

WATER LANE, ANGMERING
RESERVED MATTERS DRAINAGE STATEMENT

BARRATT DAVID WILSON HOMES

21 OCTOBER 2020



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Date:	21 October 2020
Document Reference:	A290-R007/B

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1.0 Introduction

Context

- 1.1. Abley Letchford Partnership has produced this Drainage Statement with regards to Barratt David Wilson Homes (BDW) interests in respect of the development of Water Lane, Angmering.
- 1.2. It is proposed development will accommodate 175 dwellings (Arun District Council (ADC) planning application reference: A/99/17/OUT). This permission was granted in March 2019.
- 1.3. This statement provides written evidence to support both the Reserved matters (RM) RM submission and the overall site discharge of planning conditions and should be read in conjunction with drawings associated with those packages.
- 1.4. This statement draws upon supporting work undertaken at outline planning stage on landscape, ecology and drainage design and presents a summary of the overall drainage parameters and design.

Sources of Information

- 1.5. A Flood Risk Assessment (FRA) dated May 2017 has been carried out by idom merebrook, Ref: FRA-19495-16-139 Rev R2, to accompany the outline planning application for the site. This has been consulted in order to inform the proposed drainage strategy for the site.
- 1.6. A geotechnical investigation was carried out by idom merebrook alongside further investigations on infiltration and ground water. This has been consulted in order to inform the proposed drainage strategy for the site.
- 1.7. In addition to the above approved outline planning documents, winter infiltration testing was requested by Arun DC, which was carried out in March 2020 by RSK. The results of which are contained within the appendix and have been consulted in order to inform the proposed drainage strategy for the site.
- 1.8. A desktop study of the site was carried out using the sources mentioned previously together with information from the Environment Agency, British Geological Survey, and GOV.uk websites to ascertain local features, geology, hydrology and soil characteristics.
- 1.9. Flood mapping and site characteristics, as published on the Environment Agency's (EA) and the GOV.uk websites, has been used as an information source. Guidance set out within the NPPF, the SFRA, and EA Guidance has also been used as the base for this assessment.

Statement Structure

- 1.10. This statement addresses the requirements of the planning conditions and NPPF and considers the following aspects:
 - Section 2: Baseline Environmental Conditions – a description of the site location, its topography and hydrology.



- Section 3: Drainage Strategy – flood risk from the site and appropriate mitigation measures to protect the site post development including surface water and foul water drainage strategies.



2.0 Baseline Environmental Conditions

Introduction

- 2.1. This chapter provides for a description of the site location, its topography and hydrology.

Site Location

- 2.2. The site is located to the east of the village of Angmering, West Sussex. The site is bordered to the north by Water Lane; to the east by the A280 Angmering By-Pass; to the south by existing residential properties on the eastern end of Angmering High Street; and to the west by three paddocks and Avenals Farm.
- 2.3. A narrow corridor of land connects to the westernmost part of the Site, hereafter the 'Western Parcel' which comprises a smaller parcel of land beyond Avenals Farm and adjacent to Weavers Hill.
- 2.4. Overall the site covers approximately 9.0 hectares (Ha).
- 2.5. The site lies within the administrative area of Arun District Council (Arun DC), with West Sussex County Council (ESCC) being the Lead Local Flood Authority (LLFA).
- 2.6. The National Grid Reference of the site is NGR 507539 104557.

Existing Site

- 2.7. The Site (including the Western Parcel) comprises principally arable agricultural land with some undeveloped land in the north and west, with mature trees, scrub and hedgerows. There is a Main River in the far north of the site
- 2.8. The topography of the main site falls, from a central high point of approximately 18.0m AOD, adjacent to the A280 boundary, both north to south and east to west. The slope east to west is approximately 1 in 120 and therefore relatively flat.
- 2.9. To the north the site falls to a Riverbank level of approximately 13.0m before descending to the river bed at approximately 9.0m – 10.0m AOD. To the south the site falls to a level of approximately 16.5m AOD.
- 2.10. The western parcel has levels in the range of 16.0m to 14.0m AOD falling mainly east to west but also to the northern boundary.
- 2.11. A copy of the topographical survey has been included in design packages.

Existing Drainage

- 2.12. The site currently drains mainly by infiltration with some evaporation and greenfield runoff.
- 2.13. Public sewer records obtained from Southern Water confirm there are no public surface water sewers within, or in the vicinity of, the site.
- 2.14. In addition, there are no ditches or watercourses located in the south or west parcel, or adjacent to these parcels in the immediate location. Therefore, these parcels drain solely by infiltration into the ground. This is reinforced by the geological mapping and surveys, and the infiltration testing that has taken place.



- 2.15. To the north of the main site there is a Main River which flows adjacent to Water Lane. Further downstream where the River passes through Angmering it is referred to as the Black Ditch, (also known locally as Patching Stream since it runs from Patching Pond north of the A27 – source; ‘Angmering Neighbourhood Plan 2014 – 2029: 4.06’ page 11. The River is therefore referred to as the Black Ditch in all reports.
- 2.16. Infiltration testing adjacent to the Main River suggested infiltration was not viable in the immediate vicinity, therefore to the far north of the site this area drains by run off into the Black Ditch.

Flood Risk

- 2.17. The majority of the site is located in Flood Zone 1 (Low Probability) - land assessed as having a less than 0.1% (1 in 1000) annual probability of river or sea flooding.
- 2.18. A small portion of the site is located in Flood Zones 2 and 3 which is associated with the Black Ditch. This part of the site is remaining as existing with the exception of the bridge entrance crossing which is not part of this RM submission and report.
- 2.19. The modelled flood level, undertaken by the bridge engineers, is calculated as approximately 11.0m AOD for the extreme event. Therefore, any flood risk to the site itself, which is at a minimum level of approximately 13.0m AOD, is negligible.

Geology

- 2.20. The British Geological Survey record plans for the area, indicates drift deposits to comprise Alluvium (clay, silt, sand and gravel), Head Deposits (clay, silt, sand and gravel), and River Terrace Deposits (sand, silt and clay). Bedrock geology comprises Lambeth Group (clay, silt and sand), Lewes Nodular Chalk Formation (chalk), and Tarrant Chalk Member (chalk) to the south. This is consistent with the inferred geology of the site, from the British Geological Survey 1:50,000 mapping, (via the Geology of Britain on-line viewer).
- 2.21. The geotechnical assessments and infiltration testing confirm the soil and bedrock properties.

Hydrogeological

- 2.22. The Environment Agency has classified the superficial geology as a Secondary Aquifer with the underlying bedrock classified as a Secondary A Principal Aquifer.
- 2.23. There are no active groundwater abstraction licences or potable water abstraction licenses within 500m of the site. There is one active license within 1km (967m) of the site which relates to spray irrigation. The site is not recorded to be within 500m of a Groundwater Source Protection Zone.

Groundwater

- 2.24. The geotechnical investigations carried out as part of the approved outline planning application comprised of winter testing of groundwater. No standing groundwater was encountered in the southern and western parts of the site where infiltration is prevalent.
- 2.25. In addition, all infiltration testing, both at outline planning and recently in March 202, which was during particularly wet weather, no groundwater was encountered during the tests.



Infiltration

- 2.26. Infiltration testing was undertaken as part of the approved outline planning application and recently, by RSK, in March 2020. This recent testing was classified as 'winter testing' and was undertaken in dialogue with Arun DC. The full RSK report is contained within the Appendix.
- 2.27. Testing at outline planning stage resulted in infiltration rates of between 7.2×10^{-3} m/s and 5.8×10^{-5} m/s indicating infiltration is very viable on the site.
- 2.28. Winter testing in March 202 resulted in infiltration rates of between 2.0×10^{-3} m/s and 4.24×10^{-6} m/s again confirming infiltration is very viable on the site. This was undertaken at a greater range of depths and locations across the site, hence the variations in results.
- 2.29. The results varied across the site with infiltration viable in the south and west and limited in the north adjacent to the Black Ditch.
- 2.30. To this end a suitable infiltration rate has been established to represent the variations across the site, and in regard to the locations of the main SuDS infiltration features. Refer to plan in the Appendix.

RSK Infiltration Testing Summary

Location	Trial Pits Used	Average Infiltration Rate	Notes
Western Parcel	SA1, SA6, SA7	6.387×10^{-5}	Average
Southern Basin	SA3, SA4	2.333×10^{-4}	Worse case figure
South	SA14, SA17	2.748×10^{-5}	Average
Middle South	SA10, SA11	6.427×10^{-6}	Average
Middle North	SA12, SA13	2.122×10^{-5}	Worse case figure
North	SA5, SA6, SA15, SA16	-	No Infiltration



3.0 Drainage Strategy

Introduction

- 3.1. This chapter provides details on an indicative foul and surface water drainage strategy and measures to drain the Development.

Methodology

- 3.2. The drainage strategy has been designed to achieve the requirements of NPPF and utilise a comprehensive Sustainable Drainage System (SuDS).

Management Strategy

- 3.3. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in the catchment, particularly flooding downstream. Changes of land use can have significant downstream impacts where existing drainage systems may not have sufficient capacity for any additional surface water flow.
- 3.4. A surface water management strategy for the development will be required to manage and reduce the flood risk posed by the surface water runoff from the site.
- 3.5. There are three possible options to discharge the surface water runoff in accordance with requirement H3 of the Building Regulations 2010. Rainwater shall discharge to one of the following, listed in order of priority:
- An adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,
 - a watercourse; or where that is not reasonably practicable,
 - a sewer
- 3.6. Due to the nature of the ground and the existing drainage characteristics of the site it is proposed to discharge surface water runoff from the site into the watercourses that surround the site as infiltration is unsuitable.
- 3.7. Impermeable areas for housing and associated hardstanding areas such as driveways will be calculated individually for each property with an allowance added to each property's total hardstanding area to allow for urban creep. Within the drainage strategy a full 10% allowance has been incorporated although this is associated with a residential dwelling density of less than 25 dwellings per hectare. In detailed design the Urban Creep allowance will be calculated in accordance with the Non-Statutory Technical Standards for Sustainable Drainage.

Sustainable Drainage (SuDS)

- 3.8. Sustainable water management measures should be used to control the surface water runoff from the proposed development site therefore, managing the flood risk to the site and surrounding areas from surface water runoff.



- 3.9. Current guidance, CIRIA (2004) Report C609, provides that a hierarchy of techniques should be identified, namely:
- **Prevention** – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
 - **Source Control** – control of runoff at or very near its source (such as the use of rainwater harvesting).
 - **Site Control** – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole site).
 - **Regional Control** – management of runoff from several sites, typically in a detention pond or wetland.
- 3.10. In 2015 CIRIA published The SuDS Manual (C753) providing best practice guidance on the planning, design, construction, operation and maintenance of SuDS.
- 3.11. The SuDS Manual provides guidance to ensure SuDS are planned and designed to maximise the opportunities and benefits of surface water management.
- 3.12. The four main categories of benefits that can be achieved by SuDS, referred to as the four pillars of SuDS design, are:
- **Water quantity** – control the quantity of runoff to support the management of flood risk, and maintain and protect the natural water cycle
 - **Water quality** – manage the quality of the runoff to prevent pollution
 - **Amenity** – create and sustain better places for people
 - **Biodiversity** – Create and sustain better places for nature
- 3.13. Given that infiltration type SuDS devices are not be feasible on the site the following SuDS components applicable to the site could include:
- **Pervious surfacing systems** – structural surfaces that allow water to penetrate thus providing storage and treatment, e.g. pervious paving.
 - **Conveyance systems** – components that convey flows to downstream storage systems, e.g. swales, filter drains.
 - **Storage systems** – components that control flows, and possibly volumes, by storing water and releasing it slowly, e.g. ponds, wetlands and detention basins.
 - **Treatment systems** – components that remove or facilitate the degradation of contaminants present in runoff, e.g. filter strips, proprietary treatment systems.

Pre and Post Development Surface Areas

- 3.14. The existing site is predominantly Greenfield. Therefore, any development will increase the impermeable area and surface water runoff.



- 3.15. Post development impermeable areas have been calculated using the layout masterplan to determine the area of the proposed roads, dwellings and hardstanding.

Greenfield Run Off Rates

- 3.16. In accordance with the approved FRA all surface water run off from the site, where there is a positive offsite discharge, will be limited to 3.6 l/s/ha (mean annual runoff QBAR) for all events up to the annual probability 1 in 100 year storm event plus 40% climate change. This provides considerable benefit in overall run off rates both in the short and long term with an allowance made for climate change.
- 3.17. The Greenfield run off rates in accordance with the approved FRA are:
- QBAR – 3.6 l/s/ha
 - 1 in 1 Year – 3.0 l/s/ha
 - 1 in 30 Year – 8.1 l/s/ha
 - 1 in 100 Year – 11.4 l/s/ha

Surface Water Treatment Improvements

- 3.18. Notwithstanding the requirement to provide improvements in water quality due to proposed development, the location of the site in respect to the adjacent sensitive receptors, such as the Black Ditch, necessitates additional consideration.
- 3.19. CIRIA report C753 The SuDS Manual outlines the methodology for assessing water quality risks associated with new development. This is a simple index approach which provides a high level scoping analysis of the land usage and gives guidelines for appropriate treatment stages.
- 3.20. This process identifies features necessary to provide adequate substance removal in line with Environment Agency requirements. This is a three step process of Allocation, Mitigation and Review.
- 3.21. Surfaces generating runoff are 'graded' on their potential to contribute to various harmful pollutants and gives each surface a risk of pollution from each element.
- 3.22. Historically, PPG3 documentation would recommend that pollutants were removed utilising oil separators, but since its superseding, more recent guidance has shifted to the use of SuDS features to remove pollutants; thereby providing significant improvements in treatment. The use of non-mechanical features also decrease the requirements for maintenance and increase natural biodiversity.
- 3.23. Without adequate treatment, the pollutants could cause damage if they were to enter the watercourse or water table in large volumes. The use of SuDS features to slow down and degrade these pollutants is critical to the provision of an acceptable drainage scheme.

SuDS Features

- 3.24. The surface water strategy proposes utilising a number of Sustainable Drainage System techniques (SuDS) to attenuate surface water runoff. The selection of the most appropriate SuDS needs to consider existing constraints, ownership and maintenance issues. To that end, the most suitable SuDS features that could be incorporated into this site are:



- Swales and granular filter strips, with or without underground attenuation;
 - Bioretention system within other SuDS features; and
 - Detention/Infiltration basins.
- 3.25. The banks of the SuDS features are designed with a maximum gradient of 1 in 4 and an appropriate freeboard above the maximum water level. This allows landscaping of both wetland and wildflower mixes to provide an appropriate landscape context in the vicinity of the features. However, during detailed design, it is possible that a maximum gradient of 1 in 3 could be utilised near to hedgerows and inaccessible areas with a shallower gradient of 1 in 4 or 5 incorporated on the development side. This provides aesthetic interest to the features as well as assisting in maintenance. Where basins are deeper, due to the sloping ground, a 1m berm, above the maximum water level, has been provided. This enables a shelf for planting and respite should personnel or objects enter the basin.
- 3.26. A 3m maintenance area is allowed between the top of water level, plus freeboard, and any external feature, such as hedges, boundaries, etc, to allow for continuing maintenance.
- 3.27. Open SuDS features are designed so as not to compromise the safety of residents, visitors and their property. Generally open boundaries are provided, and perimeter planting could be utilised to define the extents of the features.
- 3.28. Open larger basins are designed with forebays, to provide a sedimentation bay, and permanent treatment areas.
- 3.29. The drainage basins are sized to accommodate all storms up to and including the 1 in 100 year event with a 40% allowance for climate change with an appropriate freeboard.
- 3.30. The proposals draw reference to the DEFRA document *Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems* March 2015, as well as CIRIA C753 *The SuDS Manual*. In addition, all designs would be in accordance with best practice as stipulated in EA Report SC030219 '*Rainfall Runoff Management for Developments*'.
- 3.31. The utilisation of Sustainable Drainage Systems (SuDS) provides not only the benefit of controlling waters at source and on-site treatment of collected waters but also allows enhanced aesthetics and biodiversity.

Adoption and Ownership

- 3.32. The drainage system is designed to the appropriate standards including Sewers for Adoption, the Building Regulations and the requirement of the National Planning Policy Framework
- 3.33. The intention of adoption and ownership of drainage and SuDS is as follows:
- Surface water sewers within development parcels to be offered for adoption to Southern Water under the Section 104 process of the Water Industry Act.
 - Surface water highway drains, gullies and leads within adopted roads to be maintained by the Highway Authority.
 - Foul sewers within development parcels to be offered for adoption to Southern Water under the Section 104 process of the Water Industry Act.



