	N3-4.001	12.640	225	N3-4.000	12.640	225	
								N3-5.001	13.765	200	1100
N3-NT-4-6-0	14.165	0.200	Junction		N3-6.000	13.965	200				
N3-NT-4-6-1	10.498	0.200	Junction		N3-6.001	10.298	200	N3-6.000	10.298	200	
N3-NT-4-4-2	10.298	1.253	Open Manhole	1050	N3-4.002	9.045	225	N3-4.001	9.045	225	
								N3-6.001	10.098	200	1028
N3-NT-4-7-0	10.498	0.200	Junction		N3-7.000	10.298	200				
N3-NT-4-7-1	9.244	0.200	Junction		N3-7.001	9.044	200	N3-7.000	9.044	200	
N3-NT-4-4-3	9.044	1.506	Open Manhole	1050	N3-4.003	7.538	450	N3-4.002	7.763	225	
								N3-7.001	8.844	200	1056
N3-NT-4-8-0	10.427	0.200	Junction		N3-8.000	10.227	200				
N3-NT-4-8-1	9.238	0.200	Junction		N3-8.001	9.038	200	N3-8.000	9.038	200	
N3-NT-4-1-3	9.038	1.660	Open Manhole	1050	N3-1.003	7.378	450	N3-1.002	7.603	225	
								N3-4.003	7.378	450	
								N3-8.001	8.838	200	1210
N3-NT-4-1-4	8.550	1.950	Open Manhole	1050	N3-1.004	6.600	450	N3-1.003	6.600	450	
N3-NT-4-1-4	8.550	2.050	Open Manhole	1200		OUTFALL		N3-1.004	6.500	450	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N3-NT-4-1-0	644732.441	263744.234	644732.441	263744.234	Required	
N3-NT-4-2-0	644731.767	263743.241			No Entry	
N3-NT-4-2-1	644638.155	263738.641			No Entry	
N3-NT-4-1-1	644637.577	263739.580	644637.577	263739.580	Required	
N3-NT-4-3-0	644637.293	263738.550			No Entry	

Manhole Schedules for Network 3-Lover's Lane Junction

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N3-NT-4-3-1	644541.539	263735.546			No Entry	
N3-NT-4-1-2	644541.023	263736.659	644541.023	263736.659	Required	
N3-NT-4-4-0	644733.119	263734.107	644733.119	263734.107	Required	
N3-NT-4-5-0	644732.455	263735.057			No Entry	
N3-NT-4-5-1	644638.381	263730.747			No Entry	
N3-NT-4-4-1	644638.099	263729.224	644638.099	263729.224	Required	
N3-NT-4-6-0	644637.709	263730.603			No Entry	
N3-NT-4-6-1	644542.764	263727.454			No Entry	
N3-NT-4-4-2	644542.047	263726.050	644542.047	263726.050	Required	
N3-NT-4-7-0	644541.594	263727.488			No Entry	
N3-NT-4-7-1	644506.689	263726.773			No Entry	
N3-NT-4-4-3	644505.678	263725.337	644505.678	263725.337	Required	
N3-NT-4-8-0	644540.698	263735.523			No Entry	
N3-NT-4-8-1	644509.200	263741.105			No Entry	
N3-NT-4-1-3	644508.373	263742.275	644508.373	263742.275	Required	
N3-NT-4-1-4	644516.016	263754.969	644516.016	263754.969	Required	
N3-NT-4-1-4	644516.982	263756.144			No Entry	

PIPELINE SCHEDULES for Network 3-Lover's Lane Junction

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)
N3-1.000	o	225	N3-NT-4-1-0	15.154	13.673	1.256	Open Manhole	1200
N3-2.000	4 \=/	200	N3-NT-4-2-0	15.354	15.154	0.000	Junction	
N3-2.001	4 \=/	200	N3-NT-4-2-1	14.222	14.022	0.000	Junction	
N3-1.001	o	225	N3-NT-4-1-1	14.022	12.697	1.100	Open Manhole	1050
N3-3.000	4 \=/	200	N3-NT-4-3-0	14.222	14.022	0.000	Junction	
N3-3.001	4 \=/	200	N3-NT-4-3-1	10.427	10.227	0.000	Junction	
N3-1.002	o	225	N3-NT-4-1-2	10.277	8.925	1.127	Open Manhole	1050
N3-4.000	o	225	N3-NT-4-4-0	14.975	13.735	1.015	Open Manhole	1050
N3-5.000	4 \=/	200	N3-NT-4-5-0	15.175	14.975	0.000	Junction	
N3-5.001	4 \=/	200	N3-NT-4-5-1	14.165	13.965	0.000	Junction	
N3-4.001	o	225	N3-NT-4-4-1	13.965	12.640	1.100	Open Manhole	1050
N3-6.000	4 \=/	200	N3-NT-4-6-0	14.165	13.965	0.000	Junction	
N3-6.001	4 \=/	200	N3-NT-4-6-1	10.498	10.298	0.000	Junction	
N3-4.002	o	225	N3-NT-4-4-2	10.298	9.045	1.028	Open Manhole	1050
N3-7.000	4 \=/	200	N3-NT-4-7-0	10.498	10.298	0.000	Junction	
N3-7.001	4 \=/	200	N3-NT-4-7-1	9.244	9.044	0.000	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
N3-1.000	94.978	97.3	N3-NT-4-1-1	14.022	12.697	1.100	Open Manhole	1050
N3-2.000	93.727	82.8	N3-NT-4-2-1	14.222	14.022	0.000	Junction	
N3-2.001	1.102	5.5	N3-NT-4-1-1	14.022	13.822	0.000	Open Manhole	1050
N3-1.001	96.619	25.6	N3-NT-4-1-2	10.277	8.925	1.127	Open Manhole	1050
N3-3.000	95.808	25.2	N3-NT-4-3-1	10.427	10.227	0.000	Junction	
N3-3.001	1.227	8.2	N3-NT-4-1-2	10.277	10.077	0.000	Open Manhole	1050
N3-1.002	33.175	25.1	N3-NT-4-1-3	9.038	7.603	1.210	Open Manhole	1050
N3-4.000	95.145	86.9	N3-NT-4-4-1	13.965	12.640	1.100	Open Manhole	1050
N3-5.000	94.173	93.2	N3-NT-4-5-1	14.165	13.965	0.000	Junction	
N3-5.001	1.548	7.7	N3-NT-4-4-1	13.965	13.765	0.000	Open Manhole	1050
N3-4.001	96.127	26.7	N3-NT-4-4-2	10.298	9.045	1.028	Open Manhole	1050
N3-6.000	95.020	25.9	N3-NT-4-6-1	10.498	10.298	0.000	Junction	
N3-6.001	1.576	7.9	N3-NT-4-4-2	10.298	10.098	0.000	Open Manhole	1050
N3-4.002	36.386	28.4	N3-NT-4-4-3	9.044	7.763	1.056	Open Manhole	1050
N3-7.000	34.923	27.8	N3-NT-4-7-1	9.244	9.044	0.000	Junction	
N3-7.001	1.757	8.8	N3-NT-4-4-3	9.044	8.844	0.000	Open Manhole	1050

PIPELINE SCHEDULES for Network 3-Lover's Lane Junction

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)
N3-4.003	o	450	N3-NT-4-4-3	9.044	7.538	1.056	Open Manhole	1050
N3-8.000	4 \=/	200	N3-NT-4-8-0	10.427	10.227	0.000	Junction	
N3-8.001	4 \=/	200	N3-NT-4-8-1	9.238	9.038	0.000	Junction	
N3-1.003	o	450	N3-NT-4-1-3	9.038	7.378	1.210	Open Manhole	1050
N3-1.004	o	450	N3-NT-4-1-4	8.550	6.600	1.500	Open Manhole	1050

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)
N3-4.003	17.151	107.2	N3-NT-4-1-3	9.038	7.378	1.210	Open Manhole	1050
N3-8.000	32.015	26.9	N3-NT-4-8-1	9.238	9.038	0.000	Junction	
N3-8.001	1.433	7.2	N3-NT-4-1-3	9.038	8.838	0.000	Open Manhole	1050
N3-1.003	14.818	19.0	N3-NT-4-1-4	8.550	6.600	1.500	Open Manhole	1050
N3-1.004	1.521	15.2	N3-NT-4-1-4	8.550	6.500	1.600	Open Manhole	1200

Area Summary for Network 3-Lover's Lane Junction

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
2.000	Classification	Carriageway	100	0.031	0.031	0.031
	Classification	Swales	100	0.029	0.029	0.060
	Classification	Earthworks	25	0.011	0.003	0.063
2.001	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
3.000	Classification	Carriageway	100	0.033	0.033	0.033
	Classification	Swales	100	0.029	0.029	0.062
	Classification	Earthworks	25	0.056	0.014	0.076
3.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.000	0.000	0.000
5.000	Classification	Carriageway	100	0.030	0.030	0.030
	Classification	Swales	100	0.029	0.029	0.059
	Classification	Earthworks	25	0.049	0.012	0.071
	Classification	Verge	25	0.045	0.011	0.082
	Classification	Bridleway	25	0.027	0.007	0.089
	Classification	Earthworks	25	0.011	0.003	0.092
5.001	-	-	100	0.000	0.000	0.000
4.001	-	-	100	0.000	0.000	0.000
6.000	Classification	Swales	100	0.029	0.029	0.029
	Classification	Carriageway	100	0.032	0.032	0.062
	Classification	Earthworks	25	0.052	0.013	0.075
	Classification	Verge	25	0.049	0.012	0.087
	Classification	Bridleway	25	0.029	0.007	0.094
	Classification	Earthworks	25	0.045	0.011	0.105
6.001	-	-	100	0.000	0.000	0.000
4.002	-	-	100	0.000	0.000	0.000
7.000	Classification	Carriageway	100	0.033	0.033	0.033
	Classification	Swales	100	0.017	0.017	0.050
	Classification	Earthworks	25	0.032	0.008	0.058
	Classification	Verge	25	0.063	0.016	0.074
	Classification	Bridleway	25	0.025	0.006	0.080
	Classification	Earthworks	25	0.017	0.004	0.084
7.001	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.000	0.000	0.000
8.000	Classification	Carriageway	100	0.029	0.029	0.029
	Classification	Swales	100	0.023	0.023	0.052
	Classification	Earthworks	25	0.050	0.013	0.065
8.001	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.907	0.485	0.485

Network Classifications for Network 3-Lover's Lane Junction

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
N3-1.000	N3-NT-4-1-0	225	1.100	1.466	Unclassified	1200	0	1.256	Unclassified
N3-2.000	N3-NT-4-2-0	200	0.000	0.235	Unclassified				Junction
N3-2.001	N3-NT-4-2-1	200	0.000	0.025	Unclassified				Junction
N3-1.001	N3-NT-4-1-1	225	1.100	1.443	Unclassified	1050	0	1.100	Unclassified
N3-3.000	N3-NT-4-3-0	200	0.000	0.250	Unclassified				Junction
N3-3.001	N3-NT-4-3-1	200	0.000	0.052	Unclassified				Junction
N3-1.002	N3-NT-4-1-2	225	1.043	1.210	Unclassified	1050	0	1.127	Unclassified
N3-4.000	N3-NT-4-4-0	225	1.015	1.419	Unclassified	1050	0	1.015	Unclassified
N3-5.000	N3-NT-4-5-0	200	0.000	0.375	Unclassified				Junction
N3-5.001	N3-NT-4-5-1	200	0.000	0.073	Unclassified				Junction
N3-4.001	N3-NT-4-4-1	225	1.028	1.396	Unclassified	1050	0	1.100	Unclassified
N3-6.000	N3-NT-4-6-0	200	0.000	0.271	Unclassified				Junction
N3-6.001	N3-NT-4-6-1	200	0.000	0.090	Unclassified				Junction
N3-4.002	N3-NT-4-4-2	225	0.948	1.056	Unclassified	1050	0	1.028	Unclassified
N3-7.000	N3-NT-4-7-0	200	0.000	0.000	Unclassified				Junction
N3-7.001	N3-NT-4-7-1	200	0.000	0.071	Unclassified				Junction
N3-4.003	N3-NT-4-4-3	450	1.056	1.384	Unclassified	1050	0	1.056	Unclassified
N3-8.000	N3-NT-4-8-0	200	0.000	0.000	Unclassified				Junction
N3-8.001	N3-NT-4-8-1	200	0.000	0.011	Unclassified				Junction
N3-1.003	N3-NT-4-1-3	450	1.210	3.354	Unclassified	1050	0	1.210	Unclassified
N3-1.004	N3-NT-4-1-4	450	1.500	4.461	Unclassified	1050	0	1.500	Unclassified

Free Flowing Outfall Details for Network 3-Lover's Lane Junction

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N3-1.004	N3-NT-4-1-4	8.550	6.500	0.000	1200	0

Simulation Criteria for Network 3-Lover's Lane Junction

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	5.000
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)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 13 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Summer Storms Yes
Return Period (years)		100	Winter Storms No
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		Cv (Winter) 0.840
Data Type		Point	Storm Duration (mins) 1440

Online Controls for Network 3-Lover's Lane Junction

Weir Manhole: N3-NT-4-1-4, DS/PN: N3-1.004, Volume (m³): 3.9

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 8.550

Storage Structures for Network 3-Lover's Lane Junction

Swale Manhole: N3-NT-4-2-1, DS/PN: N3-2.001

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	93.7
Infiltration Coefficient Side (m/hr)	0.38160	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	82.8
Porosity	1.00	Cap Volume Depth (m)	0.200
Invert Level (m)	14.022	Cap Infiltration Depth (m)	0.200
Base Width (m)	0.2	Include Swale Volume	No