- Above ground attenuation within development parcels (i.e. swales and basins) to be maintained by a private maintenance company funded by residential properties, or, subject to agreement offered and maintained by Arun District Council.

SuDS Maintenance Strategy

- 3.34. For the water treatment effects of SuDS features to remain effective, a comprehensive maintenance strategy will be implemented.
- 3.35. During construction, maintenance of SuDS features will be undertaken by the Contractor. Upon completion, the assets will be passed over to the Management Company or community group commissioned to maintain the features in perpetuity.
- 3.36. A regular maintenance regime will be created, which consists of several primary measures required to ensure the longevity of the system. These should be undertaken on a regular basis to ensure consistent performance. Typical maintenance activities consist of:
- Inspecting and reporting; relatively regular review of the condition identifying issues and providing resolutions. Periodic review from the maintenance contractor;
 - Litter and debris removal;
 - Grass trimming, overall cutting and localised strimming preventing blockages;
 - Weed and evasive plant control;
 - Shrub management;
 - Aquatic and shoreline vegetation management;
 - Sweeping pervious surfaces; and
 - Oil removal from proprietary systems.
- 3.37. A remedial maintenance schedule will be recommended as part of the handover of the SuDS features. Remedial maintenance is required to provide repairs to the system and monitor long term damage ensuring the system remains consistently productive. The schedule would consist of;
- Structure rehabilitation and repair;
 - Infiltration surface rehabilitation;
 - Scarifying to remove “Thatch”;
 - Spiking or Tining the soil;
 - Air pressure treatment.
- 3.38. The maintenance schedule contents and timing will depend upon multiple factors including usage, contents of water utilising the system, location and biology. To this end, it is suggested that the schedule be finalised as part of detailed design; ensuring the most comprehensive maintenance schedule is incorporated for the phase in hand.



- 3.39. Community outreach can be undertaken as part of the development, which will raise awareness on the importance of SuDS to both flood risk and water quality in the local area. Imparting the new residents with knowledge on the risks associated with pollution to the surface water drainage system is key, as is the direct effect their actions may have on water quality and biodiversity in the area.

Surface Water Drainage Strategy

- 3.40. A surface water management strategy for the proposed development has been developed to manage and reduce the flood risk posed by the surface water runoff from the site. The drainage system for the proposed development will manage and reduce the flood risk posed by the surface water runoff from the site.
- 3.41. All designs would be in accordance with best practice as stipulated in EA Report SC030219 'Rainfall Runoff Management for Developments'.
- 3.42. In the first instance a traditional network of trapped gullies and pipes collect surface water run-off from roads, roofs and driveways. A traditional drainage system for the impermeable areas has been utilised to provide a system that can be checked, cleaned and maintained efficiently. Trapped gullies provide for the first flush of contaminants thus providing a high level of initial treatment.
- 3.43. All surface water drainage pipes have been designed to cater for the 1 in 30 year storm event, in accordance with industry standard, with all attenuation features designed to allow for the 1 in 100 year storm event plus 40% climate change allowance.
- 3.44. The traditional pipe system works in combination with swales, bioretention and attenuation/infiltration basins to provide treatment and attenuation storage, and high water quality benefits, with flow restricted by a proprietary device (e.g. Hydrobrakes) to ensure waters are released at the correct Greenfield rate.
- 3.45. The SuDS features are a mixture of swales, attenuation and infiltration basins designed to fill in excess storms.
- 3.46. For the northern parcel a permanently wet attenuation basin is proposed. This provides additional ecological and biodiversity benefits. At low flows the water will be controlled by the Hydrobrake and kept generally in the piped system, or routed through low flow channels in the online basins. For the larger storms water will back up, into the basin and fill accordingly. Once the storm has subsided flow will drain out through the pipe into the control manholes and the Hydrobrake and subsequent outfall. The outfall will drain, by a small ditch to the Black Ditch.
- 3.47. The discharge from the northern basin has been restricted to 5.6 l/s for all storms up to and including the 1 in 100 year storm event plus 40% climate change. This is in accordance with the impermeable area of the catchment utilising the QBAR discharge rate agreed at outline planning approval.
- 3.48. For the southern parcel an infiltration basin is proposed. All storms will drain into the basin and infiltrate into the ground. The basin has been designed to half drain in less than 24 hours in accordance with standard. For the majority of the time the basin will be dry and only be wet in periods of inclement weather. This basin could be used for areas of play in dry weather.



- 3.49. In addition to the basins swales are also provided in the central green space to provide infiltration at source and assist in water quality, ecology and biodiversity. These swales will drain into the ground and again only be wet in periods of inclement weather.
- 3.50. The western parcel will drain to a swale with underground storage, again wholly infiltrating into the ground. The above ground swale will infiltrate and store surface water run off, provide a surface SuDS feature, whilst also directing run off to the underground attenuation storage. In addition to this swale a small area of permeable paving with infiltration into the ground is located to the north east of the western parcel to drain a small enclave of dwellings. This provides filtration at source and resilience to the downstream feature.
- 3.51. Calculations to show the proposed drainage scheme and SuDS features are able to accommodate excess flows from storm events up to and including the 1 in 100 year event with a 40% allowance for climate change are provided in the appendix. The drainage strategy is shown on ALP drawings A290-RM-501, 502 and 503.
- 3.52. Flows in excess of the above design storms, which may flood from the network for storms in excess of the 1 in 30 year storm, will be directed along the highway routes to adjacent Greenfield areas, or into the attenuation features. This ensures recharging of the ground in the Greenfield areas and that no onsite or offsite residential units are affected by flood waters.
- 3.53. The basins in the strategic Greenspaces have in excess of 300mm freeboard and therefore are able to accept flood water from manholes upstream in very extreme events and not compromise off site flow.

Resilience

- 3.54. The surface water strategy and RM design has been undertaken in accordance with all approved documents. However, it is prudent to provide resilience to the design and test for extreme circumstances.
- 3.55. Currently the scheme provides calculations for all drainage entering the three discharge points. As described above swales are provided in the central greenspace although they are not used in the design modelling. This provides additional measures during detailed design and provides resilience to the design.
- 3.56. In addition, it is highly likely that some areas of private infiltration will be available in detailed design. Some dwellings may drain to their own private soakaways within their own curtilage. Again, these have not been included at this time and again provide resilience to the design and spread out the possible infiltration techniques.
- 3.57. Urban Creep is the allowance for the future design of small extensions and the paving over of greenspaces within new developments and is based on the density of the development as well as the ability for Urban Creep to occur, and can be as much as 10% increase in private impermeable area in large low density developments.
- 3.58. The scheme has been tested to assess Urban Creep and there is a small increase in flood risk in the larger storm events i.e. the 1 in 100 year event with a 40% allowance for climate change. However, as stated above, with the resilience already built into the system, and potential further drainage being introduced at detailed design, such as private soakaways, it is wholly reasonable to assume that Urban Creep will not be detrimental in any way.



Foul Water Drainage Strategy.

- 3.59. Southern Water (SW) Sewer records indicate that there is a network of foul water sewers within the locality of the Application Site.
- 3.60. A 150mm diameter foul water sewer is located to the south of the site in High Street. The nearest manhole is MH5301.
- 3.61. A 150mm diameter foul water sewer is located to the west of the site in Weavers Hill. The nearest manhole is MH2302.
- 3.62. There is a further network located to the north of the site at Water Lane although this is some way from the site and only accessible through the entrance bridge.
- 3.63. A foul water Impact study undertaken by Southern Water, at outline planning stage, identified that foul sewer improvements would need to be undertaken to the foul sewer network to accommodate the increased foul flows created by the development. This was on the basis of all units connecting to MH5301 is High Street.
- 3.64. Due to the topography of the site a foul water pumping station would be required in the north of the site to drain the northern parcel, irrelevant of where the final discharge point is located. This is due to the existing invert levels of the existing network. To this end Southern Water were contacted to discuss the various options available for connection.
- 3.65. It is proposed that the foul drainage for the western parcel discharges via gravity into the aforementioned Southern Water foul sewer in Weavers Hill at MH2302. Southern Water modelling and correspondence has stated that no offsite reinforcements will be required to facilitate this connection.
- 3.66. The northern parcel will drain to the proposed pumping station to be pumped back to the southern parcel network. This pumped flow, alongside the southern parcel will drain by gravity to the aforementioned Southern Water foul sewer in High Street at MH5301. Southern Water modelling and correspondence has stated that no offsite reinforcements will be required to facilitate this connection.
- 3.67. Section 104 technical approval alongside a Section 106 connection approval will be gained with Southern Water to these connections as detailed above.

Site Drainage Summary

- 3.68. It has been demonstrated that surface water from the site can be managed such that flood risk to and from the site following development is not increased.
- 3.69. It has been demonstrated that foul water from the site can be managed such that it does not have a detrimental effect to the foul sewer network.



Appendices



Appendix 1 – Calculations

Drainage Simulation Calculations

Abley Letchford Partnership Ltd		Page 1
Search House Charnham Lane Hungerford RG17 0EY	Water Lane, Angmering	
Date 20/10/2020 File NETWORK 2 V5.MDX	Designed by JS Checked by SL	
XP Solutions Network 2020.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for STORM WEST

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for STORM WEST

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	36.615	0.282	130.0	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	21.470	0.160	134.2	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	59.509	0.593	100.4	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	3.984	0.039	102.1	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	6.742	0.087	77.5	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	6.568	0.330	19.9	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	9.665	0.067	145.3	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.000	6.570	0.144	45.6	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.53	15.473	0.031	0.0	0.0	0.0	1.15	45.5	4.2
S1.001	50.00	5.85	15.191	0.060	0.0	0.0	0.0	1.13	44.8	8.1
S1.002	50.00	6.61	15.031	0.076	0.0	0.0	0.0	1.31	51.9	10.3
S2.000	50.00	5.07	14.552	0.006	0.0	0.0	0.0	0.99	17.6	0.7
S3.000	50.00	5.10	14.600	0.008	0.0	0.0	0.0	1.14	20.2	1.0
S1.003	50.00	6.65	14.438	0.136	0.0	0.0	0.0	2.95	117.2	18.5
S4.000	50.00	5.19	14.250	0.011	0.0	0.0	0.0	0.83	14.7	1.5
S5.000	50.00	5.07	14.327	0.015	0.0	0.0	0.0	1.49	26.4	2.0

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XP Solutions					Network 2020.1						
<u>Network Design Table for STORM WEST</u>											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.004	16.840	0.100	169.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.000	5.343	0.338	15.8	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	4.953	0.029	169.0	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	9.478	0.445	21.3	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit	
S8.000	7.032	0.351	20.0	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.006	4.953	0.029	169.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S9.000	3.252	0.242	13.4	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.007	38.886	0.208	187.0	0.007	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.000	4.013	0.223	18.0	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit	
S11.000	7.319	0.139	52.7	0.017	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.008	6.718	0.063	106.6	0.036	0.00	0.0	0.600	o	300	Pipe/Conduit	
<u>Network Results Table</u>											
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)	
S1.004	50.00	6.93	14.108	0.163	0.0	0.0	0.0	1.00	39.9	22.0	
S6.000	50.00	5.03	14.422	0.014	0.0	0.0	0.0	2.55	45.0	1.9	
S1.005	50.00	7.01	14.008	0.205	0.0	0.0	0.0	1.00	39.9	27.8	
S7.000	50.00	5.07	14.499	0.043	0.0	0.0	0.0	2.19	38.7	5.9	
S8.000	50.00	5.05	14.406	0.013	0.0	0.0	0.0	2.26	39.9	1.8	
S1.006	50.00	7.09	13.979	0.262	0.0	0.0	0.0	1.00	39.9	35.5	
S9.000	50.00	5.02	14.267	0.028	0.0	0.0	0.0	2.76	48.8	3.8	
S1.007	50.00	7.66	13.875	0.296	0.0	0.0	0.0	1.15	81.0	40.1	
S10.000	50.00	5.03	14.040	0.028	0.0	0.0	0.0	2.39	42.2	3.7	
S11.000	50.00	5.09	13.956	0.017	0.0	0.0	0.0	1.39	24.6	2.3	
S1.008	50.00	7.73	13.667	0.377	0.0	0.0	0.0	1.52	107.6	51.1	
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<u>Network Design Table for STORM WEST</u>											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S12.000	3.420	0.189	18.1	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.009	16.231	0.161	100.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S13.000	6.778	0.097	69.9	0.052	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.010	6.166	0.060	102.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.011	7.966	0.025	321.0	0.022	0.00	0.0	0.600	o	375	Pipe/Conduit	
S14.000	4.638	0.179	25.9	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.012	10.959	0.034	321.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.013	13.286	0.041	321.0	0.017	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.000	6.778	0.282	24.0	0.027	5.00	0.0	0.600	o	150	Pipe/Conduit	
S16.000	12.749	0.406	31.4	0.039	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.014	6.852	0.021	321.0	0.027	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.015	4.848	0.015	321.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
<u>Network Results Table</u>											
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)	
S12.000	50.00	5.02	13.943	0.015	0.0	0.0	0.0	2.38	42.0	2.0	
S1.009	50.00	7.90	13.604	0.392	0.0	0.0	0.0	1.57	110.7	53.1	
S13.000	50.00	5.09	13.690	0.052	0.0	0.0	0.0	1.20	21.3	7.0	
S1.010	50.00	7.97	13.443	0.444	0.0	0.0	0.0	1.55	109.6	60.1	
S1.011	50.00	8.10	13.308	0.466	0.0	0.0	0.0	1.01	111.1	63.1	
S14.000	50.00	5.04	13.687	0.019	0.0	0.0	0.0	1.99	35.1	2.6	
S1.012	50.00	8.28	13.283	0.486	0.0	0.0	0.0	1.01	111.1	65.8	
S1.013	50.00	8.50	13.249	0.503	0.0	0.0	0.0	1.01	111.1	68.1	
S15.000	50.00	5.05	13.715	0.027	0.0	0.0	0.0	2.06	36.4	3.7	
S16.000	50.00	5.12	13.839	0.039	0.0	0.0	0.0	1.80	31.9	5.3	
S1.014	50.00	8.62	13.207	0.596	0.0	0.0	0.0	1.01	111.1	80.7	
S1.015	50.00	8.70	13.186	0.596	0.0	0.0	0.0	1.01	111.1	80.7	
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Manhole Schedules for STORM WEST

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)
S1	16.898	1.425	Open Manhole	1200	S1.000	15.473	225				
S2	16.667	1.475	Open Manhole	1200	S1.001	15.191	225	S1.000	15.191	225	
S3	16.456	1.425	Open Manhole	1200	S1.002	15.031	225	S1.001	15.031	225	
S4	15.874	1.322	Open Manhole	600	S2.000	14.552	150				
S5	16.023	1.423	Open Manhole	600	S3.000	14.600	150				
S6	15.863	1.425	Open Manhole	1200	S1.003	14.438	225	S1.002	14.438	225	
								S2.000	14.513	150	
								S3.000	14.513	150	
S7	15.512	1.262	Open Manhole	1200	S4.000	14.250	150				
S8	15.791	1.464	Open Manhole	600	S5.000	14.327	150				
S9	15.812	1.704	Open Manhole	1200	S1.004	14.108	225	S1.003	14.108	225	
								S4.000	14.183	150	
								S5.000	14.183	150	
S10	15.787	1.365	Open Manhole	600	S6.000	14.422	150				
S11	15.639	1.631	Open Manhole	1200	S1.005	14.008	225	S1.004	14.008	225	
								S6.000	14.084	150	1
S12	15.856	1.357	Open Manhole	600	S7.000	14.499	150				
S13	15.773	1.367	Open Manhole	600	S8.000	14.406	150				
S14	15.594	1.615	Open Manhole	1200	S1.006	13.979	225	S1.005	13.979	225	
								S7.000	14.054	150	
								S8.000	14.055	150	1
S15	15.680	1.413	Open Manhole	600	S9.000	14.267	150				
S16	15.549	1.674	Open Manhole	1200	S1.007	13.875	300	S1.006	13.950	225	
								S9.000	14.025	150	
S17	15.390	1.350	Open Manhole	600	S10.000	14.040	150				
S18	15.326	1.370	Open Manhole	600	S11.000	13.956	150				
S19	15.166	1.500	Open Manhole	1200	S1.008	13.667	300	S1.007	13.667	300	
								S10.000	13.817	150	
								S11.000	13.817	150	
S20	15.242	1.299	Open Manhole	600	S12.000	13.943	150				
S21	15.103	1.500	Open Manhole	1200	S1.009	13.604	300	S1.008	13.604	300	
								S12.000	13.754	150	
S22	15.068	1.378	Open Manhole	600	S13.000	13.690	150				
S23	14.943	1.500	Open Manhole	1200	S1.010	13.443	300	S1.009	13.443	300	
								S13.000	13.593	150	
S24	14.882	1.575	Open Manhole	1350	S1.011	13.308	375	S1.010	13.383	300	
S25	14.990	1.303	Open Manhole	600	S14.000	13.687	150				
S26	14.863	1.580	Open Manhole	1350	S1.012	13.283	375	S1.011	13.283	375	

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Manhole Schedules for STORM WEST

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)
S27	14.920	1.671	Open Manhole	1350	S1.013	13.249	375	S14.000	13.508	150	
S28	15.142	1.427	Open Manhole	600	S15.000	13.715	150	S1.012	13.249	375	
S29	15.189	1.350	Open Manhole	1200	S16.000	13.839	150				
S30	15.063	1.855	Open Manhole	1350	S1.014	13.207	375	S1.013	13.207	375	
								S15.000	13.433	150	1
								S16.000	13.433	150	1
S31	15.173	1.987	Open Manhole	1350	S1.015	13.186	375	S1.014	13.186	375	
S	15.099	1.928	Open Manhole	0		OUTFALL		S1.015	13.171	375	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	507453.240	104484.843	507453.240	104484.843	Required	
S2	507417.319	104477.750	507417.319	104477.750	Required	
S3	507399.830	104490.204	507399.830	104490.204	Required	
S4	507339.150	104491.127	507339.150	104491.127	Required	
S5	507345.494	104482.936	507345.494	104482.936	Required	
S6	507340.391	104487.342	507340.391	104487.342	Required	
S7	507331.094	104490.639	507331.094	104490.639	Required	
S8	507329.535	104482.063	507329.535	104482.063	Required	
S9	507336.098	104482.370	507336.098	104482.370	Required	

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<u>Manhole Schedules for STORM WEST</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S10	507342.028	104466.999	507342.028	104466.999	Required	
S11	507336.886	104465.548	507336.886	104465.548	Required	
S12	507343.353	104458.983	507343.353	104458.983	Required	
S13	507330.554	104467.414	507330.554	104467.414	Required	
S14	507334.188	104461.394	507334.188	104461.394	Required	
S15	507330.135	104455.588	507330.135	104455.588	Required	
S16	507329.947	104458.834	507329.947	104458.834	Required	
S17	507291.358	104452.579	507291.358	104452.579	Required	
S18	507293.953	104463.337	507293.953	104463.337	Required	
S19	507291.126	104456.585	507291.126	104456.585	Required	
S20	507282.875	104456.445	507282.875	104456.445	Required	
S21	507284.929	104459.179	507284.929	104459.179	Required	
S22	507274.156	104475.338	507274.156	104475.338	Required	
S23	507271.953	104468.929	507271.953	104468.929	Required	
S24	507265.987	104470.486	507265.987	104470.486	Required	
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Manhole Schedules for STORM WEST <table><thead><tr><th>MH Name</th><th>Manhole Easting (m)</th><th>Manhole Northing (m)</th><th>Intersection Easting (m)</th><th>Intersection Northing (m)</th><th>Manhole Access</th><th>Layout (North)</th></tr></thead><tbody><tr><td>S25</td><td>507260.975</td><td>104464.438</td><td>507260.975</td><td>104464.438</td><td>Required</td><td></td></tr><tr><td>S26</td><td>507258.340</td><td>104468.254</td><td>507258.340</td><td>104468.254</td><td>Required</td><td></td></tr><tr><td>S27</td><td>507249.323</td><td>104462.026</td><td>507249.323</td><td>104462.026</td><td>Required</td><td></td></tr><tr><td>S28</td><td>507246.276</td><td>104453.713</td><td>507246.276</td><td>104453.713</td><td>Required</td><td></td></tr><tr><td>S29</td><td>507232.996</td><td>104463.994</td><td>507232.996</td><td>104463.994</td><td>Required</td><td></td></tr><tr><td>S30</td><td>507239.530</td><td>104453.046</td><td>507239.530</td><td>104453.046</td><td>Required</td><td></td></tr><tr><td>S31</td><td>507235.200</td><td>104447.736</td><td>507235.200</td><td>104447.736</td><td>Required</td><td></td></tr><tr><td>S</td><td>507232.272</td><td>104443.872</td><td></td><td></td><td>No Entry</td><td></td></tr></tbody></table>							MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)	S25	507260.975	104464.438	507260.975	104464.438	Required		S26	507258.340	104468.254	507258.340	104468.254	Required		S27	507249.323	104462.026	507249.323	104462.026	Required		S28	507246.276	104453.713	507246.276	104453.713	Required		S29	507232.996	104463.994	507232.996	104463.994	Required		S30	507239.530	104453.046	507239.530	104453.046	Required		S31	507235.200	104447.736	507235.200	104447.736	Required		S	507232.272	104443.872			No Entry	
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)																																																															
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<u>Online Controls for STORM WEST</u> <u>Pump Manhole: S31, DS/PN: S1.015, Volume (m³): 3.5</u> Invert Level (m) 13.186		
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Storage Structures for STORM WEST

Cellular Storage Manhole: S31, DS/PN: S1.015

Invert Level (m) 13.373 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.22993 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.22993

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	288.0	288.0	1.100	0.0	370.0
1.000	288.0	370.0			

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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM WEST</u>																																																																																																																																																																																																																																				
<u>Simulation Criteria</u>																																																																																																																																																																																																																																				
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000																																																																																																																																																																																																																														
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000																																																																																																																																																																																																																														
Hot Start Level (mm)		0		Inlet Coefficient		0.800																																																																																																																																																																																																																														
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000																																																																																																																																																																																																																														
Foul Sewage per hectare (l/s)		0.000																																																																																																																																																																																																																																		
Number of Input Hydrographs		0		Number of Storage Structures		1																																																																																																																																																																																																																														
Number of Online Controls		1		Number of Time/Area Diagrams		0																																																																																																																																																																																																																														
Number of Offline Controls		0		Number of Real Time Controls		0																																																																																																																																																																																																																														
<u>Synthetic Rainfall Details</u>																																																																																																																																																																																																																																				
Rainfall Model		FSR		Ratio R		0.350																																																																																																																																																																																																																														
Region England and Wales		Cv (Summer)		0.750																																																																																																																																																																																																																																
M5-60 (mm)		19.000		Cv (Winter)		0.840																																																																																																																																																																																																																														
Margin for Flood Risk Warning (mm)				300.0																																																																																																																																																																																																																																
Analysis Timestep		2.5		Second Increment (Extended)																																																																																																																																																																																																																																
DTS Status				ON																																																																																																																																																																																																																																
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Inertia Status				OFF																																																																																																																																																																																																																																
Profile(s)				Summer and Winter																																																																																																																																																																																																																																
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440																																																																																																																																																																																																																																		
Return Period(s) (years)				2																																																																																																																																																																																																																																
Climate Change (%)				0																																																																																																																																																																																																																																
<table><tr><th></th><th>US/MH</th><th></th><th>Return</th><th>Climate</th><th>First (X)</th><th>First (Y)</th><th>First (Z)</th><th>Overflow</th><th>Water</th></tr><tr><th>PN</th><th>Name</th><th>Storm</th><th>Period</th><th>Change</th><th>Surcharge</th><th>Flood</th><th>Overflow</th><th>Act.</th><th>Level</th></tr><tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>(m)</th></tr><tr><td>S1.000</td><td>S1</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.525</td></tr><tr><td>S1.001</td><td>S2</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.263</td></tr><tr><td>S1.002</td><td>S3</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.103</td></tr><tr><td>S2.000</td><td>S4</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.579</td></tr><tr><td>S3.000</td><td>S5</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.626</td></tr><tr><td>S1.003</td><td>S6</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.512</td></tr><tr><td>S4.000</td><td>S7</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.303</td></tr><tr><td>S5.000</td><td>S8</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.360</td></tr><tr><td>S1.004</td><td>S9</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.298</td></tr><tr><td>S6.000</td><td>S10</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.447</td></tr><tr><td>S1.005</td><td>S11</td><td>15 Winter</td><td>2</td><td>+0%</td><td>2/15 Summer</td><td></td><td></td><td></td><td>14.255</td></tr><tr><td>S7.000</td><td>S12</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.545</td></tr><tr><td>S8.000</td><td>S13</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.431</td></tr><tr><td>S1.006</td><td>S14</td><td>15 Winter</td><td>2</td><td>+0%</td><td>2/15 Summer</td><td></td><td></td><td></td><td>14.228</td></tr><tr><td>S9.000</td><td>S15</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.306</td></tr><tr><td>S1.007</td><td>S16</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.031</td></tr><tr><td>S10.000</td><td>S17</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>14.079</td></tr><tr><td>S11.000</td><td>S18</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>13.993</td></tr><tr><td>S1.008</td><td>S19</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>13.869</td></tr></table>										US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level										(m)	S1.000	S1	15 Winter	2	+0%					15.525	S1.001	S2	15 Winter	2	+0%					15.263	S1.002	S3	15 Winter	2	+0%					15.103	S2.000	S4	15 Winter	2	+0%					14.579	S3.000	S5	15 Winter	2	+0%					14.626	S1.003	S6	15 Winter	2	+0%					14.512	S4.000	S7	15 Winter	2	+0%					14.303	S5.000	S8	15 Winter	2	+0%					14.360	S1.004	S9	15 Winter	2	+0%					14.298	S6.000	S10	15 Winter	2	+0%					14.447	S1.005	S11	15 Winter	2	+0%	2/15 Summer				14.255	S7.000	S12	15 Winter	2	+0%					14.545	S8.000	S13	15 Winter	2	+0%					14.431	S1.006	S14	15 Winter	2	+0%	2/15 Summer				14.228	S9.000	S15	15 Winter	2	+0%					14.306	S1.007	S16	15 Winter	2	+0%					14.031	S10.000	S17	15 Winter	2	+0%					14.079	S11.000	S18	15 Winter	2	+0%					13.993	S1.008	S19	15 Winter	2	+0%					13.869
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water																																																																																																																																																																																																																											
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S1.007	S16	15 Winter	2	+0%					14.031																																																																																																																																																																																																																											
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Abley Letchford Partnership Ltd							Page 11		
Search House Charnham Lane Hungerford RG17 0EY				Water Lane, Angmering					
Date 20/10/2020 File NETWORK 2 V5.MDX				Designed by JS Checked by SL					
XP Solutions				Network 2020.1					
<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM WEST</u>									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.173	0.000	0.12			5.0	OK	
S1.001	S2	-0.154	0.000	0.22			8.9	OK	
S1.002	S3	-0.154	0.000	0.22			10.8	OK	
S2.000	S4	-0.123	0.000	0.07			0.9	OK	
S3.000	S5	-0.124	0.000	0.07			1.2	OK	
S1.003	S6	-0.151	0.000	0.23			19.0	OK	
S4.000	S7	-0.097	0.000	0.14			1.8	OK	
S5.000	S8	-0.117	0.000	0.11			2.5	OK	
S1.004	S9	-0.035	0.000	0.63			22.4	OK	
S6.000	S10	-0.125	0.000	0.06			2.3	OK	
S1.005	S11	0.022	0.000	0.96			27.8	SURCHARGED	
S7.000	S12	-0.104	0.000	0.21			7.1	OK	
S8.000	S13	-0.125	0.000	0.06			2.2	OK	
S1.006	S14	0.024	0.000	1.23			35.6	SURCHARGED	
S9.000	S15	-0.111	0.000	0.15			4.6	OK	
S1.007	S16	-0.144	0.000	0.52			39.2	OK	
S10.000	S17	-0.111	0.000	0.15			4.5	OK	
S11.000	S18	-0.113	0.000	0.13			2.8	OK	
S1.008	S19	-0.098	0.000	0.78			49.1	OK	
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Abley Letchford Partnership Ltd								Page 12																																																																																																																																																																						
Search House Charnham Lane Hungerford RG17 0EY				Water Lane, Angmering																																																																																																																																																																										
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<table><tr><th></th><th colspan="2">US/MH</th><th></th><th>Return</th><th>Climate</th><th>First (X)</th><th>First (Y)</th><th>First (Z)</th><th>Overflow</th><th>Water</th></tr><tr><th>PN</th><th>Name</th><th>Storm</th><th>Period</th><th>Change</th><th>Surcharge</th><th>Flood</th><th>Overflow</th><th>Act.</th><th>Level</th><th>(m)</th></tr><tr><td>S12.000</td><td>S20</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.973</td></tr><tr><td>S1.009</td><td>S21</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.762</td></tr><tr><td>S13.000</td><td>S22</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.763</td></tr><tr><td>S1.010</td><td>S23</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.671</td></tr><tr><td>S1.011</td><td>S24</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.594</td></tr><tr><td>S14.000</td><td>S25</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.721</td></tr><tr><td>S1.012</td><td>S26</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.575</td></tr><tr><td>S1.013</td><td>S27</td><td>60 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.553</td></tr><tr><td>S15.000</td><td>S28</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.753</td></tr><tr><td>S16.000</td><td>S29</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.887</td></tr><tr><td>S1.014</td><td>S30</td><td>60 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.548</td></tr><tr><td>S1.015</td><td>S31</td><td>60 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td></td><td>13.546</td></tr></table>											US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level	(m)	S12.000	S20	15 Winter	2	+0%						13.973	S1.009	S21	15 Winter	2	+0%						13.762	S13.000	S22	15 Winter	2	+0%						13.763	S1.010	S23	15 Winter	2	+0%						13.671	S1.011	S24	15 Winter	2	+0%						13.594	S14.000	S25	15 Winter	2	+0%						13.721	S1.012	S26	15 Winter	2	+0%						13.575	S1.013	S27	60 Winter	2	+0%						13.553	S15.000	S28	15 Winter	2	+0%						13.753	S16.000	S29	15 Winter	2	+0%						13.887	S1.014	S30	60 Winter	2	+0%						13.548	S1.015	S31	60 Winter	2	+0%						13.546											
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<table><tr><th></th><th colspan="2">Surcharged</th><th colspan="2">Flooded</th><th></th><th colspan="2">Half Drain</th><th>Pipe</th><th></th><th>Level</th></tr><tr><th>PN</th><th>US/MH</th><th>Depth</th><th>Volume</th><th>Flow /</th><th>Overflow</th><th>Time</th><th>Flow</th><th></th><th>Status</th><th>Exceeded</th></tr><tr><th></th><th>Name</th><th>(m)</th><th>(m³)</th><th>Cap.</th><th>(l/s)</th><th>(mins)</th><th>(l/s)</th><th></th><th></th><th></th></tr><tr><td>S12.000</td><td>S20</td><td>-0.120</td><td>0.000</td><td>0.09</td><td></td><td></td><td>2.4</td><td></td><td>OK</td><td></td></tr><tr><td>S1.009</td><td>S21</td><td>-0.141</td><td>0.000</td><td>0.54</td><td></td><td></td><td>51.0</td><td></td><td>OK</td><td></td></tr><tr><td>S13.000</td><td>S22</td><td>-0.077</td><td>0.000</td><td>0.47</td><td></td><td></td><td>8.5</td><td></td><td>OK</td><td></td></tr><tr><td>S1.010</td><td>S23</td><td>-0.071</td><td>0.000</td><td>0.93</td><td></td><td></td><td>57.2</td><td></td><td>OK</td><td></td></tr><tr><td>S1.011</td><td>S24</td><td>-0.088</td><td>0.000</td><td>0.79</td><td></td><td></td><td>59.5</td><td></td><td>OK</td><td></td></tr><tr><td>S14.000</td><td>S25</td><td>-0.116</td><td>0.000</td><td>0.12</td><td></td><td></td><td>3.2</td><td></td><td>OK</td><td></td></tr><tr><td>S1.012</td><td>S26</td><td>-0.083</td><td>0.000</td><td>0.76</td><td></td><td></td><td>61.2</td><td></td><td>OK</td><td></td></tr><tr><td>S1.013</td><td>S27</td><td>-0.071</td><td>0.000</td><td>0.49</td><td></td><td></td><td>40.9</td><td></td><td>OK</td><td></td></tr><tr><td>S15.000</td><td>S28</td><td>-0.112</td><td>0.000</td><td>0.14</td><td></td><td></td><td>4.4</td><td></td><td>OK</td><td></td></tr><tr><td>S16.000</td><td>S29</td><td>-0.102</td><td>0.000</td><td>0.22</td><td></td><td></td><td>6.3</td><td></td><td>OK</td><td></td></tr><tr><td>S1.014</td><td>S30</td><td>-0.034</td><td>0.000</td><td>0.66</td><td></td><td></td><td>47.7</td><td></td><td>OK</td><td></td></tr><tr><td>S1.015</td><td>S31</td><td>-0.015</td><td>0.000</td><td>0.00</td><td></td><td></td><td>53</td><td>0.0</td><td>OK</td><td></td></tr></table>											Surcharged		Flooded			Half Drain		Pipe		Level	PN	US/MH	Depth	Volume	Flow /	Overflow	Time	Flow		Status	Exceeded		Name	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)				S12.000	S20	-0.120	0.000	0.09			2.4		OK		S1.009	S21	-0.141	0.000	0.54			51.0		OK		S13.000	S22	-0.077	0.000	0.47			8.5		OK		S1.010	S23	-0.071	0.000	0.93			57.2		OK		S1.011	S24	-0.088	0.000	0.79			59.5		OK		S14.000	S25	-0.116	0.000	0.12			3.2		OK		S1.012	S26	-0.083	0.000	0.76			61.2		OK		S1.013	S27	-0.071	0.000	0.49			40.9		OK		S15.000	S28	-0.112	0.000	0.14			4.4		OK		S16.000	S29	-0.102	0.000	0.22			6.3		OK		S1.014	S30	-0.034	0.000	0.66			47.7		OK		S1.015	S31	-0.015	0.000	0.00			53	0.0	OK	
	Surcharged		Flooded			Half Drain		Pipe		Level																																																																																																																																																																				
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Date 20/10/2020 File NETWORK 2 V5.MDX	Designed by JS Checked by SL	
XP Solutions Network 2020.1		