Filter Drain Manhole: N3-NT-4-1-1, DS/PN: N3-1.001

Infiltration Coefficient Base (m/hr)	0.38160	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.38160	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	97.3
Invert Level (m)	12.697	Cap Volume Depth (m)	1.325
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.325
Trench Length (m)	95.0		

Swale Manhole: N3-NT-4-3-1, DS/PN: N3-3.001

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	95.8
Infiltration Coefficient Side (m/hr)	0.38160	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	25.2
Porosity	1.00	Cap Volume Depth (m)	0.200
Invert Level (m)	10.277	Cap Infiltration Depth (m)	0.200
Base Width (m)	0.2	Include Swale Volume	No

Filter Drain Manhole: N3-NT-4-1-2, DS/PN: N3-1.002

Infiltration Coefficient Base (m/hr)	0.38160	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.38160	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	25.6
Invert Level (m)	8.925	Cap Volume Depth (m)	1.352
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.352
Trench Length (m)	96.6		

Swale Manhole: N3-NT-4-5-1, DS/PN: N3-5.001

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	94.2
Infiltration Coefficient Side (m/hr)	0.38160	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	93.2
Porosity	1.00	Cap Volume Depth (m)	0.200
Invert Level (m)	13.965	Cap Infiltration Depth (m)	0.200
Base Width (m)	0.2	Include Swale Volume	No

Filter Drain Manhole: N3-NT-4-4-1, DS/PN: N3-4.001

Infiltration Coefficient Base (m/hr)	0.38160	Trench Width (m)	0.5
Infiltration Coefficient Side (m/hr)	0.38160	Trench Length (m)	95.1
Safety Factor	2.0	Pipe Diameter (m)	0.225
Porosity	0.30	Pipe Depth above Invert (m)	0.000
Invert Level (m)	12.640	Number of Pipes	1

Filter Drain Manhole: N3-NT-4-4-1, DS/PN: N3-4.001

Slope (1:X)	86.9	Cap Infiltration Depth (m)	1.325
Cap Volume Depth (m)	1.325		

Swale Manhole: N3-NT-4-6-1, DS/PN: N3-6.001

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	95.1
Infiltration Coefficient Side (m/hr)	0.38160	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	25.9
Porosity	1.00	Cap Volume Depth (m)	0.200
Invert Level (m)	10.298	Cap Infiltration Depth (m)	0.200
Base Width (m)	0.2	Include Swale Volume	No

Filter Drain Manhole: N3-NT-4-4-2, DS/PN: N3-4.002

Infiltration Coefficient Base (m/hr)	0.38160	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.38160	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	26.7
Invert Level (m)	9.045	Cap Volume Depth (m)	1.253
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.253
Trench Length (m)	96.1		

Swale Manhole: N3-NT-4-7-1, DS/PN: N3-7.001

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	34.9
Infiltration Coefficient Side (m/hr)	0.38160	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	27.8
Porosity	1.00	Cap Volume Depth (m)	0.200
Invert Level (m)	9.044	Cap Infiltration Depth (m)	0.200
Base Width (m)	0.2	Include Swale Volume	No

Filter Drain Manhole: N3-NT-4-4-3, DS/PN: N3-4.003

Infiltration Coefficient Base (m/hr)	0.38160	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.38160	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	28.4
Invert Level (m)	7.763	Cap Volume Depth (m)	1.281
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.281
Trench Length (m)	36.4		

Swale Manhole: N3-NT-4-8-1, DS/PN: N3-8.001

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	32.2
Infiltration Coefficient Side (m/hr)	0.38160	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	26.9
Porosity	1.00	Cap Volume Depth (m)	0.200
Invert Level (m)	9.038	Cap Infiltration Depth (m)	0.200
Base Width (m)	0.2	Include Swale Volume	No

Filter Drain Manhole: N3-NT-4-1-3, DS/PN: N3-1.003

Infiltration Coefficient Base (m/hr)	0.38160	Porosity	0.30
Infiltration Coefficient Side (m/hr)	0.38160	Invert Level (m)	7.603
Safety Factor	2.0	Trench Width (m)	0.5

Filter Drain Manhole: N3-NT-4-1-3, DS/PN: N3-1.003

Trench Length (m)	33.3	Slope (1:X)	25.2
Pipe Diameter (m)	0.225	Cap Volume Depth (m)	1.435
Pipe Depth above Invert (m)	0.000	Cap Infiltration Depth (m)	1.435
Number of Pipes	1		

Infiltration Basin Manhole: N3-NT-4-1-4, DS/PN: N3-1.004

Invert Level (m)	6.825	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.38160	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.38160		

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	100.0	1.725	609.6

C.2 O6b

Time Area Diagram for Network 5-Bridleway 19

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.110	4-8	0.091	8-12	0.190	12-16	0.121

Total Area Contributing (ha) = 0.511

Total Pipe Volume (m^3) = 150.112

Existing Network Details for Network 5-Bridleway 19

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
N5-1.000	34.748	0.500	69.5	0.093	5.00	0.0	0.600		o	300	Pipe/Conduit
N5-2.000	12.117	0.400	30.3	0.025	5.00	0.0	0.600		o	300	Pipe/Conduit
N5-1.001	17.850	0.220	81.1	0.081	0.00	0.0	0.600		o	300	Pipe/Conduit
N5-3.000	9.643	0.090	107.1	0.030	5.00	0.0	0.600		o	300	Pipe/Conduit
N5-1.002	19.751	0.140	141.1	0.004	0.00	0.0	0.600		o	450	Pipe/Conduit
N5-1.003	48.936	0.360	135.9	0.052	0.00	0.0		0.045	→|○|→		Filter Drain
N5-1.004	76.181	0.550	138.5	0.036	0.00	0.0		0.045	→|○|→		Filter Drain
N5-1.005	17.685	0.420	42.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit
N5-1.006	49.693	2.990	16.6	0.040	0.00	0.0		0.045	→|○|→		Filter Drain
N5-1.007	55.426	3.530	15.7	0.037	0.00	0.0		0.045	→|○|→		Filter Drain
N5-1.008	48.105	1.660	29.0	0.029	0.00	0.0		0.045	→|○|→		Filter Drain
N5-1.009	9.062	0.100	90.6	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit
N5-1.010	11.023	0.183	60.2	0.031	0.00	0.0	0.600		o	300	Pipe/Conduit
N5-1.011	6.029	0.076	79.3	0.053	0.00	0.0	0.600		o	300	Pipe/Conduit
N5-1.012	9.394	0.301	31.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit
N5-1.013	9.312	0.015	620.8	0.000	0.00	0.0	0.600		2 _/	500	1:2 Ditch
N5-1.014	11.479	0.023	499.1	0.000	0.00	0.0	0.600		2 _/	500	1:2 Ditch
N5-1.015	6.560	0.022	298.2	0.000	0.00	0.0	0.600		2 _/	500	1:2 Ditch

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
N5-1.000	12.800	0.093	0.0	1.89	133.5
N5-2.000	12.700	0.025	0.0	2.87	202.7
N5-1.001	12.300	0.198	0.0	1.75	123.5
N5-3.000	12.170	0.030	0.0	1.52	107.3
N5-1.002	12.080	0.232	0.0	1.71	271.9
N5-1.003	11.940	0.284	0.0	0.38	188.8
N5-1.004	11.580	0.321	0.0	0.37	187.0
N5-1.005	11.030	0.321	0.0	2.43	171.8
N5-1.006	10.610	0.361	0.0	1.07	502.2
N5-1.007	7.620	0.398	0.0	1.10	516.7
N5-1.008	4.090	0.428	0.0	0.70	149.0
N5-1.009	2.430	0.428	0.0	1.65	116.8
N5-1.010	2.330	0.459	0.0	2.03	143.5
N5-1.011	2.147	0.511	0.0	1.77	124.9
N5-1.012	2.071	0.511	0.0	2.82	199.7
N5-1.013	1.770	0.511	0.0	1.56	1587.2
N5-1.014	1.755	0.511	0.0	1.24	441.9
N5-1.015	1.732	0.511	0.0	1.57	518.2

Manhole Schedules for Network 5-Bridleway 19

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N5-NET5-1-0	14.316	1.516	Open Manhole	1200	N5-1.000	12.800	300				
N5-NET5-2-0	14.026	1.326	Open Manhole	1200	N5-2.000	12.700	300				
N5-NET5-1-1	13.765	1.465	Open Manhole	1800	N5-1.001	12.300	300	N5-1.000	12.300	300	
								N5-2.000	12.300	300	
N5-NET5-3-0	13.444	1.274	Open Manhole	1800	N5-3.000	12.170	300				
N5-NET5-1-2	13.548	1.468	Open Manhole	1200	N5-1.002	12.080	450	N5-1.001	12.080	300	
								N5-3.000	12.080	300	
N5-NET5-1-3	14.374	2.434	Open Manhole	1200	N5-1.003	11.940		N5-1.002	11.940	450	
N5-NET5-1-4	14.552	2.972	Open Manhole	1200	N5-1.004	11.580		N5-1.003	11.580		
N5-NET5-1-5	13.344	2.314	Open Manhole	1200	N5-1.005	11.030	300	N5-1.004	11.030		
N5-NET5-1-6	12.847	2.237	Open Manhole	1200	N5-1.006	10.610		N5-1.005	10.610	300	
N5-NET5-1-7	9.852	2.232	Open Manhole	1200	N5-1.007	7.620		N5-1.006	7.620		
N5-NET5-1-8	6.317	2.227	Open Manhole	1200	N5-1.008	4.090		N5-1.007	4.090		
N5-NET5-1-9	3.536	1.106	Open Manhole	1200	N5-1.009	2.430	300	N5-1.008	2.430		
N5-NET5-1-10	3.152	0.822	Open Manhole	1050 x 750	N5-1.010	2.330	300	N5-1.009	2.330	300	
N5-NET5-1-11	2.815	0.668	Open Manhole	1050	N5-1.011	2.147	300	N5-1.010	2.147	300	
N5-NET5-1-12	2.960	0.889	Open Manhole	1050	N5-1.012	2.071	300	N5-1.011	2.071	300	
N5-NET5-1-14	2.370	0.600	Open Manhole	1050	N5-1.013	1.770	500	N5-1.012	1.770	300	
N5-NET5-1-15	2.070	0.315	Junction		N5-1.014	1.755	500	N5-1.013	1.755	500	
N5-NET5-1-16	2.032	0.300	Junction		N5-1.015	1.732	500	N5-1.014	1.732	500	
N5-1-10	2.243	0.533	Open Manhole	0		OUTFALL		N5-1.015	1.710	500	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N5-NET5-1-0	645559.821	263152.065	645559.821	263152.065	Required	
N5-NET5-2-0	645592.384	263167.221	645592.384	263167.221	Required	
N5-NET5-1-1	645594.420	263155.276	645594.420	263155.276	Required	
N5-NET5-3-0	645621.803	263157.734	645621.803	263157.734	Required	
N5-NET5-1-2	645612.194	263156.926	645612.194	263156.926	Required	
N5-NET5-1-3	645610.117	263176.567	645610.117	263176.567	Required	
N5-NET5-1-4	645594.780	263223.026	645594.780	263223.026	Required	
N5-NET5-1-5	645569.193	263294.780	645569.193	263294.780	Required	
N5-NET5-1-6	645567.004	263312.329	645567.004	263312.329	Required	

Manhole Schedules for Network 5-Bridleway 19

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N5-NET5-1-7	645539.864	263353.879	645539.864	263353.879	Required	
N5-NET5-1-8	645508.541	263399.422	645508.541	263399.422	Required	
N5-NET5-1-9	645482.612	263439.935	645482.612	263439.935	Required	
N5-NET5-1-10	645478.512	263448.016	645478.512	263448.016	Required	
N5-NET5-1-11	645472.405	263457.193	645472.405	263457.193	Required	
N5-NET5-1-12	645467.543	263460.756	645467.543	263460.756	Required	
N5-NET5-1-14	645461.614	263468.043	645461.614	263468.043	Required	
N5-NET5-1-15	645455.357	263474.939			No Entry	
N5-NET5-1-16	645447.662	263483.457			No Entry	
N5-1-10	645443.267	263488.327			No Entry	