Summary of Critical Results by Maximum Level (Rank 1) for STORM WEST

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	30
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%					15.546
S1.001	S2	15 Winter	30	+0%					15.299
S1.002	S3	15 Winter	30	+0%					15.140
S2.000	S4	15 Winter	30	+0%	30/15 Summer				14.782
S3.000	S5	15 Winter	30	+0%	30/15 Winter				14.785
S1.003	S6	15 Winter	30	+0%	30/15 Summer				14.780
S4.000	S7	15 Winter	30	+0%	30/15 Summer				14.740
S5.000	S8	15 Winter	30	+0%	30/15 Summer				14.741
S1.004	S9	15 Winter	30	+0%	30/15 Summer				14.732
S6.000	S10	15 Winter	30	+0%	30/15 Winter				14.636
S1.005	S11	15 Winter	30	+0%	30/15 Summer				14.630
S7.000	S12	15 Winter	30	+0%					14.570
S8.000	S13	15 Winter	30	+0%					14.539
S1.006	S14	15 Winter	30	+0%	30/15 Summer				14.531
S9.000	S15	15 Winter	30	+0%					14.377
S1.007	S16	15 Winter	30	+0%	30/15 Summer				14.368
S10.000	S17	15 Winter	30	+0%	30/15 Winter				14.226
S11.000	S18	15 Winter	30	+0%	30/15 Summer				14.227
S1.008	S19	15 Winter	30	+0%	30/15 Summer				14.216

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XP Solutions				Network 2020.1					
<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM WEST</u>									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.152	0.000	0.22			9.5	OK	
S1.001	S2	-0.118	0.000	0.45			18.3	OK	
S1.002	S3	-0.116	0.000	0.45			22.8	OK	
S2.000	S4	0.080	0.000	0.13			1.6	SURCHARGED	
S3.000	S5	0.035	0.000	0.13			2.2	SURCHARGED	
S1.003	S6	0.117	0.000	0.41			33.0	SURCHARGED	
S4.000	S7	0.340	0.000	0.36			4.7	SURCHARGED	
S5.000	S8	0.264	0.000	0.18			3.9	SURCHARGED	
S1.004	S9	0.399	0.000	1.08			38.3	SURCHARGED	
S6.000	S10	0.064	0.000	0.11			4.0	SURCHARGED	
S1.005	S11	0.396	0.000	1.57			45.6	SURCHARGED	
S7.000	S12	-0.079	0.000	0.39			13.4	OK	
S8.000	S13	-0.017	0.000	0.12			4.2	OK	
S1.006	S14	0.327	0.000	2.08			60.2	SURCHARGED	
S9.000	S15	-0.040	0.000	0.28			8.7	OK	
S1.007	S16	0.193	0.000	0.89			66.6	SURCHARGED	
S10.000	S17	0.036	0.000	0.29			8.5	SURCHARGED	
S11.000	S18	0.121	0.000	0.23			4.9	SURCHARGED	
S1.008	S19	0.249	0.000	1.31			82.5	SURCHARGED	
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	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water																																																																																																																																																						
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PN	Name	Depth	Volume	Flow /	Overflow	Time	Flow	Status	Exceeded																																																																																																																																																						
		(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)																																																																																																																																																								
S12.000	S20	0.020	0.000	0.17			4.5	SURCHARGED																																																																																																																																																							
S1.009	S21	0.205	0.000	0.91			84.9	SURCHARGED																																																																																																																																																							
S13.000	S22	0.179	0.000	0.79			14.4	SURCHARGED																																																																																																																																																							
S1.010	S23	0.233	0.000	1.58			96.7	SURCHARGED																																																																																																																																																							
S1.011	S24	0.142	0.000	1.34			100.5	SURCHARGED																																																																																																																																																							
S14.000	S25	-0.038	0.000	0.08			2.1	OK																																																																																																																																																							
S1.012	S26	0.140	0.000	0.60			48.8	SURCHARGED																																																																																																																																																							
S1.013	S27	0.170	0.000	0.59			49.8	SURCHARGED																																																																																																																																																							
S15.000	S28	-0.074	0.000	0.09			2.9	OK																																																																																																																																																							
S16.000	S29	-0.082	0.000	0.41			12.0	OK																																																																																																																																																							
S1.014	S30	0.207	0.000	0.82			58.7	SURCHARGED																																																																																																																																																							
S1.015	S31	0.226	0.000	0.00		111	0.0	SURCHARGED																																																																																																																																																							
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Summary of Critical Results by Maximum Level (Rank 1) for STORM WEST

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.350
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 40

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	100	+40%	100/15 Summer			
S1.001	S2	15 Winter	100	+40%	100/15 Summer			
S1.002	S3	15 Winter	100	+40%	100/15 Summer			
S2.000	S4	15 Winter	100	+40%	100/15 Summer			
S3.000	S5	15 Winter	100	+40%	100/15 Summer			
S1.003	S6	15 Winter	100	+40%	100/15 Summer			
S4.000	S7	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S5.000	S8	15 Winter	100	+40%	100/15 Summer			
S1.004	S9	15 Winter	100	+40%	100/15 Summer			
S6.000	S10	15 Winter	100	+40%	100/15 Summer			
S1.005	S11	15 Winter	100	+40%	100/15 Summer			
S7.000	S12	15 Winter	100	+40%	100/15 Summer			
S8.000	S13	15 Winter	100	+40%	100/15 Summer			
S1.006	S14	15 Winter	100	+40%	100/15 Summer			
S9.000	S15	15 Winter	100	+40%	100/15 Summer			
S1.007	S16	15 Winter	100	+40%	100/15 Summer			

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Summary of Critical Results by Maximum Level (Rank 1) for STORM WEST

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)				
S1.000	S1	15.958	0.260	0.000	0.39			16.9		SURCHARGED
S1.001	S2	15.926	0.510	0.000	0.70			28.4		SURCHARGED
S1.002	S3	15.884	0.627	0.000	0.59			29.4		SURCHARGED
S2.000	S4	15.757	1.055	0.000	0.18			2.2		FLOOD RISK
S3.000	S5	15.761	1.011	0.000	0.18			3.0		FLOOD RISK
S1.003	S6	15.753	1.090	0.000	0.51			41.2		FLOOD RISK
S4.000	S7	15.515	1.115	3.791	1.99			25.9		FLOOD
S5.000	S8	15.679	1.202	0.000	0.29			6.5		FLOOD RISK
S1.004	S9	15.663	1.330	0.000	1.57			55.6		FLOOD RISK
S6.000	S10	15.612	1.040	0.000	0.16			5.9		FLOOD RISK
S1.005	S11	15.600	1.366	0.000	2.10			60.9		FLOOD RISK
S7.000	S12	15.633	0.984	0.000	0.54			18.5		FLOOD RISK
S8.000	S13	15.517	0.961	0.000	0.16			5.4		FLOOD RISK
S1.006	S14	15.502	1.298	0.000	2.39			69.3		FLOOD RISK
S9.000	S15	15.306	0.889	0.000	0.39			12.1		SURCHARGED
S1.007	S16	15.270	1.096	0.000	1.08			81.3		FLOOD RISK

PN	US/MH Level		Exceeded
	Name		
S1.000	S1		
S1.001	S2		
S1.002	S3		
S2.000	S4		
S3.000	S5		
S1.003	S6		
S4.000	S7		4
S5.000	S8		
S1.004	S9		
S6.000	S10		
S1.005	S11		
S7.000	S12		
S8.000	S13		
S1.006	S14		
S9.000	S15		
S1.007	S16		