PIPELINE SCHEDULES for Network 5-Bridleway 19

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)
N5-1.000	o	300	N5-NET5-1-0	14.316	12.800	1.216	Open Manhole	1200
N5-2.000	o	300	N5-NET5-2-0	14.026	12.700	1.026	Open Manhole	1200
N5-1.001	o	300	N5-NET5-1-1	13.765	12.300	1.165	Open Manhole	1800
N5-3.000	o	300	N5-NET5-3-0	13.444	12.170	0.974	Open Manhole	1800
N5-1.002	o	450	N5-NET5-1-2	13.548	12.080	1.018	Open Manhole	1200
N5-1.003	→|○|→		N5-NET5-1-3	14.374	11.940	0.284	Open Manhole	1200
N5-1.004	→|○|→		N5-NET5-1-4	14.552	11.580	0.822	Open Manhole	1200
N5-1.005	o	300	N5-NET5-1-5	13.344	11.030	2.014	Open Manhole	1200
N5-1.006	→|○|→		N5-NET5-1-6	12.847	10.610	0.237	Open Manhole	1200
N5-1.007	→|○|→		N5-NET5-1-7	9.852	7.620	0.232	Open Manhole	1200
N5-1.008	→|○|→		N5-NET5-1-8	6.317	4.090	1.327	Open Manhole	1200
N5-1.009	o	300	N5-NET5-1-9	3.536	2.430	0.806	Open Manhole	1200
N5-1.010	o	300	N5-NET5-1-10	3.152	2.330	0.522	Open Manhole	1050 x 750
N5-1.011	o	300	N5-NET5-1-11	2.815	2.147	0.368	Open Manhole	1050
N5-1.012	o	300	N5-NET5-1-12	2.960	2.071	0.589	Open Manhole	1050
N5-1.013	2 _/	500	N5-NET5-1-14	2.370	1.770	0.300	Open Manhole	1050
N5-1.014	2 _/	500	N5-NET5-1-15	2.070	1.755	0.015	Junction	
N5-1.015	2 _/	500	N5-NET5-1-16	2.032	1.732	0.000	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
N5-1.000	34.748	69.5	N5-NET5-1-1	13.765	12.300	1.165	Open Manhole	1800
N5-2.000	12.117	30.3	N5-NET5-1-1	13.765	12.300	1.165	Open Manhole	1800
N5-1.001	17.850	81.1	N5-NET5-1-2	13.548	12.080	1.168	Open Manhole	1200
N5-3.000	9.643	107.1	N5-NET5-1-2	13.548	12.080	1.168	Open Manhole	1200
N5-1.002	19.751	141.1	N5-NET5-1-3	14.374	11.940	1.984	Open Manhole	1200
N5-1.003	48.936	135.9	N5-NET5-1-4	14.552	11.580	0.822	Open Manhole	1200
N5-1.004	76.181	138.5	N5-NET5-1-5	13.344	11.030	0.164	Open Manhole	1200
N5-1.005	17.685	42.1	N5-NET5-1-6	12.847	10.610	1.937	Open Manhole	1200
N5-1.006	49.693	16.6	N5-NET5-1-7	9.852	7.620	0.232	Open Manhole	1200
N5-1.007	55.426	15.7	N5-NET5-1-8	6.317	4.090	0.227	Open Manhole	1200
N5-1.008	48.105	29.0	N5-NET5-1-9	3.536	2.430	0.206	Open Manhole	1200
N5-1.009	9.062	90.6	N5-NET5-1-10	3.152	2.330	0.522	Open Manhole	1050 x 750
N5-1.010	11.023	60.2	N5-NET5-1-11	2.815	2.147	0.368	Open Manhole	1050
N5-1.011	6.029	79.3	N5-NET5-1-12	2.960	2.071	0.589	Open Manhole	1050
N5-1.012	9.394	31.2	N5-NET5-1-14	2.370	1.770	0.300	Open Manhole	1050
N5-1.013	9.312	620.8	N5-NET5-1-15	2.070	1.755	0.015	Junction	
N5-1.014	11.479	499.1	N5-NET5-1-16	2.032	1.732	0.000	Junction	
N5-1.015	6.560	298.2	N5-1-10	2.243	1.710	0.233	Open Manhole	0

Area Summary for Network 5-Bridleway 19

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Carriageway	100	0.009	0.009	0.009
	Classification	Carriageway	100	0.010	0.010	0.019
	Classification	Overland	50	0.064	0.032	0.051
	Classification	Carriageway	100	0.004	0.004	0.055
	Classification	Verge	23	0.002	0.001	0.056
	Classification	Overland	50	0.019	0.010	0.066
	Classification	Verge	23	0.002	0.001	0.066
	Classification	Carriageway	100	0.004	0.004	0.070
	Classification	Verge	23	0.003	0.001	0.070
	Classification	Verge	23	0.001	0.000	0.071
	Classification	Verge	23	0.001	0.000	0.071
	Classification	Footway	100	0.002	0.002	0.073
	Classification	Carriageway	100	0.004	0.004	0.077
	Classification	Footway	100	0.002	0.002	0.079
	Classification	Verge	23	0.002	0.000	0.080
	Classification	Carriageway	100	0.006	0.006	0.085
	Classification	Overland	50	0.009	0.004	0.090
	Classification	Overland	50	0.006	0.003	0.093
2.000	Classification	Carriageway	100	0.008	0.008	0.008
	Classification	Carriageway	100	0.003	0.003	0.011
	Classification	Carriageway	100	0.003	0.003	0.014
	Classification	Verge	23	0.003	0.001	0.015
	Classification	Verge	23	0.000	0.000	0.015
	Classification	Verge	23	0.001	0.000	0.015
	Classification	Verge	23	0.002	0.000	0.016
	Classification	Verge	23	0.002	0.000	0.016
	Classification	Overland	50	0.013	0.007	0.023
	Classification	Footway	100	0.002	0.002	0.025
1.001	Classification	Carriageway	100	0.006	0.006	0.006
	Classification	Carriageway	100	0.002	0.002	0.008
	Classification	Carriageway	100	0.003	0.003	0.011
	Classification	Verge	23	0.001	0.000	0.011
	Classification	Footway	100	0.002	0.002	0.013
	Classification	Verge	23	0.002	0.000	0.013
	Classification	Verge	23	0.001	0.000	0.013
	Classification	Verge	23	0.001	0.000	0.014
	Classification	Verge	23	0.000	0.000	0.014
	Classification	Carriageway	100	0.003	0.003	0.017
	Classification	Footway	100	0.001	0.001	0.018
	Classification	Footway	100	0.002	0.002	0.020
	Classification	Verge	23	0.002	0.001	0.021
	Classification	Verge	23	0.002	0.000	0.021
	Classification	Carriageway	100	0.009	0.009	0.030
	Classification	Verge	23	0.002	0.000	0.030
	Classification	Verge	23	0.003	0.001	0.031
	Classification	Carriageway	100	0.005	0.005	0.036
	Classification	Verge	23	0.002	0.000	0.036
	Classification	Verge	23	0.001	0.000	0.037
	Classification	Carriageway	100	0.003	0.003	0.040
	Classification	Verge	23	0.001	0.000	0.040
	Classification	Overland	50	0.006	0.003	0.043
	Classification	Overland	50	0.006	0.003	0.046
	Classification	Overland	50	0.006	0.003	0.049
	User	-	100	0.032	0.032	0.081
3.000	Classification	Overland	50	0.006	0.003	0.003
	Classification	Overland	50	0.011	0.005	0.008
	Classification	Verge	23	0.002	0.000	0.009
	Classification	Carriageway	100	0.003	0.003	0.012
	Classification	Carriageway	100	0.004	0.004	0.016
	Classification	Carriageway	100	0.003	0.003	0.019
	Classification	Carriageway	100	0.005	0.005	0.024
	Classification	Verge	23	0.001	0.000	0.024
	Classification	Carriageway	100	0.003	0.003	0.028

Area Summary for Network 5-Bridleway 19

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	Classification	Overland	50	0.003	0.001	0.029
	Classification	Verge	23	0.002	0.000	0.030
1.002	Classification	Carriageway	100	0.004	0.004	0.004
1.003	Classification	Overland	50	0.054	0.027	0.027
	Classification	Verge	23	0.003	0.001	0.028
	Classification	Swales	100	0.003	0.003	0.030
	Classification	Footway	100	0.015	0.015	0.046
	Classification	Overland	50	0.002	0.001	0.047
	Classification	Verge	23	0.000	0.000	0.047
	Classification	Verge	23	0.002	0.001	0.048
	Classification	Footway	100	0.004	0.004	0.052
1.004	Classification	Overland	50	0.006	0.003	0.003
	Classification	Verge	23	0.005	0.001	0.004
	Classification	Swales	100	0.005	0.005	0.009
	Classification	Footway	100	0.023	0.023	0.031
	Classification	Overland	50	0.007	0.004	0.035
	Classification	Overland	50	0.002	0.001	0.036
	Classification	Verge	23	0.002	0.000	0.036
1.005	-	-	100	0.000	0.000	0.000
1.006	Classification	Bridleway	100	0.013	0.013	0.013
	Classification	Verge	23	0.003	0.001	0.014
	Classification	Bridleway	100	0.015	0.015	0.029
	Classification	Verge	23	0.017	0.004	0.033
	Classification	Swales	100	0.003	0.003	0.036
	Classification	Verge	23	0.008	0.002	0.038
	Classification	Swales	100	0.002	0.002	0.040
1.007	Classification	Verge	23	0.017	0.004	0.004
	Classification	Bridleway	100	0.017	0.017	0.020
	Classification	Verge	23	0.009	0.002	0.023
	Classification	Overland	50	0.030	0.015	0.037
1.008	Classification	Bridleway	100	0.015	0.015	0.015
	Classification	Verge	23	0.015	0.003	0.018
	Classification	Overland	50	0.016	0.008	0.026
	Classification	Swales	100	0.003	0.003	0.029
	Classification	Verge	23	0.002	0.000	0.029
1.009	-	-	100	0.000	0.000	0.000
1.010	Classification	Verge	23	0.004	0.001	0.001
	Classification	Bridleway	100	0.011	0.011	0.012
	Classification	Carriageway	100	0.015	0.015	0.027
	Classification	Overland	50	0.008	0.004	0.031
1.011	Classification	Overland	50	0.035	0.018	0.018
	Classification	Bridleway	100	0.024	0.024	0.041
	Classification	Overland	50	0.024	0.012	0.053
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.777	0.511	0.511

Network Classifications for Network 5-Bridleway 19

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
N5-1.000	N5-NET5-1-0	300	0.921	1.216	Unclassified	1200	0	1.216	Unclassified
N5-2.000	N5-NET5-2-0	300	1.026	1.165	Unclassified	1200	0	1.026	Unclassified
N5-1.001	N5-NET5-1-1	300	1.165	1.168	Unclassified	1800	0	1.165	Unclassified
N5-3.000	N5-NET5-3-0	300	0.974	1.168	Unclassified	1800	0	0.974	Unclassified
N5-1.002	N5-NET5-1-2	450	1.018	1.984	Unclassified	1200	0	1.018	Unclassified
N5-1.003	N5-NET5-1-3				Filter Drain	1200	0	0.284	Unclassified
N5-1.004	N5-NET5-1-4				Filter Drain	1200	0	0.822	Unclassified
N5-1.005	N5-NET5-1-5	300	1.860	2.122	Unclassified	1200	0	2.014	Unclassified
N5-1.006	N5-NET5-1-6				Filter Drain	1200	0	0.237	Unclassified
N5-1.007	N5-NET5-1-7				Filter Drain	1200	0	0.232	Unclassified
N5-1.008	N5-NET5-1-8				Filter Drain	1200	0	1.327	Unclassified
N5-1.009	N5-NET5-1-9	300	0.522	1.308	Unclassified	1200	0	0.806	Unclassified
N5-1.010	N5-NET5-1-10	300	0.368	0.522	Unclassified	1050	750	0.522	Unclassified
N5-1.011	N5-NET5-1-11	300	0.368	0.589	Unclassified	1050	0	0.368	Unclassified
N5-1.012	N5-NET5-1-12	300	0.300	0.589	Unclassified	1050	0	0.589	Unclassified
N5-1.013	N5-NET5-1-14	500	0.015	0.300	Unclassified	1050	0	0.300	Unclassified
N5-1.014	N5-NET5-1-15	500	0.000	0.015	Unclassified				Junction
N5-1.015	N5-NET5-1-16	500	0.000	0.233	Unclassified				Junction

Free Flowing Outfall Details for Network 5-Bridleway 19

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N5-1.015	N5-1-10	2.243	1.710	0.000	0	0

Simulation Criteria for Network 5-Bridleway 19

Volumetric Runoff Coeff	0.750	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)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Profile Type Summer
Return Period (years)		5	Cv (Summer) 0.750
Region	England and Wales		Cv (Winter) 0.840
M5-60 (mm)		18.700	Storm Duration (mins) 1440
Ratio R		0.400	

Storage Structures for Network 5-Bridleway 19

Filter Drain Pipe: N5-1.003

Manning's N	0.045	Trench Length (m)	48.9
Infiltration Coefficient Base (m/hr)	0.02080	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.02080	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	135.9
Invert Level (m)	11.940	Cap Volume Depth (m)	2.150
Trench Width (m)	0.7	Cap Infiltration Depth (m)	2.150

Filter Drain Pipe: N5-1.004

Manning's N	0.045	Trench Length (m)	76.2
Infiltration Coefficient Base (m/hr)	0.02080	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.02080	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	138.5
Invert Level (m)	11.580	Cap Volume Depth (m)	2.150
Trench Width (m)	0.7	Cap Infiltration Depth (m)	2.150

Filter Drain Pipe: N5-1.006

Manning's N	0.045	Trench Length (m)	49.7
Infiltration Coefficient Base (m/hr)	0.02008	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.02008	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	16.6
Invert Level (m)	10.610	Cap Volume Depth (m)	2.000
Trench Width (m)	0.7	Cap Infiltration Depth (m)	2.000

Filter Drain Pipe: N5-1.007

Manning's N	0.045	Trench Length (m)	55.4
Infiltration Coefficient Base (m/hr)	0.02080	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.02080	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	15.7
Invert Level (m)	7.620	Cap Volume Depth (m)	2.000
Trench Width (m)	0.7	Cap Infiltration Depth (m)	2.000

Filter Drain Pipe: N5-1.008

Manning's N	0.045	Trench Length (m)	48.1
Infiltration Coefficient Base (m/hr)	0.02080	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.02080	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	29.0
Invert Level (m)	4.090	Cap Volume Depth (m)	0.900
Trench Width (m)	0.6	Cap Infiltration Depth (m)	0.900

C.3 O6c

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Refuse Area

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	15
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
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