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<u>STORM SEWER DESIGN by the Modified Rational Method</u> <u>Design Criteria for STORM NORTH</u> Pipe Sizes STANDARD Manhole Sizes STANDARD FSR Rainfall Model - England and Wales <table><tr><td>Return Period (years)</td><td>5</td><td>PIMP (%)</td><td>100</td></tr><tr><td>M5-60 (mm)</td><td>19.000</td><td>Add Flow / Climate Change (%)</td><td>0</td></tr><tr><td>Ratio R</td><td>0.350</td><td>Minimum Backdrop Height (m)</td><td>9.999</td></tr><tr><td>Maximum Rainfall (mm/hr)</td><td>50</td><td>Maximum Backdrop Height (m)</td><td>0.000</td></tr><tr><td>Maximum Time of Concentration (mins)</td><td>30</td><td>Min Design Depth for Optimisation (m)</td><td>1.200</td></tr><tr><td>Foul Sewage (l/s/ha)</td><td>0.000</td><td>Min Vel for Auto Design only (m/s)</td><td>1.00</td></tr><tr><td>Volumetric Runoff Coeff.</td><td>0.750</td><td>Min Slope for Optimisation (1:X)</td><td>500</td></tr></table> Designed with Level Soffits												Return Period (years)	5	PIMP (%)	100	M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0	Ratio R	0.350	Minimum Backdrop Height (m)	9.999	Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000	Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200	Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00	Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500																																																																																																																																					
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(mins)</th><th>Base Flow (l/s)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th><th>Section Type</th><th>Auto Design</th></tr><tr><td>S5.000</td><td>5.191</td><td>0.052</td><td>99.8</td><td>0.028</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S6.000</td><td>7.598</td><td>0.076</td><td>100.0</td><td>0.008</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S7.000</td><td>11.968</td><td>0.120</td><td>99.7</td><td>0.011</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S3.002</td><td>16.608</td><td>0.281</td><td>59.1</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>225</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S8.000</td><td>7.308</td><td>0.067</td><td>109.1</td><td>0.011</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S9.000</td><td>4.100</td><td>0.177</td><td>23.2</td><td>0.018</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S3.003</td><td>26.134</td><td>0.440</td><td>59.4</td><td>0.048</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>225</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S10.000</td><td>5.687</td><td>0.394</td><td>14.4</td><td>0.013</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S3.004</td><td>9.924</td><td>0.091</td><td>109.1</td><td>0.015</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>225</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S11.000</td><td>4.519</td><td>0.045</td><td>100.4</td><td>0.023</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S1.002</td><td>9.347</td><td>0.381</td><td>24.5</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>300</td><td>Pipe/Conduit</td><td></td></tr></table> Network Results Table <table><tr><th>PN</th><th>Rain (mm/hr)</th><th>T.C. (mins)</th><th>US/IL (m)</th><th>Σ I.Area (ha)</th><th>Σ Base Flow (l/s)</th><th>Foul (l/s)</th><th>Add Flow (l/s)</th><th>Vel (m/s)</th><th>Cap (l/s)</th><th>Flow (l/s)</th></tr><tr><td>S5.000</td><td>50.00</td><td>5.09</td><td>16.255</td><td>0.028</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.01</td><td>17.8</td><td>3.7</td></tr><tr><td>S6.000</td><td>50.00</td><td>5.13</td><td>16.279</td><td>0.008</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.00</td><td>17.8</td><td>1.1</td></tr><tr><td>S7.000</td><td>50.00</td><td>5.20</td><td>16.323</td><td>0.011</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.01</td><td>17.8</td><td>1.4</td></tr><tr><td>S3.002</td><td>50.00</td><td>5.54</td><td>16.128</td><td>0.142</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.70</td><td>67.8</td><td>19.2</td></tr><tr><td>S8.000</td><td>50.00</td><td>5.13</td><td>15.989</td><td>0.011</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.96</td><td>17.0</td><td>1.4</td></tr><tr><td>S9.000</td><td>50.00</td><td>5.03</td><td>16.099</td><td>0.018</td><td>0.0</td><td>0.0</td><td>0.0</td><td>2.10</td><td>37.1</td><td>2.4</td></tr><tr><td>S3.003</td><td>50.00</td><td>5.80</td><td>15.847</td><td>0.218</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.70</td><td>67.6</td><td>29.6</td></tr><tr><td>S10.000</td><td>50.00</td><td>5.04</td><td>15.876</td><td>0.013</td><td>0.0</td><td>0.0</td><td>0.0</td><td>2.67</td><td>47.1</td><td>1.7</td></tr><tr><td>S3.004</td><td>50.00</td><td>5.93</td><td>15.407</td><td>0.246</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.25</td><td>49.8</td><td>33.3</td></tr><tr><td>S11.000</td><td>50.00</td><td>5.08</td><td>15.436</td><td>0.023</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.00</td><td>17.7</td><td>3.1</td></tr><tr><td>S1.002</td><td>50.00</td><td>5.98</td><td>15.241</td><td>0.378</td><td>0.0</td><td>0.0</td><td>0.0</td><td>3.19</td><td>225.3</td><td>51.2</td></tr></table>												PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design	S5.000	5.191	0.052	99.8	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit		S6.000	7.598	0.076	100.0	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit		S7.000	11.968	0.120	99.7	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit		S3.002	16.608	0.281	59.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		S8.000	7.308	0.067	109.1	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit		S9.000	4.100	0.177	23.2	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit		S3.003	26.134	0.440	59.4	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit		S10.000	5.687	0.394	14.4	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit		S3.004	9.924	0.091	109.1	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit		S11.000	4.519	0.045	100.4	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit		S1.002	9.347	0.381	24.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		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)	S5.000	50.00	5.09	16.255	0.028	0.0	0.0	0.0	1.01	17.8	3.7	S6.000	50.00	5.13	16.279	0.008	0.0	0.0	0.0	1.00	17.8	1.1	S7.000	50.00	5.20	16.323	0.011	0.0	0.0	0.0	1.01	17.8	1.4	S3.002	50.00	5.54	16.128	0.142	0.0	0.0	0.0	1.70	67.8	19.2	S8.000	50.00	5.13	15.989	0.011	0.0	0.0	0.0	0.96	17.0	1.4	S9.000	50.00	5.03	16.099	0.018	0.0	0.0	0.0	2.10	37.1	2.4	S3.003	50.00	5.80	15.847	0.218	0.0	0.0	0.0	1.70	67.6	29.6	S10.000	50.00	5.04	15.876	0.013	0.0	0.0	0.0	2.67	47.1	1.7	S3.004	50.00	5.93	15.407	0.246	0.0	0.0	0.0	1.25	49.8	33.3	S11.000	50.00	5.08	15.436	0.023	0.0	0.0	0.0	1.00	17.7	3.1	S1.002	50.00	5.98	15.241	0.378	0.0	0.0	0.0	3.19	225.3	51.2
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design																																																																																																																																																																																																																																																																																				
S5.000	5.191	0.052	99.8	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S6.000	7.598	0.076	100.0	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S7.000	11.968	0.120	99.7	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S3.002	16.608	0.281	59.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S8.000	7.308	0.067	109.1	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S9.000	4.100	0.177	23.2	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S3.003	26.134	0.440	59.4	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S10.000	5.687	0.394	14.4	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S3.004	9.924	0.091	109.1	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S11.000	4.519	0.045	100.4	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S1.002	9.347	0.381	24.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit																																																																																																																																																																																																																																																																																					
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)																																																																																																																																																																																																																																																																																					
S5.000	50.00	5.09	16.255	0.028	0.0	0.0	0.0	1.01	17.8	3.7																																																																																																																																																																																																																																																																																					
S6.000	50.00	5.13	16.279	0.008	0.0	0.0	0.0	1.00	17.8	1.1																																																																																																																																																																																																																																																																																					
S7.000	50.00	5.20	16.323	0.011	0.0	0.0	0.0	1.01	17.8	1.4																																																																																																																																																																																																																																																																																					
S3.002	50.00	5.54	16.128	0.142	0.0	0.0	0.0	1.70	67.8	19.2																																																																																																																																																																																																																																																																																					
S8.000	50.00	5.13	15.989	0.011	0.0	0.0	0.0	0.96	17.0	1.4																																																																																																																																																																																																																																																																																					
S9.000	50.00	5.03	16.099	0.018	0.0	0.0	0.0	2.10	37.1	2.4																																																																																																																																																																																																																																																																																					
S3.003	50.00	5.80	15.847	0.218	0.0	0.0	0.0	1.70	67.6	29.6																																																																																																																																																																																																																																																																																					
S10.000	50.00	5.04	15.876	0.013	0.0	0.0	0.0	2.67	47.1	1.7																																																																																																																																																																																																																																																																																					
S3.004	50.00	5.93	15.407	0.246	0.0	0.0	0.0	1.25	49.8	33.3																																																																																																																																																																																																																																																																																					
S11.000	50.00	5.08	15.436	0.023	0.0	0.0	0.0	1.00	17.7	3.1																																																																																																																																																																																																																																																																																					
S1.002	50.00	5.98	15.241	0.378	0.0	0.0	0.0	3.19	225.3	51.2																																																																																																																																																																																																																																																																																					
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Search House Charnham Lane Hungerford RG17 0EY					Water Lane, Angmering						
Date 20/10/2020 File NETWORK 2 V5.MDX					Designed by JS Checked by SL						
XP Solutions					Network 2020.1						
Network Design Table for STORM NORTH											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S12.000	10.927	0.310	35.2	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
S13.000	4.452	0.044	101.2	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	24.863	0.842	29.5	0.020	0.00	0.0	0.600	o	300	Pipe/Conduit	
S14.000	6.629	0.093	71.3	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
S15.000	10.788	0.211	51.1	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	17.561	0.716	24.5	0.019	0.00	0.0	0.600	o	300	Pipe/Conduit	
S16.000	11.469	0.270	42.5	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
S17.000	5.749	0.074	77.7	0.022	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	13.001	0.494	26.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S18.000	12.154	0.344	35.3	0.022	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.006	17.689	0.271	65.3	0.032	0.00	0.0	0.600	o	300	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S12.000	50.00	5.11	15.320	0.018	0.0	0.0	0.0	1.70	30.1	2.4	
S13.000	50.00	5.07	15.054	0.028	0.0	0.0	0.0	1.00	17.7	3.8	
S1.003	50.00	6.12	14.860	0.444	0.0	0.0	0.0	2.90	205.3	60.1	
S14.000	50.00	5.09	14.261	0.010	0.0	0.0	0.0	1.19	21.1	1.3	
S15.000	50.00	5.13	14.379	0.018	0.0	0.0	0.0	1.41	24.9	2.4	
S1.004	50.00	6.21	14.018	0.490	0.0	0.0	0.0	3.19	225.3	66.4	
S16.000	50.00	5.12	13.722	0.010	0.0	0.0	0.0	1.55	27.4	1.3	
S17.000	50.00	5.08	13.526	0.022	0.0	0.0	0.0	1.14	20.2	2.9	
S1.005	50.00	6.28	13.302	0.522	0.0	0.0	0.0	3.08	217.5	70.7	
S18.000	50.00	5.12	13.302	0.022	0.0	0.0	0.0	1.70	30.0	3.0	
S1.006	50.00	6.44	12.808	0.576	0.0	0.0	0.0	1.95	137.8	78.0	
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Network Design Table for STORM NORTH											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.007	13.409	0.532	25.2	0.052	0.00	0.0	0.600	o	300	Pipe/Conduit	
S19.000	10.281	0.069	150.0	0.070	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.008	15.946	0.060	265.8	0.024	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.009	12.318	0.070	176.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S20.000	9.800	0.097	100.9	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.001	30.594	1.741	17.6	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
S21.000	10.680	1.068	10.0	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.002	7.317	0.043	169.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S20.003	8.415	0.842	10.0	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
S22.000	5.810	0.581	10.0	0.007	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.004	7.317	0.732	10.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S23.000	3.670	0.036	100.9	0.001	5.00	0.0	0.600	o	150	Pipe/Conduit	
S23.001	12.356	0.122	100.9	0.043	0.00	0.0	0.600	o	150	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S1.007	50.00	6.51	12.537	0.628	0.0	0.0	0.0	3.14	222.3	85.1	
S19.000	50.00	5.21	12.224	0.070	0.0	0.0	0.0	0.82	14.5	9.4	
S1.008	50.00	6.75	11.930	0.722	0.0	0.0	0.0	1.11	122.2	97.8	
S1.009	50.00	6.90	11.870	0.722	0.0	0.0	0.0	1.36	150.5	97.8	
S20.000	50.00	5.16	17.178	0.019	0.0	0.0	0.0	1.00	17.7	2.5	
S20.001	50.00	5.33	17.006	0.049	0.0	0.0	0.0	3.14	124.7	6.6	
S21.000	50.00	5.06	16.408	0.014	0.0	0.0	0.0	3.21	56.6	1.9	
S20.002	50.00	5.45	15.265	0.063	0.0	0.0	0.0	1.00	39.9	8.5	
S20.003	50.00	5.48	15.222	0.081	0.0	0.0	0.0	4.16	165.5	11.0	
S22.000	50.00	5.03	14.962	0.007	0.0	0.0	0.0	3.20	56.6	0.9	
S20.004	50.00	5.51	14.306	0.088	0.0	0.0	0.0	4.16	165.5	12.0	
S23.000	50.00	5.06	14.116	0.001	0.0	0.0	0.0	1.00	17.7	0.2	
S23.001	50.00	5.27	14.080	0.045	0.0	0.0	0.0	1.00	17.7	6.1	
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Date 20/10/2020 File NETWORK 2 V5.MDX					Designed by JS Checked by SL						
XP Solutions					Network 2020.1						
Network Design Table for STORM NORTH											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S24.000	9.017	0.089	101.3	0.037	5.00	0.0	0.600	o	150	Pipe/Conduit	
S25.000	4.683	0.378	12.4	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
S24.001	5.342	0.510	10.5	0.032	0.00	0.0	0.600	o	225	Pipe/Conduit	
S26.000	6.196	0.591	10.5	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit	
S23.002	44.923	0.268	167.6	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
S27.000	6.317	0.632	10.0	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit	
S28.000	8.498	0.850	10.0	0.022	5.00	0.0	0.600	o	150	Pipe/Conduit	
S23.003	16.249	0.097	167.9	0.026	0.00	0.0	0.600	o	225	Pipe/Conduit	
S20.005	10.284	0.043	241.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S29.000	4.372	0.437	10.0	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
S30.000	6.444	0.644	10.0	0.048	5.00	0.0	0.600	o	150	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S24.000	50.00	5.15	14.556	0.037	0.0	0.0	0.0	1.00	17.6	5.0	
S25.000	50.00	5.03	14.845	0.009	0.0	0.0	0.0	2.88	50.9	1.2	
S24.001	50.00	5.17	14.392	0.078	0.0	0.0	0.0	4.07	161.7	10.5	
S26.000	50.00	5.03	14.548	0.043	0.0	0.0	0.0	3.13	55.3	5.8	
S23.002	50.00	6.01	13.882	0.219	0.0	0.0	0.0	1.01	40.0	29.6	
S27.000	50.00	5.03	14.322	0.032	0.0	0.0	0.0	3.21	56.7	4.3	
S28.000	50.00	5.04	14.540	0.022	0.0	0.0	0.0	3.20	56.6	2.9	
S23.003	50.00	6.28	13.615	0.298	0.0	0.0	0.0	1.01	40.0«	40.3	
S20.005	50.00	6.45	13.443	0.386	0.0	0.0	0.0	1.01	71.1	52.3	
S29.000	50.00	5.02	13.987	0.010	0.0	0.0	0.0	3.21	56.6	1.3	
S30.000	50.00	5.03	14.194	0.048	0.0	0.0	0.0	3.20	56.6	6.5	
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<u>Network Design Table for STORM NORTH</u> <table><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>I.Area (ha)</th><th>T.E. (mins)</th><th>Base Flow (l/s)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th><th>Section Type</th><th>Auto Design</th></tr><tr><td>S20.006</td><td>24.854</td><td>0.103</td><td>241.9</td><td>0.021</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>300</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S31.000</td><td>6.198</td><td>0.064</td><td>96.8</td><td>0.020</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S32.000</td><td>5.947</td><td>0.087</td><td>68.4</td><td>0.009</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S31.001</td><td>15.937</td><td>0.499</td><td>31.9</td><td>0.033</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>225</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S33.000</td><td>5.992</td><td>0.215</td><td>27.9</td><td>0.014</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S34.000</td><td>11.090</td><td>0.058</td><td>191.3</td><td>0.014</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S31.002</td><td>21.388</td><td>1.434</td><td>14.9</td><td>0.030</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>225</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S35.000</td><td>4.309</td><td>0.431</td><td>10.0</td><td>0.006</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S36.000</td><td>7.649</td><td>0.765</td><td>10.0</td><td>0.006</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S31.003</td><td>6.374</td><td>0.637</td><td>10.0</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>225</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S20.007</td><td>14.355</td><td>0.045</td><td>321.4</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>375</td><td>Pipe/Conduit</td><td></td></tr></table> <u>Network Results Table</u> <table><tr><th>PN</th><th>Rain (mm/hr)</th><th>T.C. (mins)</th><th>US/IL (m)</th><th>Σ I.Area (ha)</th><th>Σ Base Flow (l/s)</th><th>Foul (l/s)</th><th>Add Flow (l/s)</th><th>Vel (m/s)</th><th>Cap (l/s)</th><th>Flow (l/s)</th></tr><tr><td>S20.006</td><td>50.00</td><td>6.86</td><td>13.400</td><td>0.465</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.01</td><td>71.1</td><td>63.0</td></tr><tr><td>S31.000</td><td>50.00</td><td>5.10</td><td>16.082</td><td>0.020</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.02</td><td>18.0</td><td>2.6</td></tr><tr><td>S32.000</td><td>50.00</td><td>5.08</td><td>16.105</td><td>0.009</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.22</td><td>21.5</td><td>1.2</td></tr><tr><td>S31.001</td><td>50.00</td><td>5.22</td><td>15.943</td><td>0.062</td><td>0.0</td><td>0.0</td><td>0.0</td><td>2.32</td><td>92.4</td><td>8.4</td></tr><tr><td>S33.000</td><td>50.00</td><td>5.05</td><td>15.734</td><td>0.014</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.91</td><td>33.8</td><td>1.8</td></tr><tr><td>S34.000</td><td>50.00</td><td>5.26</td><td>15.577</td><td>0.014</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.72</td><td>12.8</td><td>1.9</td></tr><tr><td>S31.002</td><td>50.00</td><td>5.36</td><td>15.444</td><td>0.119</td><td>0.0</td><td>0.0</td><td>0.0</td><td>3.41</td><td>135.4</td><td>16.1</td></tr><tr><td>S35.000</td><td>50.00</td><td>5.02</td><td>14.516</td><td>0.006</td><td>0.0</td><td>0.0</td><td>0.0</td><td>3.21</td><td>56.6</td><td>0.7</td></tr><tr><td>S36.000</td><td>50.00</td><td>5.04</td><td>14.850</td><td>0.006</td><td>0.0</td><td>0.0</td><td>0.0</td><td>3.21</td><td>56.6</td><td>0.7</td></tr><tr><td>S31.003</td><td>50.00</td><td>5.39</td><td>14.010</td><td>0.130</td><td>0.0</td><td>0.0</td><td>0.0</td><td>4.16</td><td>165.5</td><td>17.6</td></tr><tr><td>S20.007</td><td>50.00</td><td>7.10</td><td>13.223</td><td>0.596</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.01</td><td>111.0</td><td>80.7</td></tr></table>												PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design	S20.006	24.854	0.103	241.9	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit		S31.000	6.198	0.064	96.8	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit		S32.000	5.947	0.087	68.4	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit		S31.001	15.937	0.499	31.9	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit		S33.000	5.992	0.215	27.9	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit		S34.000	11.090	0.058	191.3	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit		S31.002	21.388	1.434	14.9	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit		S35.000	4.309	0.431	10.0	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit		S36.000	7.649	0.765	10.0	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit		S31.003	6.374	0.637	10.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		S20.007	14.355	0.045	321.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		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)	S20.006	50.00	6.86	13.400	0.465	0.0	0.0	0.0	1.01	71.1	63.0	S31.000	50.00	5.10	16.082	0.020	0.0	0.0	0.0	1.02	18.0	2.6	S32.000	50.00	5.08	16.105	0.009	0.0	0.0	0.0	1.22	21.5	1.2	S31.001	50.00	5.22	15.943	0.062	0.0	0.0	0.0	2.32	92.4	8.4	S33.000	50.00	5.05	15.734	0.014	0.0	0.0	0.0	1.91	33.8	1.8	S34.000	50.00	5.26	15.577	0.014	0.0	0.0	0.0	0.72	12.8	1.9	S31.002	50.00	5.36	15.444	0.119	0.0	0.0	0.0	3.41	135.4	16.1	S35.000	50.00	5.02	14.516	0.006	0.0	0.0	0.0	3.21	56.6	0.7	S36.000	50.00	5.04	14.850	0.006	0.0	0.0	0.0	3.21	56.6	0.7	S31.003	50.00	5.39	14.010	0.130	0.0	0.0	0.0	4.16	165.5	17.6	S20.007	50.00	7.10	13.223	0.596	0.0	0.0	0.0	1.01	111.0	80.7
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design																																																																																																																																																																																																																																																																																				
S20.006	24.854	0.103	241.9	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S31.000	6.198	0.064	96.8	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S32.000	5.947	0.087	68.4	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S31.001	15.937	0.499	31.9	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S33.000	5.992	0.215	27.9	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S34.000	11.090	0.058	191.3	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S31.002	21.388	1.434	14.9	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S35.000	4.309	0.431	10.0	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S36.000	7.649	0.765	10.0	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S31.003	6.374	0.637	10.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit																																																																																																																																																																																																																																																																																					
S20.007	14.355	0.045	321.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit																																																																																																																																																																																																																																																																																					
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)																																																																																																																																																																																																																																																																																					
S20.006	50.00	6.86	13.400	0.465	0.0	0.0	0.0	1.01	71.1	63.0																																																																																																																																																																																																																																																																																					
S31.000	50.00	5.10	16.082	0.020	0.0	0.0	0.0	1.02	18.0	2.6																																																																																																																																																																																																																																																																																					
S32.000	50.00	5.08	16.105	0.009	0.0	0.0	0.0	1.22	21.5	1.2																																																																																																																																																																																																																																																																																					
S31.001	50.00	5.22	15.943	0.062	0.0	0.0	0.0	2.32	92.4	8.4																																																																																																																																																																																																																																																																																					
S33.000	50.00	5.05	15.734	0.014	0.0	0.0	0.0	1.91	33.8	1.8																																																																																																																																																																																																																																																																																					
S34.000	50.00	5.26	15.577	0.014	0.0	0.0	0.0	0.72	12.8	1.9																																																																																																																																																																																																																																																																																					
S31.002	50.00	5.36	15.444	0.119	0.0	0.0	0.0	3.41	135.4	16.1																																																																																																																																																																																																																																																																																					
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S36.000	50.00	5.04	14.850	0.006	0.0	0.0	0.0	3.21	56.6	0.7																																																																																																																																																																																																																																																																																					
S31.003	50.00	5.39	14.010	0.130	0.0	0.0	0.0	4.16	165.5	17.6																																																																																																																																																																																																																																																																																					
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PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S37.000	6.268	0.627	10.0	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
S38.000	5.191	0.519	10.0	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.008	13.102	0.041	321.4	0.040	0.00	0.0	0.600	o	375	Pipe/Conduit	
S20.009	14.885	0.046	321.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S39.000	6.775	0.121	56.0	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.010	11.007	0.369	29.8	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S40.000	7.087	0.245	28.9	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.011	20.134	0.357	56.4	0.030	0.00	0.0	0.600	o	375	Pipe/Conduit	
S20.012	23.361	0.565	41.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S41.000	11.710	0.319	36.7	0.057	5.00	0.0	0.600	o	225	Pipe/Conduit	
S42.000	4.870	0.290	16.8	0.041	5.00	0.0	0.600	o	150	Pipe/Conduit	
S41.001	18.046	0.310	58.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S41.002	40.357	0.714	56.5	0.000	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)	
S37.000	50.00	5.03	14.030	0.006	0.0	0.0	0.0	3.21	56.6	0.7	
S38.000	50.00	5.03	13.922	0.021	0.0	0.0	0.0	3.21	56.6	2.8	
S20.008	50.00	7.32	13.178	0.662	0.0	0.0	0.0	1.01	111.0	89.6	
S20.009	50.00	7.56	13.137	0.662	0.0	0.0	0.0	1.01	111.0	89.6	
S39.000	50.00	5.08	13.437	0.018	0.0	0.0	0.0	1.35	23.8	2.5	
S20.010	50.00	7.62	13.091	0.680	0.0	0.0	0.0	3.33	367.8	92.1	
S40.000	50.00	5.06	13.192	0.015	0.0	0.0	0.0	1.88	33.2	2.0	
S20.011	50.00	7.76	12.721	0.724	0.0	0.0	0.0	2.42	266.9	98.1	
S20.012	50.00	7.90	12.365	0.724	0.0	0.0	0.0	2.82	311.9	98.1	
S41.000	50.00	5.09	13.368	0.057	0.0	0.0	0.0	2.17	86.1	7.7	
S42.000	50.00	5.03	13.339	0.041	0.0	0.0	0.0	2.47	43.7	5.5	
S41.001	50.00	5.27	12.974	0.097	0.0	0.0	0.0	1.72	68.3	13.2	
S41.002	50.00	5.65	12.664	0.097	0.0	0.0	0.0	1.74	69.3	13.2	
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<u>Network Design Table for STORM NORTH</u> <table><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>I.Area (ha)</th><th>T.E. (mins)</th><th>Base Flow (l/s)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th><th>Section Type</th><th>Auto Design</th></tr><tr><td>S1.010</td><td>24.669</td><td>1.473</td><td>16.7</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>375</td><td>Pipe/Conduit</td><td></td></tr></table> <u>Network Results Table</u> <table><tr><th>PN</th><th>Rain (mm/hr)</th><th>T.C. (mins)</th><th>US/IL (m)</th><th>Σ I.Area (ha)</th><th>Σ Base Flow (l/s)</th><th>Foul (l/s)</th><th>Add Flow (l/s)</th><th>Vel (m/s)</th><th>Cap (l/s)</th><th>Flow (l/s)</th></tr><tr><td>S1.010</td><td>50.00</td><td>5.09</td><td>11.800</td><td>0.000</td><td>20.0</td><td>0.0</td><td>0.0</td><td>4.45</td><td>491.1</td><td>20.0</td></tr></table>												PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design	S1.010	24.669	1.473	16.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		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)	S1.010	50.00	5.09	11.800	0.000	20.0	0.0	0.0	4.45	491.1	20.0
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design																																														
S1.010	24.669	1.473	16.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit																																															
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S1.010	50.00	5.09	11.800	0.000	20.0	0.0	0.0	4.45	491.1	20.0																																															
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Manhole Schedules for STORM NORTH