Time Area Diagram for Refuse Area

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.088	4-8	0.031

Total Area Contributing (ha) = 0.119

Total Pipe Volume (m^3) = 11.880

Conduit Sections for Refuse Area

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m^2)
28	\/	450	543	45.0		1.086	0.539

Manhole Schedules for Refuse Area

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N9-NT-9-1-0	8.796	0.913	Open Manhole	1050	N9-1.000	7.883	225				
N9-NT-9-1-1	7.700	1.047	Open Manhole	1200	N9-1.001	6.653	225	N9-1.000	6.653	225	
N9-NT-9-1-2	5.299	0.792	Open Manhole	1200	N9-1.002	4.507	225	N9-1.001	4.507	225	
N9-NT-9-1-3	4.800	0.871	Open Manhole	1200	N9-1.003	3.929	225	N9-1.002	3.929	225	
N9-NT-9-2-4	3.430	0.965	Open Manhole	1200	N9-1.004	2.465	225	N9-1.003	2.465	225	
N9-NT-	2.014	0.868	Junction		N9-1.005	1.146	28	N9-1.004	1.464	225	
N9-NT-14-4	3.329	2.321	Open Manhole	1200		OUTFALL		N9-1.005	1.008	28	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N9-NT-9-1-0	645555.824	263358.140	645555.824	263358.140	Required	
N9-NT-9-1-1	645532.105	263392.660	645532.105	263392.660	Required	
N9-NT-9-1-2	645522.850	263416.696	645522.850	263416.696	Required	
N9-NT-9-1-3	645517.239	263424.757	645517.239	263424.757	Required	
N9-NT-9-2-4	645489.677	263458.963	645489.677	263458.963	Required	
N9-NT-	645477.221	263475.598			No Entry	
N9-NT-14-4	645470.095	263484.691			No Entry	

PIPELINE SCHEDULES for Refuse Area

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)
N9-1.000	o	225	N9-NT-9-1-0	8.796	7.883	0.688	Open Manhole	1050
N9-1.001	o	225	N9-NT-9-1-1	7.700	6.653	0.822	Open Manhole	1200
N9-1.002	o	225	N9-NT-9-1-2	5.299	4.507	0.567	Open Manhole	1200
N9-1.003	o	225	N9-NT-9-1-3	4.800	3.929	0.646	Open Manhole	1200
N9-1.004	o	225	N9-NT-9-2-4	3.430	2.465	0.740	Open Manhole	1200
N9-1.005	\/	28	N9-NT-	2.014	1.146	0.325	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
N9-1.000	41.883	34.1	N9-NT-9-1-1	7.700	6.653	0.822	Open Manhole	1200
N9-1.001	25.756	12.0	N9-NT-9-1-2	5.299	4.507	0.567	Open Manhole	1200
N9-1.002	9.822	17.0	N9-NT-9-1-3	4.800	3.929	0.646	Open Manhole	1200
N9-1.003	43.929	30.0	N9-NT-9-2-4	3.430	2.465	0.740	Open Manhole	1200
N9-1.004	20.781	20.8	N9-NT-	2.014	1.464	0.325	Junction	
N9-1.005	11.553	83.7	N9-NT-14-4	3.329	1.008	1.778	Open Manhole	1200

Area Summary for Refuse Area

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.033	0.033	0.033
	User	-	100	0.023	0.023	0.056
1.001	-	-	100	0.029	0.029	0.029
1.002	-	-	100	0.034	0.034	0.034
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.119	0.119	0.119

Network Classifications for Refuse Area

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
N9-1.000	N9-NT-9-1-0	225	0.688	0.822	Unclassified	1050	0	0.688	Unclassified
N9-1.001	N9-NT-9-1-1	225	0.567	0.822	Unclassified	1200	0	0.822	Unclassified
N9-1.002	N9-NT-9-1-2	225	0.567	0.646	Unclassified	1200	0	0.567	Unclassified
N9-1.003	N9-NT-9-1-3	225	0.646	0.740	Unclassified	1200	0	0.646	Unclassified
N9-1.004	N9-NT-9-2-4	225	0.325	0.740	Unclassified	1200	0	0.740	Unclassified
N9-1.005	N9-NT-	28	0.325	1.778	Unclassified				Junction

Free Flowing Outfall Details for Refuse Area

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N9-1.005	N9-NT-14-4	3.329	1.008	0.000	1200	0

Simulation Criteria for Refuse Area

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	5.000
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)	1440
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	12

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

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	720

C.4 O8a

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Network 1-Main Site Access Roundabout

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	1.000
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
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

Time Area Diagram for Network 1-Main Site Access Roundabout at outfall N1- (pipe N1-1.000)

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.003	4-8	0.008	8-12	0.008	12-16	0.008	16-20	0.003

Total Area Contributing (ha) = 0.031

Total Pipe Volume (m³) = 205.007

Time Area Diagram at outfall N1-1-16 (pipe N1-2.011)

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.028	4-8	0.082	8-12	0.324	12-16	0.142	16-20	0.190	20-24	0.130	24-28	0.059	28-32	0.051	32-36	0.020

Total Area Contributing (ha) = 1.026

Total Pipe Volume (m³) = 932.640

Network Design Table for Network 1-Main Site Access Roundabout

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N1-1.000	52.990	0.334	158.7	0.031	15.00	0.0	0.045	3	\=/	600	1:3 Swale	

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)
N1-1.000	90.25	17.30	17.472	0.031	0.0	0.0	0.0	0.38	60.5	10.0

Network Design Table for Network 1-Main Site Access Roundabout

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
N1-2.000	25.162	0.629	40.0	0.017	15.00	0.0	0.600		o	300	Pipe/Conduit	
N1-2.001	14.495	0.485	29.9	0.018	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-3.000	2.540	0.079	32.2	0.000	15.00	0.0	0.600		o	300	Pipe/Conduit	
N1-3.001	42.053	0.298	141.1	0.038	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-3.002	21.981	0.110	200.7	0.022	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-3.003	20.252	0.110	184.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-4.000	25.425	0.152	167.3	0.014	15.00	0.0	0.600		o	300	Pipe/Conduit	
N1-4.001	20.825	0.819	25.4	0.014	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-3.004	12.755	0.082	155.6	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-3.005	33.808	0.183	184.7	0.028	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-3.006	21.389	0.194	110.3	0.026	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-5.000	19.914	0.170	117.1	0.028	15.00	0.0	0.600		o	300	Pipe/Conduit	
N1-6.000	56.112	0.561	100.0	0.037	15.00	0.0	0.045	3	\=/	500	1:3 Swale	
N1-6.001	73.967	0.443	167.0	0.050	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N1-6.002	2.736	0.016	171.0	0.001	0.00	0.0	0.045		o	450	Pipe/Conduit	
N1-7.000	62.884	0.311	202.2	0.112	15.00	0.0	0.045	3	\=/	500	1:3 Swale	
N1-7.001	9.712	0.049	198.2	0.006	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N1-7.002	23.205	0.232	100.0	0.011	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N1-7.003	2.850	0.029	98.3	0.001	0.00	0.0	0.045		o	300	Pipe/Conduit	
N1-8.000	50.301	0.252	199.6	0.031	15.00	0.0	0.045	3	\=/	500	1:3 Swale	

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)
N1-2.000	97.20	15.17	18.000	0.017	0.0	0.0	0.0	2.49	176.2	6.1
N1-2.001	96.91	15.25	17.371	0.035	0.0	0.0	0.0	2.89	204.0	12.3
N1-3.000	97.75	15.02	18.000	0.000	0.0	0.0	0.0	2.78	196.7	0.0
N1-3.001	95.89	15.55	17.921	0.038	0.0	0.0	0.0	1.32	93.4	13.1
N1-3.002	94.77	15.88	17.623	0.059	0.0	0.0	0.0	1.11	78.2	20.3
N1-3.003	93.80	16.17	17.514	0.059	0.0	0.0	0.0	1.16	81.7	20.3
N1-4.000	96.57	15.35	18.460	0.014	0.0	0.0	0.0	1.21	85.7	4.8
N1-4.001	96.18	15.46	18.308	0.028	0.0	0.0	0.0	3.13	221.3	9.7
N1-3.004	93.25	16.34	17.404	0.087	0.0	0.0	0.0	1.26	88.9	29.4
N1-3.005	91.69	16.83	17.322	0.116	0.0	0.0	0.0	1.15	81.5	38.2
N1-3.006	90.96	17.06	17.139	0.142	0.0	0.0	0.0	1.50	105.8	46.5
N1-5.000	96.99	15.23	17.614	0.028	0.0	0.0	0.0	1.45	102.6	9.7
N1-6.000	92.13	16.69	18.000	0.037	0.0	0.0	0.0	0.55	122.0	12.4
N1-6.001	83.97	19.56	17.439	0.087	0.0	0.0	0.0	0.43	94.4	26.3
N1-6.002	83.67	19.67	16.996	0.087	0.0	0.0	0.0	0.40	63.0	26.4
N1-7.000	89.09	17.69	18.400	0.112	0.0	0.0	0.0	0.39	85.8	36.2
N1-7.001	87.91	18.10	17.783	0.118	0.0	0.0	0.0	0.39	86.7	37.6
N1-7.002	85.98	18.80	17.685	0.130	0.0	0.0	0.0	0.55	122.0	40.3
N1-7.003	85.66	18.92	17.453	0.130	0.0	0.0	0.0	0.40	28.2«	40.3
N1-8.000	90.74	17.14	17.813	0.031	0.0	0.0	0.0	0.39	86.3	10.3

Network Design Table for Network 1-Main Site Access Roundabout

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
N1-8.001	57.113	0.286	199.7	0.041	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N1-8.002	30.677	0.184	166.7	0.034	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N1-8.003	2.871	0.287	10.0	0.001	0.00	0.0	0.600		3 \=/	300	1:3 Swale	
N1-7.004	16.232	0.068	238.7	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N1-9.000	19.995	0.200	100.0	0.025	15.00	0.0		0.045	3 \=/	500	1:3 Swale	
N1-9.001	2.051	1.367	1.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-6.003	8.497	0.030	283.2	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N1-6.004	34.148	0.083	411.4	0.022	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-6.005	10.874	0.026	418.2	0.007	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-6.006	13.816	0.034	406.3	0.007	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-6.007	17.559	0.039	450.2	0.018	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-6.008	7.947	0.021	378.4	0.000	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-10.000	44.996	0.272	165.4	0.027	15.00	0.0	0.600		o	300	Pipe/Conduit	
N1-10.001	25.908	0.117	221.4	0.014	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-6.009	16.818	0.039	431.2	0.000	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-6.010	18.757	0.053	353.9	0.017	0.00	0.0		0.045	o	600	Pipe/Conduit	
N1-5.001	32.269	0.071	454.5	0.021	0.00	0.0	0.600		o	450	Pipe/Conduit	
N1-3.007	13.170	0.030	439.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-11.000	39.260	0.261	150.4	0.044	15.00	0.0	0.600		o	225	Pipe/Conduit	
N1-11.001	26.749	0.160	167.2	0.010	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
N1-8.001	83.96	19.56	17.516	0.073	0.0	0.0	0.0	0.39	86.3	22.0
N1-8.002	82.20	20.27	17.230	0.106	0.0	0.0	0.0	0.72	724.4	31.6
N1-8.003	82.18	20.28	17.046	0.107	0.0	0.0	0.0	5.61	631.6	31.7
N1-7.004	81.68	20.48	16.740	0.237	0.0	0.0	0.0	1.31	208.6	70.0
N1-9.000	95.35	15.70	18.000	0.025	0.0	0.0	0.0	0.47	67.5	8.5
N1-9.001	95.34	15.71	17.800	0.025	0.0	0.0	0.0	10.77	428.1	8.6
N1-6.003	81.40	20.60	16.890	0.350	0.0	0.0	0.0	1.20	191.3	102.8
N1-6.004	77.57	22.29	16.860	0.372	0.0	0.0	0.0	0.34	276.4	104.1
N1-6.005	76.42	22.84	16.777	0.379	0.0	0.0	0.0	0.33	297.8	104.6
N1-6.006	75.02	23.53	16.751	0.386	0.0	0.0	0.0	0.33	317.5	104.7
N1-6.007	73.23	24.46	16.508	0.404	0.0	0.0	0.0	0.32	331.9	106.9
N1-6.008	72.52	24.85	16.469	0.404	0.0	0.0	0.0	0.34	365.8	106.9
N1-10.000	95.65	15.61	18.000	0.027	0.0	0.0	0.0	1.22	86.2	9.4
N1-10.001	94.27	16.03	17.728	0.041	0.0	0.0	0.0	1.05	74.4	14.0
N1-6.009	70.94	25.73	16.448	0.445	0.0	0.0	0.0	0.32	447.5	114.1
N1-6.010	69.35	26.67	16.316	0.462	0.0	0.0	0.0	0.33	94.3«	115.7
N1-5.001	68.42	27.24	16.263	0.511	0.0	0.0	0.0	0.95	150.6	126.3
N1-3.007	68.12	27.43	16.192	0.653	0.0	0.0	0.0	1.16	326.8	160.5
N1-11.000	95.65	15.62	18.640	0.044	0.0	0.0	0.0	1.06	42.3	15.0
N1-11.001	94.17	16.06	18.379	0.053	0.0	0.0	0.0	1.01	40.1	18.1