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	17.658	1.471	Open Manhole	600	S1.000	16.187	150				
S2	17.491	1.493	Open Manhole	600	S2.000	15.998	150				
S3	17.432	1.557	Open Manhole	1200	S1.001	15.875	225	S1.000	15.950	150	
								S2.000	15.950	150	
S4	17.981	1.246	Open Manhole	600	S3.000	16.735	150				
S5	18.213	1.471	Open Manhole	600	S4.000	16.742	150				
S6	18.032	1.425	Open Manhole	1200	S3.001	16.607	225	S3.000	16.682	150	
								S4.000	16.682	150	
S7A	17.733	1.478	Open Manhole	600	S5.000	16.255	150				
S7B	17.654	1.375	Open Manhole	600	S6.000	16.279	150				
S7C	17.858	1.535	Open Manhole	600	S7.000	16.323	150				
S7	17.553	1.425	Open Manhole	1200	S3.002	16.128	225	S3.001	16.128	225	
								S5.000	16.203	150	
								S6.000	16.203	150	
								S7.000	16.203	150	
S8	17.339	1.350	Open Manhole	600	S8.000	15.989	150				
S9	17.449	1.350	Open Manhole	600	S9.000	16.099	150				
S10	17.302	1.455	Open Manhole	1200	S3.003	15.847	225	S3.002	15.847	225	
								S8.000	15.922	150	
								S9.000	15.922	150	
S10A	17.248	1.372	Open Manhole	600	S10.000	15.876	150				
S11	16.839	1.432	Open Manhole	1200	S3.004	15.407	225	S3.003	15.407	225	
								S10.000	15.482	150	
S12	16.956	1.520	Open Manhole	600	S11.000	15.436	150				
S13	16.868	1.627	Open Manhole	1200	S1.002	15.241	300	S1.001	15.316	225	
								S3.004	15.316	225	
								S11.000	15.391	150	
S14	16.892	1.572	Open Manhole	600	S12.000	15.320	150				
S15	16.500	1.446	Open Manhole	600	S13.000	15.054	150				
S16	16.498	1.638	Open Manhole	1200	S1.003	14.860	300	S1.002	14.860	300	
								S12.000	15.010	150	
								S13.000	15.010	150	
S17	15.885	1.624	Open Manhole	600	S14.000	14.261	150				
S18	15.768	1.389	Open Manhole	600	S15.000	14.379	150				
S19	15.833	1.815	Open Manhole	1200	S1.004	14.018	300	S1.003	14.018	300	
								S14.000	14.168	150	
								S15.000	14.168	150	
S20	15.197	1.475	Open Manhole	600	S16.000	13.722	150				

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Manhole Schedules for STORM NORTH

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)
S21A	15.081	1.555	Open Manhole	600	S17.000	13.526	150				
S21	14.802	1.500	Open Manhole	1200	S1.005	13.302	300	S1.004	13.302	300	
								S16.000	13.452	150	
								S17.000	13.452	150	
S22A	14.893	1.591	Open Manhole	600	S18.000	13.302	150				
S22	14.309	1.501	Open Manhole	1200	S1.006	12.808	300	S1.005	12.808	300	
								S18.000	12.958	150	
S25	13.925	1.388	Open Manhole	1200	S1.007	12.537	300	S1.006	12.537	300	
S24	13.577	1.353	Open Manhole	1200	S19.000	12.224	150				
S25	13.561	1.631	Open Manhole	1350	S1.008	11.930	375	S1.007	12.005	300	
								S19.000	12.155	150	
S26	13.500	1.630	Open Manhole	1350	S1.009	11.870	375	S1.008	11.870	375	
S27	18.503	1.325	Open Manhole	600	S20.000	17.178	150				
S28	18.706	1.700	Open Manhole	1200	S20.001	17.006	225	S20.000	17.081	150	
S29	18.295	1.887	Open Manhole	600	S21.000	16.408	150				
S30	18.295	3.030	Open Manhole	1200	S20.002	15.265	225	S20.001	15.265	225	
								S21.000	15.340	150	
S31	18.138	2.916	Open Manhole	1200	S20.003	15.222	225	S20.002	15.222	225	
S32	18.139	3.177	Open Manhole	600	S22.000	14.962	150				
S33	17.926	3.620	Open Manhole	1200	S20.004	14.306	225	S20.003	14.381	225	75
								S22.000	14.381	150	
S34	15.500	1.384	Open Manhole	600	S23.000	14.116	150				
S38	15.450	1.370	Open Manhole	1200	S23.001	14.080	150	S23.000	14.080	150	
S37	16.074	1.518	Open Manhole	600	S24.000	14.556	150				
S38	16.282	1.437	Open Manhole	600	S25.000	14.845	150				
S39	16.015	1.623	Open Manhole	1200	S24.001	14.392	225	S24.000	14.467	150	
								S25.000	14.467	150	
S40	15.849	1.301	Open Manhole	600	S26.000	14.548	150				
S41	15.944	2.062	Open Manhole	1200	S23.002	13.882	225	S23.001	13.957	150	
								S24.001	13.882	225	
								S26.000	13.957	150	
S42	17.584	3.262	Open Manhole	600	S27.000	14.322	150				
S43	17.170	2.630	Open Manhole	600	S28.000	14.540	150				
S44	17.493	3.879	Open Manhole	1200	S23.003	13.615	225	S23.002	13.614	225	
								S27.000	13.690	150	
								S28.000	13.690	150	
S45	17.716	4.273	Open Manhole	1200	S20.005	13.443	300	S20.004	13.574	225	56
								S23.003	13.518	225	

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Manhole Schedules for STORM NORTH

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S46	17.534	3.547	Open Manhole	600	S29.000	13.987	150				
S47	17.513	3.319	Open Manhole	600	S30.000	14.194	150				
S48	17.376	3.975	Open Manhole	1200	S20.006	13.400	300	S20.005	13.400	300	
								S29.000	13.550	150	
								S30.000	13.550	150	
S49	17.272	1.190	Open Manhole	600	S31.000	16.082	150				
S50	17.426	1.321	Open Manhole	600	S32.000	16.105	150				
S51	17.085	1.142	Open Manhole	1200	S31.001	15.943	225	S31.000	16.018	150	
								S32.000	16.018	150	
S52	17.119	1.385	Open Manhole	600	S33.000	15.734	150				
S53	17.123	1.546	Open Manhole	600	S34.000	15.577	150				
S54	16.765	1.321	Open Manhole	1200	S31.002	15.444	225	S31.001	15.444	225	
								S33.000	15.519	150	
								S34.000	15.519	150	
S55	16.565	2.049	Open Manhole	600	S35.000	14.516	150				
S56	16.754	1.904	Open Manhole	600	S36.000	14.850	150				
S57	16.359	2.349	Open Manhole	1200	S31.003	14.010	225	S31.002	14.010	225	
								S35.000	14.085	150	
								S36.000	14.085	150	
S58	16.393	3.170	Open Manhole	1350	S20.007	13.223	375	S20.006	13.298	300	
								S31.003	13.373	225	
S59	15.960	1.930	Open Manhole	600	S37.000	14.030	150				
S60	16.091	2.169	Open Manhole	600	S38.000	13.922	150				
S61	15.824	2.646	Open Manhole	1350	S20.008	13.178	375	S20.007	13.178	375	
								S37.000	13.403	150	
								S38.000	13.403	150	
S65	15.299	2.162	Open Manhole	1350	S20.009	13.137	375	S20.008	13.137	375	
S66A	15.077	1.640	Open Manhole	600	S39.000	13.437	150				
S66	14.698	1.607	Open Manhole	1350	S20.010	13.091	375	S20.009	13.091	375	
								S39.000	13.316	150	
S62	14.831	1.640	Open Manhole	600	S40.000	13.192	150				
S63	14.296	1.575	Open Manhole	1350	S20.011	12.721	375	S20.010	12.721	375	
								S40.000	12.946	150	
S64	13.837	1.472	Open Manhole	1350	S20.012	12.365	375	S20.011	12.365	375	
S65	14.718	1.350	Open Manhole	1200	S41.000	13.368	225				
S66	14.572	1.233	Open Manhole	600	S42.000	13.339	150				
S67	14.399	1.425	Open Manhole	1200	S41.001	12.974	225	S41.000	13.049	225	
								S42.000	13.049	150	

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Manhole Schedules for STORM NORTH

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)
S68	13.789	1.125	Open Manhole	1200	S41.002	12.664	225	S41.001	12.664	225	
S69	13.500	1.700	Open Manhole	1350	S1.010	11.800	375	S1.009	11.800	375	
								S20.012	11.800	375	
								S41.002	11.950	225	
S	12.000	1.673	Open Manhole	0		OUTFALL		S1.010	10.327	375	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	507512.929	104545.716	507512.929	104545.716	Required	
S2	507498.329	104543.409	507498.329	104543.409	Required	
S3	507503.025	104544.151	507503.025	104544.151	Required	
S4	507578.259	104571.333	507578.259	104571.333	Required	
S5	507579.752	104582.494	507579.752	104582.494	Required	
S6	507578.958	104576.562	507578.958	104576.562	Required	
S7A	507551.408	104575.224	507551.408	104575.224	Required	
S7B	507549.440	104587.860	507549.440	104587.860	Required	
S7C	507561.720	104584.800	507561.720	104584.800	Required	
S7	507550.609	104580.353	507550.609	104580.353	Required	
S8	507532.815	104584.974	507532.815	104584.974	Required	

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<u>Manhole Schedules for STORM NORTH</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	507534.975	104573.772	507534.975	104573.772	Required	
S10	507534.199	104577.798	507534.199	104577.798	Required	
S10A	507509.530	104567.251	507509.988	104567.466	Required	
S11	507508.538	104572.850	507509.107	104572.940	Required	
S12	507494.272	104570.596	507494.272	104570.596	Required	
S13	507498.735	104571.301	507498.735	104571.301	Required	
S14	507508.203	104580.453	507508.203	104580.453	Required	
S15	507492.830	104580.313	507492.830	104580.313	Required	
S16	507497.276	104580.534	507497.276	104580.534	Required	
S17	507492.353	104601.373	507492.353	104601.373	Required	
S18	507508.403	104605.000	507508.403	104605.000	Required	
S19	507497.623	104605.395	507497.623	104605.395	Required	
S20	507504.832	104621.085	507504.832	104621.085	Required	
S21A	507488.854	104618.990	507488.854	104618.990	Required	
S21	507493.445	104622.452	507493.445	104622.452	Required	
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<u>Manhole Schedules for STORM NORTH</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S37	507625.630	104721.524	507625.630	104721.524	Required	
S38	507619.557	104710.030	507619.557	104710.030	Required	
S39	507619.724	104714.710	507619.724	104714.710	Required	
S40	507608.193	104715.122	507608.193	104715.122	Required	
S41	507614.385	104714.901	507614.385	104714.901	Required	
S42	507618.730	104672.128	507618.730	104672.128	Required	
S43	507605.690	104674.690	507605.690	104674.690	Required	
S44	507612.781	104670.006	507612.781	104670.006	Required	
S45	507603.830	104656.445	507603.830	104656.445	Required	
S46	507593.808	104662.283	507593.808	104662.283	Required	
S47	507593.736	104651.470	507593.736	104651.470	Required	
S48	507593.652	104657.914	507593.652	104657.914	Required	
S49	507553.083	104617.522	507553.083	104617.522	Required	
S50	507563.811	104612.972	507563.811	104612.972	Required	
S51	507559.235	104616.772	507559.235	104616.772	Required	
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MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S52	507571.302	104624.637	507571.302	104624.637	Required	
S53	507558.147	104625.492	507558.147	104625.492	Required	
S54	507568.345	104629.849	507568.345	104629.849	Required	
S55	507572.871	104649.147	507572.871	104649.147	Required	
S56	507561.457	104650.845	507561.457	104650.845	Required	
S57	507569.096	104651.224	507569.096	104651.224	Required	
S58	507568.800	104657.591	507568.800	104657.591	Required	
S59	507558.235	104662.956	507558.235	104662.956	Required	
S60	507554.498	104652.770	507554.498	104652.770	Required	
S61	507554.450	104657.960	507554.450	104657.960	Required	
S65	507542.989	104664.309	507542.989	104664.309	Required	
S66A	507527.465	104656.970	507527.465	104656.970	Required	
S66	507528.116	104663.714	507528.116	104663.714	Required	
S62	507517.225	104658.923	507517.225	104658.923	Required	
S63	507517.351	104666.008	507517.351	104666.008	Required	
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Online Controls for STORM NORTH

Hydro-Brake® Optimum Manhole: S69, DS/PN: S1.010, Volume (m³): 7.6

Unit Reference	MD-SHE-0105-5600-1400-5600
Design Head (m)	1.400
Design Flow (l/s)	5.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	11.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.6
Flush-Flo™	0.413	5.6
Kick-Flo®	0.856	4.5
Mean Flow over Head Range	-	4.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.2	3.000	8.0	7.000	12.0
0.200	5.1	1.400	5.6	3.500	8.6	7.500	12.4
0.300	5.5	1.600	6.0	4.000	9.2	8.000	12.7
0.400	5.6	1.800	6.3	4.500	9.7	8.500	13.1
0.500	5.6	2.000	6.6	5.000	10.2	9.000	13.5
0.600	5.4	2.200	6.9	5.500	10.7	9.500	13.8
0.800	4.8	2.400	7.2	6.000	11.1		
1.000	4.8	2.600	7.5	6.500	11.5		