Network Design Table for Network 1-Main Site Access Roundabout

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
N1-11.002	27.713	0.167	165.9	0.017	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-11.003	11.029	0.070	157.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-11.004	37.692	1.100	34.3	0.031	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-3.008	15.221	0.038	400.6	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N1-2.002	9.548	0.024	397.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-2.003	11.956	0.082	145.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-12.000	19.220	0.114	168.6	0.035	15.00	0.0	0.600		o	225	Pipe/Conduit	
N1-12.001	5.639	0.034	165.9	0.006	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-12.002	9.858	0.067	147.1	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-13.000	13.634	0.088	154.9	0.014	15.00	0.0	0.600		o	225	Pipe/Conduit	
N1-13.001	15.540	1.262	12.3	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-12.003	49.013	0.337	145.4	0.025	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-14.000	10.469	0.063	166.2	0.000	15.00	0.0	0.600		o	225	Pipe/Conduit	
N1-14.001	17.126	0.571	30.0	0.014	0.00	0.0	0.600		o	450	Pipe/Conduit	
N1-12.004	14.134	0.101	139.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
N1-12.005	12.658	0.041	308.7	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N1-2.004	39.066	0.078	500.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-2.005	34.547	0.253	136.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N1-15.000	40.928	0.269	152.2	0.023	15.00	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)
N1-11.002	92.68	16.51	18.219	0.070	0.0	0.0	0.0	1.01	40.2	23.5
N1-11.003	92.12	16.69	17.982	0.070	0.0	0.0	0.0	1.04	41.3	23.5
N1-11.004	91.25	16.97	17.912	0.101	0.0	0.0	0.0	2.24	89.2	33.3
N1-3.008	67.72	27.68	16.162	0.754	0.0	0.0	0.0	1.01	160.6«	184.3
N1-2.002	67.52	27.81	16.124	0.789	0.0	0.0	0.0	1.21	343.5	192.3
N1-2.003	67.37	27.91	16.100	0.789	0.0	0.0	0.0	2.01	569.6	192.3
N1-12.000	96.68	15.32	17.230	0.035	0.0	0.0	0.0	1.00	39.9	12.1
N1-12.001	96.35	15.41	17.116	0.041	0.0	0.0	0.0	1.01	40.3	14.2
N1-12.002	95.82	15.56	17.082	0.041	0.0	0.0	0.0	1.08	42.8	14.2
N1-13.000	97.03	15.22	18.300	0.014	0.0	0.0	0.0	1.05	41.7	4.8
N1-13.001	96.79	15.29	18.212	0.014	0.0	0.0	0.0	3.75	149.1	4.8
N1-12.003	93.31	16.32	16.940	0.080	0.0	0.0	0.0	1.08	43.0	27.0
N1-14.000	97.19	15.17	17.341	0.000	0.0	0.0	0.0	1.01	40.2	0.0
N1-14.001	96.92	15.25	17.278	0.014	0.0	0.0	0.0	3.72	592.1	5.0
N1-12.004	92.62	16.53	16.603	0.094	0.0	0.0	0.0	1.10	43.9	31.5
N1-12.005	92.04	16.72	16.477	0.094	0.0	0.0	0.0	1.15	183.2	31.5
N1-2.004	66.45	28.51	16.018	0.883	0.0	0.0	0.0	1.08	305.7	211.9
N1-2.005	65.81	28.94	15.940	0.883	0.0	0.0	0.0	1.34	95.0«	211.9
N1-15.000	96.58	15.35	18.500	0.023	0.0	0.0	0.0	1.97	557.6	8.1

Network Design Table for Network 1-Main Site Access Roundabout

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
N1-15.001	31.434	1.381	22.8	0.016	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-15.002	12.885	0.691	18.6	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-15.003	9.087	0.691	13.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-2.006	39.053	0.191	204.5	0.016	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-2.007	47.906	0.240	199.6	0.018	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-2.008	36.002	0.180	200.0	0.012	0.00	0.0	0.600		o	600	Pipe/Conduit	
N1-2.009	52.840	0.176	300.2	0.018	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-2.010	57.914	0.643	90.1	0.022	0.00	0.0		0.045	→|○|→		Filter Drain	
N1-2.011	41.539	0.208	199.7	0.017	0.00	0.0	0.600		o	900	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)
N1-15.001	96.23	15.45	18.000	0.040	0.0	0.0	0.0	5.12	1447.3	13.8
N1-15.002	96.09	15.49	16.619	0.040	0.0	0.0	0.0	5.66	1599.5	13.8
N1-15.003	96.02	15.51	15.928	0.040	0.0	0.0	0.0	6.74	1905.3	13.8
N1-2.006	65.26	29.32	15.238	0.938	0.0	0.0	0.0	1.70	480.5	221.1
N1-2.007	64.60	29.79	15.047	0.956	0.0	0.0	0.0	1.72	486.3	223.0
N1-2.008	64.30	30.00	14.807	0.968	0.0	0.0	0.0	1.72	485.8	224.9
N1-2.009	64.30	30.00	14.627	0.987	0.0	0.0	0.0	0.33	234.9	229.1
N1-2.010	64.30	30.00	14.451	1.009	0.0	0.0	0.0	0.61	457.1	234.3
N1-2.011	64.30	30.00	13.808	1.026	0.0	0.0	0.0	2.21	1408.3	238.3

Manhole Schedules for Network 1-Main Site Access Roundabout

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N1-NT-1-1-0	18.512	1.040	Open Manhole	1200	N1-1.000	17.472	600				
N1-	0.000		Open Manhole	0		OUTFALL		N1-1.000	17.138	600	
N1-NT-1-2-0	19.840	1.840	Open Manhole	1200	N1-2.000	18.000	300				
N1-NT-1-2-1	19.740	2.369	Open Manhole	1350	N1-2.001	17.371	300	N1-2.000	17.371	300	
N1-NT-1-3-0	19.180	1.180	Open Manhole	1200	N1-3.000	18.000	300				
N1-NT-1-3-1	19.180	1.259	Open Manhole	1200	N1-3.001	17.921	300	N1-3.000	17.921	300	
N1-NT-1-3-2	19.660	2.037	Open Manhole	1200	N1-3.002	17.623	300	N1-3.001	17.623	300	
N1-NT-1-3-3	20.125	2.612	Open Manhole	1200	N1-3.003	17.514	300	N1-3.002	17.514	300	
N1-NT-1-4-0	19.560	1.100	Open Manhole	1200	N1-4.000	18.460	300				
N1-NT-1-4-1	19.860	1.552	Open Manhole	1200	N1-4.001	18.308	300	N1-4.000	18.308	300	
N1-NT-1-3-4	20.125	2.722	Open Manhole	1200	N1-3.004	17.404	300	N1-3.003	17.404	300	
								N1-4.001	17.489	300	85
N1-NT-1-3-5	20.060	2.738	Open Manhole	1200	N1-3.005	17.322	300	N1-3.004	17.322	300	
N1-NT-1-3-6	19.960	2.821	Open Manhole	1200	N1-3.006	17.139	300	N1-3.005	17.139	300	
N1-NT-1-5-0	20.060	2.446	Open Manhole	1200	N1-5.000	17.614	300				
N1-NT-1-6-0	18.300	0.300	Junction		N1-6.000	18.000	500				
N1-NT-1-6-1	18.076	0.637	Junction		N1-6.001	17.439	500	N1-6.000	17.439	500	
N1-NT-1-6-2	18.167	1.171	Junction		N1-6.002	16.996	450	N1-6.001	16.996	500	
N1-NT-1-7-0	18.919	0.519	Junction		N1-7.000	18.400	500				
N1-NT-1-7-1	19.000	1.217	Junction		N1-7.001	17.783	500	N1-7.000	18.089	500	306
N1-NT-1-7-2	18.800	1.115	Junction		N1-7.002	17.685	500	N1-7.001	17.734	500	49
N1-NT-1-7-3	18.500	1.047	Junction		N1-7.003	17.453	300	N1-7.002	17.453	500	
N1-NT-1-8-0	18.300	0.487	Junction		N1-8.000	17.813	500				
N1-NT-1-8-1	18.100	0.584	Junction		N1-8.001	17.516	500	N1-8.000	17.561	500	45
N1-NT-1-8-2	18.000	0.770	Junction		N1-8.002	17.230	500	N1-8.001	17.230	500	
N1-NT-1-8-3	18.500	1.454	Junction		N1-8.003	17.046	300	N1-8.002	17.046	500	
N1-NT-1-7-4	18.500	1.760	Junction		N1-7.004	16.740	450	N1-7.003	17.424	300	459
								N1-8.003	16.759	300	
N1-NT-1-9-0	18.500	0.500	Junction		N1-9.000	18.000	500				
N1-NT-1-9-1	18.500	0.700	Open Manhole	1200	N1-9.001	17.800	225	N1-9.000	17.800	500	
N1-NT-1-6-3	18.167	1.734	Junction		N1-6.003	16.890	450	N1-6.002	16.980	450	90
								N1-7.004	16.672	450	
								N1-9.001	16.433	225	
N1-NT-1-6-4	18.283	1.423	Open Manhole	1200	N1-6.004	16.860		N1-6.003	16.860	450	
N1-NT-1-6-5	18.460	1.683	Open Manhole	1800	N1-6.005	16.777		N1-6.004	16.777		
N1-NT-1-6-6	18.600	1.849	Open Manhole	1800	N1-6.006	16.751		N1-6.005	16.751		
N1-NT-1-6-7	18.700	2.192	Open Manhole	1800	N1-6.007	16.508		N1-6.006	16.717		
N1-NT-1-6-8	18.700	2.231	Open Manhole	1200	N1-6.008	16.469		N1-6.007	16.469		
N1-NT-1-10-0	19.100	1.100	Open Manhole	1200	N1-10.000	18.000	300				
N1-NT-1-10-1	19.000	1.272	Open Manhole	1200	N1-10.001	17.728	300	N1-10.000	17.728	300	
N1-NT-1-6-9	19.840	3.392	Open Manhole	1800	N1-6.009	16.448		N1-6.008	16.448		
								N1-10.001	17.611	300	
N1-NT-1-6-10	19.840	3.524	Open Manhole	2100	N1-6.010	16.316	600	N1-6.009	16.409		2885
N1-NT-1-5-1	19.900	3.637	Open Manhole	1500	N1-5.001	16.263	450	N1-5.000	17.444	300	1031
								N1-6.010	16.263	600	
N1-NT-1-6-6	19.820	3.628	Open Manhole	1500	N1-3.007	16.192	600	N1-3.006	16.945	300	453

Manhole Schedules for Network 1-Main Site Access Roundabout

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
								N1-5.001	16.192	450	
N1-NT-1-11-0	19.740	1.100	Open Manhole	1200	N1-11.000	18.640	225				
N1-NT-1-11-1	19.974	1.595	Open Manhole	1200	N1-11.001	18.379	225	N1-11.000	18.379	225	
N1-NT-1-11-2	19.920	1.701	Open Manhole	1200	N1-11.002	18.219	225	N1-11.001	18.219	225	
N1-NT-1-11-3	19.621	1.639	Open Manhole	1200	N1-11.003	17.982	225	N1-11.002	18.052	225	70
N1-NT-1-11-4	19.640	1.728	Open Manhole	1200	N1-11.004	17.912	225	N1-11.003	17.912	225	
N1-NT-1-3-7	19.820	3.658	Open Manhole	1500	N1-3.008	16.162	450	N1-3.007	16.162	600	
								N1-11.004	16.812	225	425
N1-NT-1-2-2	18.401	2.277	Open Manhole	1800	N1-2.002	16.124	600	N1-2.001	16.886	300	462
								N1-3.008	16.124	450	
N1-NT-1-2-3	18.312	2.212	Open Manhole	1650	N1-2.003	16.100	600	N1-2.002	16.100	600	
N1-NT-1-12-0	18.330	1.100	Open Manhole	1200	N1-12.000	17.230	225				
N1-NT-1-12-1	18.720	1.604	Open Manhole	1200	N1-12.001	17.116	225	N1-12.000	17.116	225	
N1-NT-1-12-2	18.760	1.678	Open Manhole	1200	N1-12.002	17.082	225	N1-12.001	17.082	225	
N1-NT-1-13-0	19.460	1.160	Open Manhole	1200	N1-13.000	18.300	225				
N1-NT-1-13-1	19.140	0.928	Open Manhole	1200	N1-13.001	18.212	225	N1-13.000	18.212	225	
N1-NT-1-13-3	18.860	1.920	Open Manhole	1200	N1-12.003	16.940	225	N1-12.002	17.015	225	75
								N1-13.001	16.950	225	10
N1-NT-1-14-0	18.530	1.189	Open Manhole	1200	N1-14.000	17.341	225				
N1-NT-1-14-1	18.400	1.122	Open Manhole	1800	N1-14.001	17.278	450	N1-14.000	17.278	225	
N1-NT-1-12-4	17.566	0.963	Open Manhole	1200	N1-12.004	16.603	225	N1-12.003	16.603	225	
								N1-14.001	16.707	450	329
N1-NT-1-12-5	18.400	1.923	Open Manhole	1800	N1-12.005	16.477	450	N1-12.004	16.502	225	
N1-NT-1-2-4	18.118	2.100	Open Manhole	1800	N1-2.004	16.018	600	N1-2.003	16.018	600	
								N1-12.005	16.436	450	268
N1-NT-1-2-5	17.950	2.010	Open Manhole	1500	N1-2.005	15.940	300	N1-2.004	15.940	600	
N1-NT-1-15-0	19.600	1.100	Open Manhole	1200	N1-15.000	18.500	600				
N1-NT-1-15-1	19.361	1.361	Open Manhole	2400	N1-15.001	18.000	600	N1-15.000	18.231	600	231
N1-NT-1-15-2	19.000	2.381	Open Manhole	1650	N1-15.002	16.619	600	N1-15.001	16.619	600	
N1-NT-15-3	19.000	3.072	Open Manhole	1650	N1-15.003	15.928	600	N1-15.002	15.928	600	
N1-NT-1-2-6	19.000	3.763	Open Manhole	1800	N1-2.006	15.238	600	N1-2.005	15.687	300	149
								N1-15.003	15.237	600	
N1-NT-1-2-7	17.668	2.621	Open Manhole	1800	N1-2.007	15.047	600	N1-2.006	15.047	600	
N1-NT-1-2-8	16.952	2.145	Open Manhole	1800	N1-2.008	14.807	600	N1-2.007	14.807	600	
N1-NT-1-2-9	16.333	1.706	Open Manhole	1800	N1-2.009	14.627		N1-2.008	14.627	600	
N1-NT-1-2-10	16.300	1.849	Open Manhole	2400	N1-2.010	14.451		N1-2.009	14.451		
N1-NT-1-2-11	16.300	2.492	Open Manhole	2400	N1-2.011	13.808	900	N1-2.010	13.808		
N1-1-16	16.827	3.227	Open Manhole	1200		OUTFALL		N1-2.011	13.600	900	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-NT-1-1-0	644734.249	264635.544	644734.249	264635.544	Required	
N1-	644761.702	264590.237			No Entry	

Manhole Schedules for Network 1-Main Site Access Roundabout

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-NT-1-2-0	644878.461	264510.681	644878.461	264510.681	Required	
N1-NT-1-2-1	644868.024	264487.787	644868.125	264487.760	Required	
N1-NT-1-3-0	644764.469	264590.709	644764.469	264590.709	Required	
N1-NT-1-3-1	644762.333	264589.335	644762.333	264589.335	Required	
N1-NT-1-3-2	644788.172	264556.285	644788.298	264556.414	Required	
N1-NT-1-3-3	644805.766	264543.275	644805.812	264543.449	Required	
N1-NT-1-4-0	644843.581	264587.304	644843.581	264587.304	Required	
N1-NT-1-4-1	644837.728	264562.562	644837.565	264562.637	Required	
N1-NT-1-3-4	644825.553	264545.930	644825.553	264545.930	Required	
N1-NT-1-3-5	644827.967	264533.405	644827.788	264533.393	Required	
N1-NT-1-3-6	644826.055	264499.943	644826.205	264500.043	Required	
N1-NT-1-5-0	644854.959	264535.371	644854.959	264535.371	Required	
N1-NT-1-6-0	644992.591	264669.173			No Entry	
N1-NT-1-6-1	644938.147	264656.031			No Entry	
N1-NT-1-6-2	644874.988	264621.447			No Entry	
N1-NT-1-7-0	644796.012	264559.534			No Entry	
N1-NT-1-7-1	644836.710	264603.021			No Entry	
N1-NT-1-7-2	644841.713	264611.279			No Entry	
N1-NT-1-7-3	644858.317	264626.282			No Entry	
N1-NT-1-8-0	644989.455	264676.803			No Entry	

Manhole Schedules for Network 1-Main Site Access Roundabout

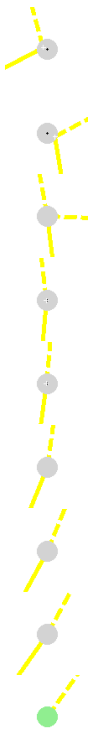
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-NT-1-8-1	644940.497	264665.501			No Entry	
N1-NT-1-8-2	644885.945	264649.593			No Entry	
N1-NT-1-8-3	644861.951	264630.689			No Entry	
N1-NT-1-7-4	644860.042	264628.549			No Entry	
N1-NT-1-9-0	644862.032	264600.416			No Entry	
N1-NT-1-9-1	644872.097	264617.633	644872.097	264617.633	Required	
N1-NT-1-6-3	644873.350	264619.256			No Entry	
N1-NT-1-6-4	644880.611	264614.842	644880.611	264614.842	Required	
N1-NT-1-6-5	644867.492	264583.592	644867.492	264583.592	Required	
N1-NT-1-6-6	644860.242	264575.487	644860.242	264575.487	Required	
N1-NT-1-6-7	644857.793	264561.890	644857.793	264561.890	Required	
N1-NT-1-6-8	644869.922	264551.135	644869.922	264551.135	Required	
N1-NT-1-10-0	644858.842	264600.767	644858.842	264600.767	Required	
N1-NT-1-10-1	644851.356	264556.400	644851.517	264556.480	Required	
N1-NT-1-6-9	644874.232	264544.458	644874.232	264544.458	Required	
N1-NT-1-6-10	644881.034	264529.076	644881.034	264529.076	Required	
N1-NT-1-5-1	644865.542	264518.502	644865.542	264518.502	Required	
N1-NT-1-6-6	644846.113	264492.738	644846.113	264492.738	Required	
N1-NT-1-11-0	644787.453	264536.581	644787.453	264536.581	Required	
N1-NT-1-11-1	644810.166	264505.695	644810.048	264505.616	Required	

Manhole Schedules for Network 1-Main Site Access Roundabout

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-NT-1-11-2	644824.139	264482.982	644824.004	264482.936	Required	
N1-NT-1-11-3	644826.716	264456.148	644826.822	264456.243	Required	
N1-NT-1-11-4	644837.486	264453.815	644837.431	264453.947	Required	
N1-NT-1-3-7	644856.514	264484.659	644856.514	264484.659	Required	
N1-NT-1-2-2	644866.705	264473.352	644866.705	264473.352	Required	
N1-NT-1-2-3	644874.383	264467.677	644874.309	264467.603	Required	
N1-NT-1-12-0	644830.301	264398.056	644830.301	264398.056	Required	
N1-NT-1-12-1	644832.514	264416.927	644832.638	264416.856	Required	
N1-NT-1-12-2	644836.788	264420.127	644836.663	264420.195	Required	
N1-NT-1-13-0	644823.863	264445.346	644823.863	264445.346	Required	
N1-NT-1-13-1	644822.311	264431.800	644822.423	264431.888	Required	
N1-NT-1-13-3	644837.730	264429.862	644837.730	264429.862	Required	
N1-NT-1-14-0	644909.615	264446.653	644909.615	264446.653	Required	
N1-NT-1-14-1	644902.834	264438.719	644902.834	264438.719	Required	
N1-NT-1-12-4	644886.584	264433.804	644886.584	264433.804	Required	
N1-NT-1-12-5	644888.841	264447.756	644888.841	264447.756	Required	
N1-NT-1-2-4	644881.414	264458.007	644881.414	264458.007	Required	
N1-NT-1-2-5	644843.574	264448.295	644843.555	264448.474	Required	
N1-NT-1-15-0	644792.994	264531.631	644792.994	264531.631	Required	
N1-NT-1-15-1	644810.489	264494.632	644810.489	264494.632	Required	

Manhole Schedules for Network 1-Main Site Access Roundabout

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-NT-1-15-2	644818.844	264464.353	644818.747	264464.395	Required	
N1-NT-15-3	644807.407	264458.427	644807.591	264458.338	Required	
N1-NT-1-2-6	644809.049	264449.516	644809.049	264449.516	Required	
N1-NT-1-2-7	644813.811	264410.754	644813.781	264410.754	Required	
N1-NT-1-2-8	644809.586	264363.047	644809.556	264363.050	Required	
N1-NT-1-2-9	644804.659	264327.384	644804.659	264327.384	Required	
N1-NT-1-2-10	644784.696	264278.615	644784.696	264278.615	Required	
N1-NT-1-2-11	644757.015	264227.765	644757.015	264227.765	Required	
N1-1-16	644733.063	264193.835			No Entry	



PIPELINE SCHEDULES for Network 1-Main Site Access Roundabout

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)
N1-1.000	3 \=/	600	N1-NT-1-1-0	18.512	17.472	0.890	Open Manhole	1200
N1-2.000	o	300	N1-NT-1-2-0	19.840	18.000	1.540	Open Manhole	1200
N1-2.001	o	300	N1-NT-1-2-1	19.740	17.371	2.069	Open Manhole	1350
N1-3.000	o	300	N1-NT-1-3-0	19.180	18.000	0.880	Open Manhole	1200
N1-3.001	o	300	N1-NT-1-3-1	19.180	17.921	0.959	Open Manhole	1200
N1-3.002	o	300	N1-NT-1-3-2	19.660	17.623	1.737	Open Manhole	1200
N1-3.003	o	300	N1-NT-1-3-3	20.125	17.514	2.312	Open Manhole	1200
N1-4.000	o	300	N1-NT-1-4-0	19.560	18.460	0.800	Open Manhole	1200
N1-4.001	o	300	N1-NT-1-4-1	19.860	18.308	1.252	Open Manhole	1200
N1-3.004	o	300	N1-NT-1-3-4	20.125	17.404	2.421	Open Manhole	1200
N1-3.005	o	300	N1-NT-1-3-5	20.060	17.322	2.438	Open Manhole	1200
N1-3.006	o	300	N1-NT-1-3-6	19.960	17.139	2.521	Open Manhole	1200
N1-5.000	o	300	N1-NT-1-5-0	20.060	17.614	2.146	Open Manhole	1200
N1-6.000	3 \=/	500	N1-NT-1-6-0	18.300	18.000	0.100	Junction	
N1-6.001	3 \=/	500	N1-NT-1-6-1	18.076	17.439	0.437	Junction	
N1-6.002	o	450	N1-NT-1-6-2	18.167	16.996	0.721	Junction	
N1-7.000	3 \=/	500	N1-NT-1-7-0	18.919	18.400	0.319	Junction	
N1-7.001	3 \=/	500	N1-NT-1-7-1	19.000	17.783	1.017	Junction	
N1-7.002	3 \=/	500	N1-NT-1-7-2	18.800	17.685	0.915	Junction	
N1-7.003	o	300	N1-NT-1-7-3	18.500	17.453	0.822	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
N1-1.000	52.990	158.7	N1-	0.000	17.138		Open Manhole	0
N1-2.000	25.162	40.0	N1-NT-1-2-1	19.740	17.371	2.069	Open Manhole	1350
N1-2.001	14.495	29.9	N1-NT-1-2-2	18.401	16.886	1.215	Open Manhole	1800
N1-3.000	2.540	32.2	N1-NT-1-3-1	19.180	17.921	0.959	Open Manhole	1200
N1-3.001	42.053	141.1	N1-NT-1-3-2	19.660	17.623	1.737	Open Manhole	1200
N1-3.002	21.981	200.7	N1-NT-1-3-3	20.125	17.514	2.312	Open Manhole	1200
N1-3.003	20.252	184.1	N1-NT-1-3-4	20.125	17.404	2.422	Open Manhole	1200
N1-4.000	25.425	167.3	N1-NT-1-4-1	19.860	18.308	1.252	Open Manhole	1200
N1-4.001	20.825	25.4	N1-NT-1-3-4	20.125	17.489	2.336	Open Manhole	1200
N1-3.004	12.755	155.6	N1-NT-1-3-5	20.060	17.322	2.438	Open Manhole	1200
N1-3.005	33.808	184.7	N1-NT-1-3-6	19.960	17.139	2.521	Open Manhole	1200
N1-3.006	21.389	110.3	N1-NT-1-6-6	19.820	16.945	2.575	Open Manhole	1500
N1-5.000	19.914	117.1	N1-NT-1-5-1	19.900	17.444	2.156	Open Manhole	1500
N1-6.000	56.112	100.0	N1-NT-1-6-1	18.076	17.439	0.437	Junction	
N1-6.001	73.967	167.0	N1-NT-1-6-2	18.167	16.996	0.971	Junction	
N1-6.002	2.736	171.0	N1-NT-1-6-3	18.167	16.980	0.737	Junction	
N1-7.000	62.884	202.2	N1-NT-1-7-1	19.000	18.089	0.711	Junction	
N1-7.001	9.712	198.2	N1-NT-1-7-2	18.800	17.734	0.866	Junction	
N1-7.002	23.205	100.0	N1-NT-1-7-3	18.500	17.453	0.847	Junction	
N1-7.003	2.850	98.3	N1-NT-1-7-4	18.500	17.424	0.851	Junction	