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XP Solutions Network 2020.1		

Storage Structures for STORM NORTH

Tank or Pond Manhole: S69, DS/PN: S1.010

Invert Level (m) 11.832

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	500.0	0.700	746.6	1.400	1042.4	2.100	0.0
0.100	532.2	0.800	785.8	1.500	1088.7	2.200	0.0
0.200	565.4	0.900	826.1	1.600	1136.0	2.300	0.0
0.300	599.6	1.000	867.3	1.700	1184.3	2.400	0.0
0.400	634.9	1.100	909.6	1.800	0.0	2.500	0.0
0.500	671.1	1.200	952.9	1.900	0.0		
0.600	708.3	1.300	997.1	2.000	0.0		

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Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000																																																																																																																																																																																																																				
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000																																																																																																																																																																																																																				
Hot Start Level (mm)		0		Inlet Coefficient		0.800																																																																																																																																																																																																																				
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000																																																																																																																																																																																																																				
Foul Sewage per hectare (l/s)		0.000																																																																																																																																																																																																																								
Number of Input Hydrographs		0		Number of Storage Structures		1																																																																																																																																																																																																																				
Number of Online Controls		1		Number of Time/Area Diagrams		0																																																																																																																																																																																																																				
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<u>Synthetic Rainfall Details</u>																																																																																																																																																																																																																										
Rainfall Model		FSR		Ratio R		0.350																																																																																																																																																																																																																				
Region England and Wales Cv (Summer)		0.750																																																																																																																																																																																																																								
M5-60 (mm)		19.000 Cv (Winter)		0.840																																																																																																																																																																																																																						
Margin for Flood Risk Warning (mm)		300.0																																																																																																																																																																																																																								
Analysis Timestep		2.5 Second Increment (Extended)																																																																																																																																																																																																																								
DTS Status		ON																																																																																																																																																																																																																								
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Inertia Status		OFF																																																																																																																																																																																																																								
Profile(s)		Summer and Winter																																																																																																																																																																																																																								
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440																																																																																																																																																																																																																								
Return Period(s) (years)		2																																																																																																																																																																																																																								
Climate Change (%)		0																																																																																																																																																																																																																								
<table><tr><th colspan="5"></th><th colspan="2"></th><th colspan="2"></th><th>Water</th></tr><tr><th>PN</th><th>US/MH Name</th><th>Storm</th><th>Return Period</th><th>Climate Change</th><th>First (X) Surge</th><th>First (Y) Flood</th><th>First (Z) Overflow</th><th>Overflow Act.</th><th>Level (m)</th></tr><tr><td>S1.000</td><td>S1</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.216</td></tr><tr><td>S2.000</td><td>S2</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.057</td></tr><tr><td>S1.001</td><td>S3</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.949</td></tr><tr><td>S3.000</td><td>S4</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.787</td></tr><tr><td>S4.000</td><td>S5</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.776</td></tr><tr><td>S3.001</td><td>S6</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.679</td></tr><tr><td>S5.000</td><td>S7A</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.313</td></tr><tr><td>S6.000</td><td>S7B</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.309</td></tr><tr><td>S7.000</td><td>S7C</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.356</td></tr><tr><td>S3.002</td><td>S7</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.222</td></tr><tr><td>S8.000</td><td>S8</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.023</td></tr><tr><td>S9.000</td><td>S9</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.132</td></tr><tr><td>S3.003</td><td>S10</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.964</td></tr><tr><td>S10.000</td><td>S10A</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.898</td></tr><tr><td>S3.004</td><td>S11</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.573</td></tr><tr><td>S11.000</td><td>S12</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.491</td></tr><tr><td>S1.002</td><td>S13</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.367</td></tr><tr><td>S12.000</td><td>S14</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.353</td></tr><tr><td>S13.000</td><td>S15</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.116</td></tr></table>																		Water	PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	S1.000	S1	15 Winter	2	+0%					16.216	S2.000	S2	15 Winter	2	+0%					16.057	S1.001	S3	15 Winter	2	+0%					15.949	S3.000	S4	15 Winter	2	+0%					16.787	S4.000	S5	15 Winter	2	+0%					16.776	S3.001	S6	15 Winter	2	+0%					16.679	S5.000	S7A	15 Winter	2	+0%					16.313	S6.000	S7B	15 Winter	2	+0%					16.309	S7.000	S7C	15 Winter	2	+0%					16.356	S3.002	S7	15 Winter	2	+0%					16.222	S8.000	S8	15 Winter	2	+0%					16.023	S9.000	S9	15 Winter	2	+0%					16.132	S3.003	S10	15 Winter	2	+0%					15.964	S10.000	S10A	15 Winter	2	+0%					15.898	S3.004	S11	15 Winter	2	+0%					15.573	S11.000	S12	15 Winter	2	+0%					15.491	S1.002	S13	15 Winter	2	+0%					15.367	S12.000	S14	15 Winter	2	+0%					15.353	S13.000	S15	15 Winter	2	+0%					15.116
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PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)																																																																																																																																																																																																																	
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S3.000	S4	15 Winter	2	+0%					16.787																																																																																																																																																																																																																	
S4.000	S5	15 Winter	2	+0%					16.776																																																																																																																																																																																																																	
S3.001	S6	15 Winter	2	+0%					16.679																																																																																																																																																																																																																	
S5.000	S7A	15 Winter	2	+0%					16.313																																																																																																																																																																																																																	
S6.000	S7B	15 Winter	2	+0%					16.309																																																																																																																																																																																																																	
S7.000	S7C	15 Winter	2	+0%					16.356																																																																																																																																																																																																																	
S3.002	S7	15 Winter	2	+0%					16.222																																																																																																																																																																																																																	
S8.000	S8	15 Winter	2	+0%					16.023																																																																																																																																																																																																																	
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S3.003	S10	15 Winter	2	+0%					15.964																																																																																																																																																																																																																	
S10.000	S10A	15 Winter	2	+0%					15.898																																																																																																																																																																																																																	
S3.004	S11	15 Winter	2	+0%					15.573																																																																																																																																																																																																																	
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S1.002	S13	15 Winter	2	+0%					15.367																																																																																																																																																																																																																	
S12.000	S14	15 Winter	2	+0%					15.353																																																																																																																																																																																																																	
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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.121	0.000	0.08			2.0	OK	
S2.000	S2	-0.091	0.000	0.32			4.4	OK	
S1.001	S3	-0.151	0.000	0.23			16.0	OK	
S3.000	S4	-0.098	0.000	0.26			3.7	OK	
S4.000	S5	-0.116	0.000	0.12			1.7	OK	
S3.001	S6	-0.153	0.000	0.22			13.9	OK	
S5.000	S7A	-0.092	0.000	0.31			4.5	OK	
S6.000	S7B	-0.120	0.000	0.09			1.3	OK	
S7.000	S7C	-0.117	0.000	0.11			1.7	OK	
S3.002	S7	-0.131	0.000	0.36			21.5	OK	
S8.000	S8	-0.116	0.000	0.12			1.7	OK	
S9.000	S9	-0.117	0.000	0.11			2.9	OK	
S3.003	S10	-0.108	0.000	0.52			32.8	OK	
S10.000	S10A	-0.128	0.000	0.05			2.1	OK	
S3.004	S11	-0.059	0.000	0.89			37.0	OK	
S11.000	S12	-0.095	0.000	0.29			3.8	OK	
S1.002	S13	-0.174	0.000	0.37			56.6	OK	
S12.000	S14	-0.117	0.000	0.11			2.9	OK	
S13.000	S15	-0.088	0.000	0.35			4.6	OK	
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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.003	S16	15 Winter	2	+0%					14.985
S14.000	S17	15 Winter	2	+0%					14.291
S15.000	S18	15 Winter	2	+0%					14.415
S1.004	S19	15 Winter	2	+0%					14.146
S16.000	S20	15 Winter	2	+0%					13.747
S17.000	S21A	15 Winter	2	+0%					13.573
S1.005	S21	15 Winter	2	+0%					13.442
S18.000	S22A	15 Winter	2	+0%					13.338
S1.006	S22	15 Winter	2	+0%					12.999
S1.007	S25	15 Winter	2	+0%					12.689
S19.000	S24	15 Winter	2	+0%					12.344
S1.008	S25	15 Winter	2	+0%					12.305
S1.009	S26	480 Winter	2	+0%	2/240 Winter				12.274
S20.000	S27	15 Winter	2	+0%					17.223
S20.001	S28	15 Winter	2	+0%					17.042
S21.000	S29	15 Winter	2	+0%					16.428
S20.002	S30	15 Winter	2	+0%					15.353
S20.003	S31	15 Winter	2	+0%					15.268
S22.000	S32	15 Winter	2	+0%					14.978
S20.004	S33	15 Winter	2	+0%					14.356
S23.000	S34	15 Winter	2	+0%					14.146
S23.001	S38	15 Winter	2	+0%					14.145
S24.000	S37	15 Winter	2	+0%					14.621
S25.000	S38	15 Winter	2	+0%					14.864
S24.001	S39	15 Winter	2	+0%					14.443
S26.000	S40	15 Winter	2	+0%					14.587
S23.002	S41	15 Winter	2	+0%					14.047
S27.000	S42	15 Winter	2	+0%					14.355
S28.000	S43	15 Winter	2	+0%					14.566
S23.003	S44	15 Winter	2	+0%	2/15 Summer				13.868
S20.005	S45	15 Winter	2	+0%					13.692
S29.000	S46	15 Winter	2	+0%					14.006
S30.000	S47	15 Winter	2	+0%					14.235
S20.006	S48	15 Winter	2	+0%					13.655
S31.000	S49	15 Winter	2	+0%					16.129
S32.000	S50	15 Winter	2	+0%					16.134
S31.001	S51	15 Winter	2	+0%					15.994
S33.000	S52	15 Winter	2	+0%					15.762
S34.000	S53	15 Winter	2	+0%					15.622
S31.002	S54	15 Winter	2	+0%					15.501
S35.000	S55	15 Winter	2	+0%					14.531
S36.000	S56	15 Winter	2	+0%					14.863
S31.003	S57	15 Winter	2	+0%					14.074
S20.007	S58	15 Winter	2	+0%					13.559
S37.000	S59	15 Winter	2	+0%					14.044
S38.000	S60	15 Winter	2	+0%					13.949
S20.008	S61	15 Winter	2	+0%					13.520
S20.009	S65	15 Winter	2	+0%					13.432
S39.000	S66A	15 Winter	2	+0%					13.476
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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.003	S16	-0.175	0.000	0.36			66.6	OK	
S14.000	S17	-0.120	0.000	0.09			1.6	OK	
S15.000	S18	-0.114	0.000	0.13			2.9	OK	
S1.004	S19	-0.172	0.000	0.38			73.4	OK	
S16.000	S20	-0.125	0.000	0.06			1.6	OK	
S17.000	S21A	-0.103	0.000	0.21			3.5	OK	
S1.005	S21	-0.160	0.000	0.44			78.1	OK	
S18.000	S22A	-0.114	0.000	0.13			3.6	OK	
S1.006	S22	-0.109	0.000	0.72			85.3	OK	
S1.007	S25	-0.148	0.000	0.50			92.0	OK	
S19.000	S24	-0.030	0.000	0.87			11.2	OK	
S1.008	S25	0.000	0.000	1.06			104.6	OK	
S1.009	S26	0.029	0.000	0.14			15.2	SURCHARGED	
S20.000	S27	-0.105	0.000	0.19			3.1	OK	
S20.001	S28	-0.189	0.000	0.06			7.2	OK	
S21.000	S29	-0.130	0.000	0.04			2.3	OK	
S20.002	S30	-0.137	0.000	0.32			9.4	OK	
S20.003	S31	-0.179	0.000	0.09			12.1	OK	
S22.000	S32	-0.134	0.000	0.02			1.1	OK	
S20.004	S33	-0.175	0.000	0.11			13.2	OK	
S23.000	S34	-0.121	0.000	0.02			0.2	OK	
S23.001	S38	-0.085	0.000	0.39			6.2	OK	
S24.000	S37	-0.085	0.000	0.39			6.0	OK	
S25.000	S38	-0.131	0.000	0.04			1.5	OK	
S24.001	S39	-0.174	0.000	0.12			11.8	OK	
S26.000	S40	-0.111	0.000	0.15			7.1	OK	
S23.002	S41	-0.060	0.000	0.83			31.6	OK	
S27.000	S42	-0.117	0.000	0.11			5.2	OK	
S28.000	S43	-0.124	0.000	0.07			3.5	OK	
S23.003	S44	0.029	0.000	1.18			42.0	SURCHARGED	
S20.005	S45	-0.051	0.000	0.96			53.7	OK	
S29.000	S46	-0.131	0.000	0.04			1.6	OK	
S30.000	S47	-0.109	0.000	0.17			7.9	OK	
S20.006	S48	-0.046	0.000	0.99			63.1	OK	
S31.000	S49	-0.103	0.000	0.21			3.2	OK	
S32.000	S50	-0.121	0.000	0.08			1.5	OK	
S31.001	S51	-0.174	0.000	0.11			9.2	OK	
S33.000	S52	-0.122	0.000	0.08			2.2	OK	
S34.000	S53	-0.105	0.000	0.20			2.3	OK	
S31.002	S54	-0.168	0.000	0.14			17.7	OK	
S35.000	S55	-0.135	0.000	0.02			0.9	OK	
S36.000	S56	-0.137	0.000	0.02			0.9	OK	
S31.003	S57	-0.161	0.000	0.17			19.6	OK	
S20.007	S58	-0.038	0.000	0.91			77.7	OK	
S37.000	S59	-0.136	0.000	0.02			0.9	OK	
S38.000	S60	-0.123	0.000	0.08			3.4	OK	
S20.008	S61	-0.033	0.000	1.00			83.7	OK	
S20.009	S65	-0.080	0.000	0.98			83.7	OK	
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<table><tr><th></th><th>US/MH</th><th></th><th>Return</th><th>Climate</th><th>First (X)</th><th>First (Y)</th><th>First (Z)</th><th>Overflow</th><th>Water</th></tr><tr><th>PN</th><th>Name</th><th>Storm</th><th>Period</th><th>Change</th><th>Surcharge</th><th>Flood</th><th>Overflow</th><th>Act.</th><th>Level</th></tr><tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>(m)</th></tr><tr><td>S20.010</td><td>S66</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>13.246</td></tr><tr><td>S40.000</td><td>S62</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>13.221</td></tr><tr><td>S20.011</td><td>S63</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>12.887</td></tr><tr><td>S20.012</td><td>S64</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>12.515</td></tr><tr><td>S41.000</td><td>S65</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>13.421</td></tr><tr><td>S42.000</td><td>S66</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>13.384</td></tr><tr><td>S41.001</td><td>S67</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>13.052</td></tr><tr><td>S41.002</td><td>S68</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>12.739</td></tr><tr><td>S1.010</td><td>S69</td><td>480 Winter</td><td>2</td><td>+0%</td><td>2/120 Winter</td><td></td><td></td><td></td><td>12.273</td></tr></table>											US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level										(m)	S20.010	S66	15 Winter	2	+0%					13.246	S40.000	S62	15 Winter	2	+0%					13.221	S20.011	S63	15 Winter	2	+0%					12.887	S20.012	S64	15 Winter	2	+0%					12.515	S41.000	S65	15 Winter	2	+0%					13.421	S42.000	S66	15 Winter	2	+0%					13.384	S41.001	S67	15 Winter	2	+0%					13.052	S41.002	S68	15 Winter	2	+0%					12.739	S1.010	S69	480 Winter	2	+0%	2/120 Winter				12.273
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water																																																																																																																								
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level																																																																																																																								
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S20.010	S66	15 Winter	2	+0%					13.246																																																																																																																								
S40.000	S62	15 Winter	2	+0%					13.221																																																																																																																								
S20.011	S63	15 Winter	2	+0%					12.887																																																																																																																								
S20.012	S64	15 Winter	2	+0%					12.515																																																																																																																								
S41.000	S65	15 Winter	2	+0%					13.421																																																																																																																								
S42.000	S66	15 Winter	2	+0%					13.384																																																																																																																								
S41.001	S67	15 Winter	2	+0%					13.052																																																																																																																								
S41.002	S68	15 Winter	2	+0%					12.739																																																																																																																								
S1.010	S69	480 Winter	2	+0%	2/120 Winter				12.273																																																																																																																								
<table><tr><th></th><th>US/MH</th><th>Depth</th><th>Volume</th><th>Flow /</th><th>Overflow</th><th>Half Drain</th><th>Pipe</th><th></th><th>Level</th></tr><tr><th>PN</th><th>Name</th><th>(m)</th><th>(m³)</th><th>Cap.</th><th>(l/s)</th><th>Time</th><th>Flow</th><th>Status</th><th>Exceeded</th></tr><tr><th></th><th></th><th></th><th></th><th></th><th></th><th>(mins)</th><th>(l/s)</th><th></th><th></th></tr><tr><td>S20.010</td><td>S66</td><td>-0.220</td><td>0.000</td><td>0.36</td><td></td><td></td><td>85.5</td><td>OK</td><td></td></tr><tr><td>S40.000</td><td>S62</td><td>-0.121</td><td>0.000</td><td>0.08</td><td></td><td></td><td>2.4</td><td>OK</td><td></td></tr><tr><td>S20.011</td><td>S63</td><td>-0.209</td><td>0.000</td><td>0.40</td><td></td><td></td><td>90.2</td><td>OK</td><td></td></tr><tr><td>S20.012</td><td>S64</td><td>-0.225</td><td>0.000</td><td>0.34</td><td></td><td></td><td>90.2</td><td>OK</td><td></td></tr><tr><td>S41.000</td><td>S65</td><td>-0.172</td><td>0.000</td><td>0.13</td><td></td><td></td><td>9.2</td><td>OK</td><td></td></tr><tr><td>S42.000</td><td>S66</td><td>-0.105</td><td>0.000</td><td>0.20</td><td></td><td></td><td>6.6</td><td>OK</td><td></td></tr><tr><td>S41.001</td><td>S67</td><td>-0.147</td><td>0.000</td><td>0.26</td><td></td><td></td><td>15.7</td><td>OK</td><td></td></tr><tr><td>S41.002</td><td>S68</td><td>-0.150</td><td>0.000</td><td>0.24</td><td></td><td></td><td>15.9</td><td>OK</td><td></td></tr><tr><td>S1.010</td><td>S69</td><td>0.098</td><td>0.000</td><td>0.01</td><td></td><td></td><td>5.6</td><td>SURCHARGED</td><td></td></tr></table>											US/MH	Depth	Volume	Flow /	Overflow	Half Drain	Pipe		Level	PN	Name	(m)	(m³)	Cap.	(l/s)	Time	Flow	Status	Exceeded							(mins)	(l/s)			S20.010	S66	-0.220	0.000	0.36			85.5	OK		S40.000	S62	-0.121	0.000	0.08			2.4	OK		S20.011	S63	-0.209	0.000	0.40			90.2	OK		S20.012	S64	-0.225	0.000	0.34			90.2	OK		S41.000	S65	-0.172	0.000	0.13			9.2	OK		S42.000	S66	-0.105	0.000	0.20			6.6	OK		S41.001	S67	-0.147	0.000	0.26			15.7	OK		S41.002	S68	-0.150	0.000	0.24			15.9	OK		S1.010	S69	0.098	0.000	0.01			5.6	SURCHARGED	
	US/MH	Depth	Volume	Flow /	Overflow	Half Drain	Pipe		Level																																																																																																																								
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Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.350
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440
 Return Period(s) (years) 30
 Climate Change (%) 0