PIPELINE SCHEDULES for Network 1-Main Site Access Roundabout

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)
N1-8.000	3 \=/	500	N1-NT-1-8-0	18.300	17.813	0.287	Junction	
N1-8.001	3 \=/	500	N1-NT-1-8-1	18.100	17.516	0.384	Junction	
N1-8.002	3 \=/	500	N1-NT-1-8-2	18.000	17.230	0.270	Junction	
N1-8.003	3 \=/	300	N1-NT-1-8-3	18.500	17.046	1.304	Junction	
N1-7.004	o	450	N1-NT-1-7-4	18.500	16.740	1.310	Junction	
N1-9.000	3 \=/	500	N1-NT-1-9-0	18.500	18.000	0.350	Junction	
N1-9.001	o	225	N1-NT-1-9-1	18.500	17.800	0.475	Open Manhole	1200
N1-6.003	o	450	N1-NT-1-6-3	18.167	16.890	0.827	Junction	
N1-6.004	→|○|→		N1-NT-1-6-4	18.283	16.860	0.000	Open Manhole	1200
N1-6.005	→|○|→		N1-NT-1-6-5	18.460	16.777	0.000	Open Manhole	1800
N1-6.006	→|○|→		N1-NT-1-6-6	18.600	16.751	0.000	Open Manhole	1800
N1-6.007	→|○|→		N1-NT-1-6-7	18.700	16.508	0.000	Open Manhole	1800
N1-6.008	→|○|→		N1-NT-1-6-8	18.700	16.469	0.000	Open Manhole	1200
N1-10.000	o	300	N1-NT-1-10-0	19.100	18.000	0.800	Open Manhole	1200
N1-10.001	o	300	N1-NT-1-10-1	19.000	17.728	0.972	Open Manhole	1200
N1-6.009	→|○|→		N1-NT-1-6-9	19.840	16.448	0.000	Open Manhole	1800
N1-6.010	o	600	N1-NT-1-6-10	19.840	16.316	2.924	Open Manhole	2100
N1-5.001	o	450	N1-NT-1-5-1	19.900	16.263	3.187	Open Manhole	1500
N1-3.007	o	600	N1-NT-1-6-6	19.820	16.192	3.028	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)
N1-8.000	50.301	199.6	N1-NT-1-8-1	18.100	17.561	0.339	Junction	
N1-8.001	57.113	199.7	N1-NT-1-8-2	18.000	17.230	0.570	Junction	
N1-8.002	30.677	166.7	N1-NT-1-8-3	18.500	17.046	0.954	Junction	
N1-8.003	2.871	10.0	N1-NT-1-7-4	18.500	16.759	1.591	Junction	
N1-7.004	16.232	238.7	N1-NT-1-6-3	18.167	16.672	1.045	Junction	
N1-9.000	19.995	100.0	N1-NT-1-9-1	18.500	17.800	0.550	Open Manhole	1200
N1-9.001	2.051	1.5	N1-NT-1-6-3	18.167	16.433	1.509	Junction	
N1-6.003	8.497	283.2	N1-NT-1-6-4	18.283	16.860	0.973	Open Manhole	1200
N1-6.004	34.148	411.4	N1-NT-1-6-5	18.460	16.777	0.260	Open Manhole	1800
N1-6.005	10.874	418.2	N1-NT-1-6-6	18.600	16.751	0.166	Open Manhole	1800
N1-6.006	13.816	406.3	N1-NT-1-6-7	18.700	16.717	0.134	Open Manhole	1800
N1-6.007	17.559	450.2	N1-NT-1-6-8	18.700	16.469	0.039	Open Manhole	1200
N1-6.008	7.947	378.4	N1-NT-1-6-9	19.840	16.448	1.161	Open Manhole	1800
N1-10.000	44.996	165.4	N1-NT-1-10-1	19.000	17.728	0.972	Open Manhole	1200
N1-10.001	25.908	221.4	N1-NT-1-6-9	19.840	17.611	1.929	Open Manhole	1800
N1-6.009	16.818	431.2	N1-NT-1-6-10	19.840	16.409	0.039	Open Manhole	2100
N1-6.010	18.757	353.9	N1-NT-1-5-1	19.900	16.263	3.037	Open Manhole	1500
N1-5.001	32.269	454.5	N1-NT-1-6-6	19.820	16.192	3.178	Open Manhole	1500
N1-3.007	13.170	439.0	N1-NT-1-3-7	19.820	16.162	3.058	Open Manhole	1500

PIPELINE SCHEDULES for Network 1-Main Site Access Roundabout

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)
N1-11.000	o	225	N1-NT-1-11-0	19.740	18.640	0.875	Open Manhole	1200
N1-11.001	o	225	N1-NT-1-11-1	19.974	18.379	1.370	Open Manhole	1200
N1-11.002	o	225	N1-NT-1-11-2	19.920	18.219	1.476	Open Manhole	1200
N1-11.003	o	225	N1-NT-1-11-3	19.621	17.982	1.414	Open Manhole	1200
N1-11.004	o	225	N1-NT-1-11-4	19.640	17.912	1.503	Open Manhole	1200
N1-3.008	o	450	N1-NT-1-3-7	19.820	16.162	3.208	Open Manhole	1500
N1-2.002	o	600	N1-NT-1-2-2	18.401	16.124	1.677	Open Manhole	1800
N1-2.003	o	600	N1-NT-1-2-3	18.312	16.100	1.612	Open Manhole	1650
N1-12.000	o	225	N1-NT-1-12-0	18.330	17.230	0.875	Open Manhole	1200
N1-12.001	o	225	N1-NT-1-12-1	18.720	17.116	1.379	Open Manhole	1200
N1-12.002	o		N1-NT-1-12-2	18.760	17.082	1.453	Open Manhole	1200
N1-13.000	o	225	N1-NT-1-13-0	19.460	18.300	0.935	Open Manhole	1200
N1-13.001	o	225	N1-NT-1-13-1	19.140	18.212	0.703	Open Manhole	1200
N1-12.003	o	225	N1-NT-1-13-3	18.860	16.940	1.695	Open Manhole	1200
N1-14.000	o	225	N1-NT-1-14-0	18.530	17.341	0.964	Open Manhole	1200
N1-14.001	o	450	N1-NT-1-14-1	18.400	17.278	0.672	Open Manhole	1800
N1-12.004	o	225	N1-NT-1-12-4	17.566	16.603	0.738	Open Manhole	1200
N1-12.005	o	450	N1-NT-1-12-5	18.400	16.477	1.473	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
N1-11.000	39.260	150.4	N1-NT-1-11-1	19.974	18.379	1.370	Open Manhole	1200
N1-11.001	26.749	167.2	N1-NT-1-11-2	19.920	18.219	1.476	Open Manhole	1200
N1-11.002	27.713	165.9	N1-NT-1-11-3	19.621	18.052	1.344	Open Manhole	1200
N1-11.003	11.029	157.6	N1-NT-1-11-4	19.640	17.912	1.503	Open Manhole	1200
N1-11.004	37.692	34.3	N1-NT-1-3-7	19.820	16.812	2.783	Open Manhole	1500
N1-3.008	15.221	400.6	N1-NT-1-2-2	18.401	16.124	1.827	Open Manhole	1800
N1-2.002	9.548	397.8	N1-NT-1-2-3	18.312	16.100	1.612	Open Manhole	1650
N1-2.003	11.956	145.8	N1-NT-1-2-4	18.118	16.018	1.500	Open Manhole	1800
N1-12.000	19.220	168.6	N1-NT-1-12-1	18.720	17.116	1.379	Open Manhole	1200
N1-12.001	5.639	165.9	N1-NT-1-12-2	18.760	17.082	1.453	Open Manhole	1200
N1-12.002	9.858	147.1	N1-NT-1-13-3	18.860	17.015	1.620	Open Manhole	1200
N1-13.000	13.634	154.9	N1-NT-1-13-1	19.140	18.212	0.703	Open Manhole	1200
N1-13.001	15.540	12.3	N1-NT-1-13-3	18.860	16.950	1.685	Open Manhole	1200
N1-12.003	49.013	145.4	N1-NT-1-12-4	17.566	16.603	0.738	Open Manhole	1200
N1-14.000	10.469	166.2	N1-NT-1-14-1	18.400	17.278	0.897	Open Manhole	1800
N1-14.001	17.126	30.0	N1-NT-1-12-4	17.566	16.707	0.409	Open Manhole	1200
N1-12.004	14.134	139.9	N1-NT-1-12-5	18.400	16.502	1.673	Open Manhole	1800
N1-12.005	12.658	308.7	N1-NT-1-2-4	18.118	16.436	1.232	Open Manhole	1800

PIPELINE SCHEDULES for Network 1-Main Site Access Roundabout

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)
N1-2.004	o	600	N1-NT-1-2-4	18.118	16.018	1.500	Open Manhole	1800
N1-2.005	o	300	N1-NT-1-2-5	17.950	15.940	1.710	Open Manhole	1500
N1-15.000	o	600	N1-NT-1-15-0	19.600	18.500	0.500	Open Manhole	1200
N1-15.001	o	600	N1-NT-1-15-1	19.361	18.000	0.761	Open Manhole	2400
N1-15.002	o	600	N1-NT-1-15-2	19.000	16.619	1.781	Open Manhole	1650
N1-15.003	o	600	N1-NT-15-3	19.000	15.928	2.472	Open Manhole	1650
N1-2.006	o	600	N1-NT-1-2-6	19.000	15.238	3.162	Open Manhole	1800
N1-2.007	o	600	N1-NT-1-2-7	17.668	15.047	2.021	Open Manhole	1800
N1-2.008	o	600	N1-NT-1-2-8	16.952	14.807	1.545	Open Manhole	1800
N1-2.009	→|○|→		N1-NT-1-2-9	16.333	14.627	0.000	Open Manhole	1800
N1-2.010	→|○|→		N1-NT-1-2-10	16.300	14.451	0.000	Open Manhole	2400
N1-2.011	o	900	N1-NT-1-2-11	16.300	13.808	1.592	Open Manhole	2400

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)
N1-2.004	39.066	500.8	N1-NT-1-2-5	17.950	15.940	1.410	Open Manhole	1500
N1-2.005	34.547	136.5	N1-NT-1-2-6	19.000	15.687	3.013	Open Manhole	1800
N1-15.000	40.928	152.2	N1-NT-1-15-1	19.361	18.231	0.530	Open Manhole	2400
N1-15.001	31.434	22.8	N1-NT-1-15-2	19.000	16.619	1.781	Open Manhole	1650
N1-15.002	12.885	18.6	N1-NT-15-3	19.000	15.928	2.472	Open Manhole	1650
N1-15.003	9.087	13.2	N1-NT-1-2-6	19.000	15.237	3.163	Open Manhole	1800
N1-2.006	39.053	204.5	N1-NT-1-2-7	17.668	15.047	2.021	Open Manhole	1800
N1-2.007	47.906	199.6	N1-NT-1-2-8	16.952	14.807	1.545	Open Manhole	1800
N1-2.008	36.002	200.0	N1-NT-1-2-9	16.333	14.627	1.106	Open Manhole	1800
N1-2.009	52.840	300.2	N1-NT-1-2-10	16.300	14.451	0.143	Open Manhole	2400
N1-2.010	57.914	90.1	N1-NT-1-2-11	16.300	13.808	0.643	Open Manhole	2400
N1-2.011	41.539	199.7	N1-1-16	16.827	13.600	2.327	Open Manhole	1200

Area Summary for Network 1-Main Site Access Roundabout

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Carriageway	100	0.031	0.031	0.031
2.000	Classification	Carriageway	100	0.017	0.017	0.017
2.001	Classification	Carriageway	100	0.018	0.018	0.018
3.000	-	-	100	0.000	0.000	0.000
3.001	Classification	Carriageway	100	0.025	0.025	0.025
	Classification	Carriageway	100	0.013	0.013	0.038
3.002	Classification	Carriageway	100	0.022	0.022	0.022
3.003	-	-	100	0.000	0.000	0.000
4.000	Classification	Carriageway	100	0.014	0.014	0.014
4.001	Classification	Carriageway	100	0.014	0.014	0.014
3.004	-	-	100	0.000	0.000	0.000
3.005	Classification	Carriageway	100	0.028	0.028	0.028
3.006	Classification	Carriageway	100	0.026	0.026	0.026
5.000	Classification	Carriageway	100	0.028	0.028	0.028
6.000	User	-	50	0.074	0.037	0.037
6.001	User	-	50	0.099	0.050	0.050
6.002	User	-	50	0.001	0.001	0.001
7.000	User	-	50	0.225	0.112	0.112
7.001	User	-	50	0.012	0.006	0.006
7.002	User	-	50	0.023	0.011	0.011
7.003	User	-	50	0.001	0.001	0.001
8.000	User	-	50	0.032	0.016	0.016
	Classification	Carriageway	100	0.015	0.015	0.031
8.001	User	-	50	0.036	0.018	0.018
	Classification	Carriageway	100	0.023	0.023	0.041
8.002	Classification	Carriageway	100	0.020	0.020	0.020
	User	-	50	0.027	0.014	0.034
8.003	User	-	50	0.001	0.001	0.001
7.004	-	-	100	0.000	0.000	0.000
9.000	Classification	Carriageway	100	0.018	0.018	0.018
	User	-	50	0.015	0.007	0.025
9.001	User	-	50	0.000	0.000	0.000
6.003	-	-	100	0.000	0.000	0.000
6.004	User	-	50	0.022	0.011	0.011
	User	-	50	0.004	0.002	0.013
	User	-	50	0.004	0.002	0.015
	User	-	50	0.005	0.002	0.017
	User	-	50	0.006	0.003	0.020
	User	-	50	0.004	0.002	0.022
6.005	User	-	50	0.003	0.002	0.002
	User	-	50	0.004	0.002	0.003
	User	-	50	0.008	0.004	0.007
6.006	User	-	50	0.005	0.002	0.002
	User	-	50	0.006	0.003	0.005
	User	-	50	0.004	0.002	0.007
6.007	User	-	50	0.027	0.013	0.013
	User	-	50	0.009	0.005	0.018
6.008	-	-	100	0.000	0.000	0.000
10.000	Classification	Carriageway	100	0.027	0.027	0.027
10.001	User	-	100	0.014	0.014	0.014
6.009	-	-	100	0.000	0.000	0.000
6.010	User	-	100	0.017	0.017	0.017
5.001	Classification	Carriageway	100	0.021	0.021	0.021
3.007	-	-	100	0.000	0.000	0.000
11.000	Classification	Carriageway	100	0.028	0.028	0.028
	Classification	Carriageway	100	0.015	0.015	0.044
11.001	Classification	Carriageway	100	0.010	0.010	0.010
11.002	Classification	Carriageway	100	0.017	0.017	0.017
11.003	-	-	100	0.000	0.000	0.000
11.004	Classification	Carriageway	100	0.031	0.031	0.031
3.008	-	-	100	0.000	0.000	0.000
2.002	-	-	100	0.000	0.000	0.000
2.003	-	-	100	0.000	0.000	0.000

Area Summary for Network 1-Main Site Access Roundabout

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
12.000	Classification	Carriageway	100	0.035	0.035	0.035
12.001	Classification	Carriageway	100	0.006	0.006	0.006
12.002	-	-	100	0.000	0.000	0.000
13.000	Classification	Carriageway	100	0.014	0.014	0.014
13.001	-	-	100	0.000	0.000	0.000
12.003	Classification	Carriageway	100	0.025	0.025	0.025
14.000	-	-	100	0.000	0.000	0.000
14.001	Classification	Carriageway	100	0.014	0.014	0.014
12.004	-	-	100	0.000	0.000	0.000
12.005	-	-	100	0.000	0.000	0.000
2.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
15.000	User	-	50	0.032	0.016	0.016
	User	-	50	0.015	0.008	0.023
15.001	User	-	50	0.033	0.016	0.016
15.002	-	-	100	0.000	0.000	0.000
15.003	-	-	100	0.000	0.000	0.000
2.006	User	-	50	0.031	0.016	0.016
2.007	User	-	50	0.035	0.018	0.018
2.008	User	-	50	0.025	0.012	0.012
2.009	User	-	50	0.037	0.018	0.018
2.010	User	-	50	0.044	0.022	0.022
2.011	User	-	50	0.035	0.017	0.017
				Total	Total	Total
				1.528	1.057	1.057

Network Classifications for Network 1-Main Site Access Roundabout

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
N1-1.000	N1-NT-1-1-0	600	0.890	1.339	Unclassified	1200	0	0.890	Unclassified
N1-2.000	N1-NT-1-2-0	300	1.540	2.069	Unclassified	1200	0	1.540	Unclassified
N1-2.001	N1-NT-1-2-1	300	1.215	2.069	Unclassified	1350	0	2.069	Unclassified
N1-3.000	N1-NT-1-3-0	300	0.880	0.959	Unclassified	1200	0	0.880	Unclassified
N1-3.001	N1-NT-1-3-1	300	0.953	1.737	Unclassified	1200	0	0.959	Unclassified
N1-3.002	N1-NT-1-3-2	300	1.737	2.344	Unclassified	1200	0	1.737	Unclassified
N1-3.003	N1-NT-1-3-3	300	2.312	2.422	Unclassified	1200	0	2.312	Unclassified
N1-4.000	N1-NT-1-4-0	300	0.800	1.252	Unclassified	1200	0	0.800	Unclassified
N1-4.001	N1-NT-1-4-1	300	1.252	2.336	Unclassified	1200	0	1.252	Unclassified
N1-3.004	N1-NT-1-3-4	300	2.421	2.838	Unclassified	1200	0	2.421	Unclassified
N1-3.005	N1-NT-1-3-5	300	2.438	2.521	Unclassified	1200	0	2.438	Unclassified
N1-3.006	N1-NT-1-3-6	300	2.521	2.575	Unclassified	1200	0	2.521	Unclassified
N1-5.000	N1-NT-1-5-0	300	2.146	2.156	Unclassified	1200	0	2.146	Unclassified
N1-6.000	N1-NT-1-6-0	500	0.100	0.437	Unclassified				Junction
N1-6.001	N1-NT-1-6-1	500	0.437	1.207	Unclassified				Junction
N1-6.002	N1-NT-1-6-2	450	0.721	0.737	Unclassified				Junction
N1-7.000	N1-NT-1-7-0	500	0.319	0.711	Unclassified				Junction
N1-7.001	N1-NT-1-7-1	500	0.866	1.017	Unclassified				Junction
N1-7.002	N1-NT-1-7-2	500	0.847	0.915	Unclassified				Junction
N1-7.003	N1-NT-1-7-3	300	0.822	0.851	Unclassified				Junction
N1-8.000	N1-NT-1-8-0	500	0.287	0.671	Unclassified				Junction
N1-8.001	N1-NT-1-8-1	500	0.384	0.747	Unclassified				Junction
N1-8.002	N1-NT-1-8-2	500	0.270	0.954	Unclassified				Junction
N1-8.003	N1-NT-1-8-3	300	1.304	1.591	Unclassified				Junction
N1-7.004	N1-NT-1-7-4	450	1.045	1.941	Unclassified				Junction
N1-9.000	N1-NT-1-9-0	500	0.350	0.550	Unclassified				Junction
N1-9.001	N1-NT-1-9-1	225	0.475	1.509	Unclassified	1200	0	0.475	Unclassified
N1-6.003	N1-NT-1-6-3	450	0.827	1.976	Unclassified				Junction
N1-6.004	N1-NT-1-6-4				Filter Drain	1200	0	0.000	Unclassified
N1-6.005	N1-NT-1-6-5				Filter Drain	1800	0	0.000	Unclassified
N1-6.006	N1-NT-1-6-6				Filter Drain	1800	0	0.000	Unclassified
N1-6.007	N1-NT-1-6-7				Filter Drain	1800	0	0.000	Unclassified
N1-6.008	N1-NT-1-6-8				Filter Drain	1200	0	0.000	Unclassified
N1-10.000	N1-NT-1-10-0	300	0.800	2.117	Unclassified	1200	0	0.800	Unclassified
N1-10.001	N1-NT-1-10-1	300	0.972	1.929	Unclassified	1200	0	0.972	Unclassified
N1-6.009	N1-NT-1-6-9				Filter Drain	1800	0	0.000	Unclassified
N1-6.010	N1-NT-1-6-10	600	2.924	3.037	Unclassified	2100	0	2.924	Unclassified
N1-5.001	N1-NT-1-5-1	450	3.178	3.187	Unclassified	1500	0	3.187	Unclassified
N1-3.007	N1-NT-1-6-6	600	3.028	3.058	Unclassified	1500	0	3.028	Unclassified
N1-11.000	N1-NT-1-11-0	225	0.875	1.370	Unclassified	1200	0	0.875	Unclassified
N1-11.001	N1-NT-1-11-1	225	1.370	1.476	Unclassified	1200	0	1.370	Unclassified
N1-11.002	N1-NT-1-11-2	225	1.344	1.476	Unclassified	1200	0	1.476	Unclassified
N1-11.003	N1-NT-1-11-3	225	1.414	2.039	Unclassified	1200	0	1.414	Unclassified
N1-11.004	N1-NT-1-11-4	225	1.503	2.783	Unclassified	1200	0	1.503	Unclassified
N1-3.008	N1-NT-1-3-7	450	1.827	3.907	Unclassified	1500	0	3.208	Unclassified
N1-2.002	N1-NT-1-2-2	600	1.612	1.677	Unclassified	1800	0	1.677	Unclassified
N1-2.003	N1-NT-1-2-3	600	1.500	1.612	Unclassified	1650	0	1.612	Unclassified
N1-12.000	N1-NT-1-12-0	225	0.875	1.850	Unclassified	1200	0	0.875	Unclassified
N1-12.001	N1-NT-1-12-1	225	1.379	1.453	Unclassified	1200	0	1.379	Unclassified
N1-12.002	N1-NT-1-12-2	225	1.453	1.620	Unclassified	1200	0	1.453	Unclassified
N1-13.000	N1-NT-1-13-0	225	0.703	0.935	Unclassified	1200	0	0.935	Unclassified
N1-13.001	N1-NT-1-13-1	225	0.703	1.685	Unclassified	1200	0	0.703	Unclassified
N1-12.003	N1-NT-1-13-3	225	0.738	1.695	Unclassified	1200	0	1.695	Unclassified
N1-14.000	N1-NT-1-14-0	225	0.897	0.964	Unclassified	1200	0	0.964	Unclassified
N1-14.001	N1-NT-1-14-1	450	0.409	0.672	Unclassified	1800	0	0.672	Unclassified
N1-12.004	N1-NT-1-12-4	225	0.738	1.673	Unclassified	1200	0	0.738	Unclassified
N1-12.005	N1-NT-1-12-5	450	1.232	1.473	Unclassified	1800	0	1.473	Unclassified
N1-2.004	N1-NT-1-2-4	600	1.410	1.516	Unclassified	1800	0	1.500	Unclassified
N1-2.005	N1-NT-1-2-5	300	1.710	3.542	Unclassified	1500	0	1.710	Unclassified
N1-15.000	N1-NT-1-15-0	600	0.165	0.530	Unclassified	1200	0	0.500	Unclassified
N1-15.001	N1-NT-1-15-1	600	0.761	1.781	Unclassified	2400	0	0.761	Unclassified

Network Classifications for Network 1-Main Site Access Roundabout

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
N1-15.002	N1-NT-1-15-2	600	1.781	2.472	Unclassified	1650	0	1.781	Unclassified
N1-15.003	N1-NT-15-3	600	2.472	3.163	Unclassified	1650	0	2.472	Unclassified
N1-2.006	N1-NT-1-2-6	600	2.021	3.162	Unclassified	1800	0	3.162	Unclassified
N1-2.007	N1-NT-1-2-7	600	1.545	2.021	Unclassified	1800	0	2.021	Unclassified
N1-2.008	N1-NT-1-2-8	600	1.106	1.545	Unclassified	1800	0	1.545	Unclassified
N1-2.009	N1-NT-1-2-9				Filter Drain	1800	0	0.000	Unclassified
N1-2.010	N1-NT-1-2-10				Filter Drain	2400	0	0.000	Unclassified
N1-2.011	N1-NT-1-2-11	900	0.549	2.327	Unclassified	2400	0	1.592	Unclassified

Free Flowing Outfall Details for Network 1-Main Site Access Roundabout

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N1-1.000	N1-	0.000	17.138	0.000	0	0

Free Flowing Outfall Details for Network 1-Main Site Access Roundabout

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N1-2.011	N1-1-16	16.827	13.600	0.000	1200	0

Simulation Criteria for Network 1-Main Site Access Roundabout

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	5.000
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)	1440
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	12

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 2	Number of Storage Structures 9	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	720

Online Controls for Network 1-Main Site Access Roundabout

Hydro-Brake® Optimum Manhole: N1-NT-1-2-4, DS/PN: N1-2.004, Volume (m³): 10.0

Unit Reference	MD-SHE-0095-4000-1000-4000
Design Head (m)	1.000
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	95
Invert Level (m)	16.018
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.0	Kick-Flo®	0.629	3.2
Flush-Flo™	0.294	4.0	Mean Flow over Head Range	-	3.5

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)	Depth (m)	Flow (l/s)
0.100	3.0	0.800	3.6	2.000	5.5	4.000	7.6	7.000	10.0
0.200	3.9	1.000	4.0	2.200	5.8	4.500	8.1	7.500	10.3
0.300	4.0	1.200	4.3	2.400	6.0	5.000	8.5	8.000	10.6
0.400	3.9	1.400	4.7	2.600	6.2	5.500	8.9	8.500	10.9
0.500	3.8	1.600	5.0	3.000	6.7	6.000	9.3	9.000	11.2
0.600	3.4	1.800	5.3	3.500	7.2	6.500	9.6	9.500	11.5

Hydro-Brake® Optimum Manhole: N1-NT-1-2-11, DS/PN: N1-2.011, Volume (m³): 53.1

Unit Reference	MD-SHE-0094-5000-1800-5000
Design Head (m)	1.800
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	94
Invert Level (m)	13.808
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	5.0	Kick-Flo®	0.838	3.5
Flush-Flo™	0.411	4.4	Mean Flow over Head Range	-	4.1

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)	Depth (m)	Flow (l/s)
0.100	3.0	0.800	3.7	2.000	5.2	4.000	7.3	7.000	9.5
0.200	4.0	1.000	3.8	2.200	5.5	4.500	7.7	7.500	9.8
0.300	4.3	1.200	4.1	2.400	5.7	5.000	8.1	8.000	10.1
0.400	4.4	1.400	4.4	2.600	5.9	5.500	8.4	8.500	10.4
0.500	4.4	1.600	4.7	3.000	6.3	6.000	8.8	9.000	10.7
0.600	4.3	1.800	5.0	3.500	6.8	6.500	9.1	9.500	11.0

Storage Structures for Network 1-Main Site Access Roundabout

Filter Drain Pipe: N1-6.004

Manning's N	0.045	Trench Length (m)	34.1
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	2
Porosity	0.30	Slope (1:X)	411.4
Invert Level (m)	16.860	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: N1-6.005

Manning's N	0.045	Trench Length (m)	10.9
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	2
Porosity	0.30	Slope (1:X)	418.2
Invert Level (m)	16.777	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: N1-6.006

Manning's N	0.045	Trench Length (m)	13.8
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	2
Porosity	0.30	Slope (1:X)	406.3
Invert Level (m)	16.751	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: N1-6.007

Manning's N	0.045	Trench Length (m)	17.6
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	2
Porosity	0.30	Slope (1:X)	450.2
Invert Level (m)	16.508	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: N1-6.008

Manning's N	0.045	Trench Length (m)	7.9
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	2
Porosity	0.30	Slope (1:X)	378.4
Invert Level (m)	16.469	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: N1-6.009

Manning's N	0.045	Trench Length (m)	16.8
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	2
Porosity	0.30	Slope (1:X)	431.2
Invert Level (m)	16.448	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Tank or Pond Manhole: N1-NT-1-2-4, DS/PN: N1-2.004

Invert Level (m) 16.018

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	795.0	2.100	2740.0

Filter Drain Pipe: N1-2.009

Manning's N	0.045	Trench Length (m)	52.8
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	300.2
Invert Level (m)	14.627	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: N1-2.010

Manning's N	0.045	Trench Length (m)	57.9
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.600
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	90.1
Invert Level (m)	14.451	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000