								Water	
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)
S1.000	S1	15 Winter	30	+0%					16.227
S2.000	S2	15 Winter	30	+0%					16.084
S1.001	S3	15 Winter	30	+0%					15.989
S3.000	S4	15 Winter	30	+0%					16.809
S4.000	S5	15 Winter	30	+0%					16.790
S3.001	S6	15 Winter	30	+0%					16.719
S5.000	S7A	15 Winter	30	+0%					16.358
S6.000	S7B	15 Winter	30	+0%					16.348
S7.000	S7C	15 Winter	30	+0%					16.369
S3.002	S7	15 Winter	30	+0%					16.341
S8.000	S8	15 Winter	30	+0%	30/15 Summer				16.223
S9.000	S9	15 Winter	30	+0%					16.223
S3.003	S10	15 Winter	30	+0%	30/15 Summer				16.215
S10.000	S10A	15 Winter	30	+0%					15.908
S3.004	S11	15 Winter	30	+0%	30/15 Summer				15.785
S11.000	S12	15 Winter	30	+0%					15.515
S1.002	S13	15 Winter	30	+0%					15.429
S12.000	S14	15 Winter	30	+0%					15.366
S13.000	S15	15 Winter	30	+0%					15.144

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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.003	S16	15 Winter	30	+0%					15.048
S14.000	S17	15 Winter	30	+0%					14.302
S15.000	S18	15 Winter	30	+0%					14.430
S1.004	S19	15 Winter	30	+0%					14.212
S16.000	S20	15 Winter	30	+0%					13.822
S17.000	S21A	15 Winter	30	+0%	30/15 Summer				13.827
S1.005	S21	15 Winter	30	+0%	30/15 Summer				13.814
S18.000	S22A	15 Winter	30	+0%	30/15 Winter				13.524
S1.006	S22	15 Winter	30	+0%	30/15 Summer				13.503
S1.007	S25	15 Winter	30	+0%	30/15 Summer				13.045
S19.000	S24	15 Winter	30	+0%	30/15 Summer				12.744
S1.008	S25	720 Winter	30	+0%	30/15 Summer				12.690
S1.009	S26	720 Winter	30	+0%	30/15 Summer				12.689
S20.000	S27	15 Winter	30	+0%					17.241
S20.001	S28	15 Winter	30	+0%					17.061
S21.000	S29	15 Winter	30	+0%					16.437
S20.002	S30	15 Winter	30	+0%					15.401
S20.003	S31	15 Winter	30	+0%					15.291
S22.000	S32	15 Winter	30	+0%					14.983
S20.004	S33	15 Winter	30	+0%					14.380
S23.000	S34	15 Winter	30	+0%	30/15 Summer				15.024
S23.001	S38	15 Winter	30	+0%	30/15 Summer				15.023
S24.000	S37	15 Winter	30	+0%	30/15 Summer				15.031
S25.000	S38	15 Winter	30	+0%	30/15 Winter				15.005
S24.001	S39	15 Winter	30	+0%	30/15 Summer				15.001
S26.000	S40	15 Winter	30	+0%	30/15 Summer				15.017
S23.002	S41	15 Winter	30	+0%	30/15 Summer				14.988
S27.000	S42	15 Winter	30	+0%	30/15 Summer				14.635
S28.000	S43	15 Winter	30	+0%					14.632
S23.003	S44	15 Winter	30	+0%	30/15 Summer				14.614
S20.005	S45	15 Winter	30	+0%	30/15 Summer				14.323
S29.000	S46	15 Winter	30	+0%	30/15 Summer				14.210
S30.000	S47	15 Winter	30	+0%					14.258
S20.006	S48	15 Winter	30	+0%	30/15 Summer				14.205
S31.000	S49	15 Winter	30	+0%					16.148
S32.000	S50	15 Winter	30	+0%					16.145
S31.001	S51	15 Winter	30	+0%					16.018
S33.000	S52	15 Winter	30	+0%					15.773
S34.000	S53	15 Winter	30	+0%					15.641
S31.002	S54	15 Winter	30	+0%					15.530
S35.000	S55	15 Winter	30	+0%					14.536
S36.000	S56	15 Winter	30	+0%					14.868
S31.003	S57	15 Winter	30	+0%					14.105
S20.007	S58	15 Winter	30	+0%	30/15 Summer				13.910
S37.000	S59	15 Winter	30	+0%					14.048
S38.000	S60	15 Winter	30	+0%					13.960
S20.008	S61	15 Winter	30	+0%	30/15 Summer				13.777
S20.009	S65	15 Winter	30	+0%	30/15 Summer				13.610
S39.000	S66A	15 Winter	30	+0%					13.491
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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.003	S16	-0.112	0.000	0.70			128.3	OK	
S14.000	S17	-0.109	0.000	0.17			3.0	OK	
S15.000	S18	-0.099	0.000	0.25			5.6	OK	
S1.004	S19	-0.106	0.000	0.74			142.5	OK	
S16.000	S20	-0.050	0.000	0.12			3.0	OK	
S17.000	S21A	0.151	0.000	0.37			6.2	SURCHARGED	
S1.005	S21	0.212	0.000	0.81			143.0	SURCHARGED	
S18.000	S22A	0.072	0.000	0.24			6.6	SURCHARGED	
S1.006	S22	0.395	0.000	1.31			154.2	SURCHARGED	
S1.007	S25	0.208	0.000	0.90			163.7	SURCHARGED	
S19.000	S24	0.370	0.000	1.43			18.5	SURCHARGED	
S1.008	S25	0.385	0.000	0.20			20.3	SURCHARGED	
S1.009	S26	0.444	0.000	0.19			20.2	SURCHARGED	
S20.000	S27	-0.087	0.000	0.37			5.8	OK	
S20.001	S28	-0.170	0.000	0.13			15.7	OK	
S21.000	S29	-0.121	0.000	0.08			4.3	OK	
S20.002	S30	-0.089	0.000	0.67			19.9	OK	
S20.003	S31	-0.156	0.000	0.20			26.0	OK	
S22.000	S32	-0.129	0.000	0.05			2.2	OK	
S20.004	S33	-0.151	0.000	0.23			27.9	OK	
S23.000	S34	0.757	0.000	0.13			1.5	SURCHARGED	
S23.001	S38	0.793	0.000	0.78			12.5	SURCHARGED	
S24.000	S37	0.325	0.000	0.67			10.5	SURCHARGED	
S25.000	S38	0.010	0.000	0.07			2.8	SURCHARGED	
S24.001	S39	0.384	0.000	0.19			19.6	SURCHARGED	
S26.000	S40	0.319	0.000	0.27			12.3	SURCHARGED	
S23.002	S41	0.881	0.000	1.23			46.9	SURCHARGED	
S27.000	S42	0.163	0.000	0.19			9.1	SURCHARGED	
S28.000	S43	-0.058	0.000	0.14			6.7	OK	
S23.003	S44	0.774	0.000	1.78			63.3	SURCHARGED	
S20.005	S45	0.580	0.000	1.55			86.5	SURCHARGED	
S29.000	S46	0.073	0.000	0.07			2.8	SURCHARGED	
S30.000	S47	-0.086	0.000	0.31			15.0	OK	
S20.006	S48	0.505	0.000	1.68			106.5	SURCHARGED	
S31.000	S49	-0.084	0.000	0.40			6.0	OK	
S32.000	S50	-0.110	0.000	0.16			2.8	OK	
S31.001	S51	-0.150	0.000	0.24			19.8	OK	
S33.000	S52	-0.111	0.000	0.15			4.2	OK	
S34.000	S53	-0.086	0.000	0.37			4.3	OK	
S31.002	S54	-0.139	0.000	0.31			38.0	OK	
S35.000	S55	-0.130	0.000	0.04			1.7	OK	
S36.000	S56	-0.132	0.000	0.04			1.7	OK	
S31.003	S57	-0.130	0.000	0.37			41.2	OK	
S20.007	S58	0.313	0.000	1.67			142.0	SURCHARGED	
S37.000	S59	-0.132	0.000	0.04			1.7	OK	
S38.000	S60	-0.112	0.000	0.14			6.5	OK	
S20.008	S61	0.224	0.000	1.89			158.1	SURCHARGED	
S20.009	S65	0.098	0.000	1.83			157.3	SURCHARGED	
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US/MH		Return Climate		First (X)	First (Y)	First (Z)	Overflow	Water																																																																																																														
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S41.002	S68	15 Winter	30	+0%					12.771																																																																																																													
S1.010	S69	720 Winter	30	+0%	30/15 Winter				12.688																																																																																																													
<table><tr><th colspan="2">US/MH</th><th colspan="2">Surcharged Flooded</th><th colspan="2">Half Drain</th><th>Pipe</th><th colspan="2">Level</th></tr><tr><th>PN</th><th>Name</th><th>Depth (m)</th><th>Volume (m³)</th><th>Flow / Cap.</th><th>Overflow (l/s)</th><th>Time (mins)</th><th>Flow (l/s)</th><th>Status</th><th>Exceeded</th></tr><tr><td>S20.010</td><td>S66</td><td>-0.147</td><td>0.000</td><td>0.68</td><td></td><td></td><td>161.0</td><td>OK</td><td></td></tr><tr><td>S40.000</td><td>S62</td><td>-0.110</td><td>0.000</td><td>0.16</td><td></td><td></td><td>4.5</td><td>OK</td><td></td></tr><tr><td>S20.011</td><td>S63</td><td>-0.127</td><td>0.000</td><td>0.76</td><td></td><td></td><td>169.7</td><td>OK</td><td></td></tr><tr><td>S20.012</td><td>S64</td><td>-0.050</td><td>0.000</td><td>0.08</td><td></td><td></td><td>20.7</td><td>OK</td><td></td></tr><tr><td>S41.000</td><td>S65</td><td>-0.150</td><td>0.000</td><td>0.24</td><td></td><td></td><td>17.5</td><td>OK</td><td></td></tr><tr><td>S42.000</td><td>S66</td><td>-0.086</td><td>0.000</td><td>0.37</td><td></td><td></td><td>12.6</td><td>OK</td><td></td></tr><tr><td>S41.001</td><td>S67</td><td>-0.113</td><td>0.000</td><td>0.49</td><td></td><td></td><td>29.7</td><td>OK</td><td></td></tr><tr><td>S41.002</td><td>S68</td><td>-0.118</td><td>0.000</td><td>0.46</td><td></td><td></td><td>30.1</td><td>OK</td><td></td></tr><tr><td>S1.010</td><td>S69</td><td>0.513</td><td>0.000</td><td>0.01</td><td></td><td></td><td>5.6</td><td>SURCHARGED</td><td></td></tr></table>										US/MH		Surcharged Flooded		Half Drain		Pipe	Level		PN	Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded	S20.010	S66	-0.147	0.000	0.68			161.0	OK		S40.000	S62	-0.110	0.000	0.16			4.5	OK		S20.011	S63	-0.127	0.000	0.76			169.7	OK		S20.012	S64	-0.050	0.000	0.08			20.7	OK		S41.000	S65	-0.150	0.000	0.24			17.5	OK		S42.000	S66	-0.086	0.000	0.37			12.6	OK		S41.001	S67	-0.113	0.000	0.49			29.7	OK		S41.002	S68	-0.118	0.000	0.46			30.1	OK		S1.010	S69	0.513	0.000	0.01			5.6	SURCHARGED	
US/MH		Surcharged Flooded		Half Drain		Pipe	Level																																																																																																															
PN	Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Exceeded																																																																																																													
S20.010	S66	-0.147	0.000	0.68			161.0	OK																																																																																																														
S40.000	S62	-0.110	0.000	0.16			4.5	OK																																																																																																														
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S41.000	S65	-0.150	0.000	0.24			17.5	OK																																																																																																														
S42.000	S66	-0.086	0.000	0.37			12.6	OK																																																																																																														
S41.001	S67	-0.113	0.000	0.49			29.7	OK																																																																																																														
S41.002	S68	-0.118	0.000	0.46			30.1	OK																																																																																																														
S1.010	S69	0.513	0.000	0.01			5.6	SURCHARGED																																																																																																														
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Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	100	+40%	100/15 Winter			
S2.000	S2	15 Winter	100	+40%	100/15 Summer			
S1.001	S3	15 Winter	100	+40%	100/15 Summer			
S3.000	S4	15 Winter	100	+40%	100/15 Summer			
S4.000	S5	15 Winter	100	+40%	100/15 Summer			
S3.001	S6	15 Winter	100	+40%	100/15 Summer			
S5.000	S7A	15 Winter	100	+40%	100/15 Summer			
S6.000	S7B	15 Winter	100	+40%	100/15 Summer			
S7.000	S7C	15 Winter	100	+40%	100/15 Summer			
S3.002	S7	15 Winter	100	+40%	100/15 Summer			
S8.000	S8	15 Winter	100	+40%	100/15 Summer			
S9.000	S9	15 Winter	100	+40%	100/15 Summer			
S3.003	S10	15 Winter	100	+40%	100/15 Summer	100/15 Winter		
S10.000	S10A	15 Winter	100	+40%	100/15 Summer			
S3.004	S11	15 Winter	100	+40%	100/15 Summer			
S11.000	S12	15 Winter	100	+40%	100/15 Summer			
S1.002	S13	15 Winter	100	+40%	100/15 Summer			
S12.000	S14	15 Winter	100	+40%	100/15 Summer			
S13.000	S15	15 Winter	100	+40%	100/15 Summer			

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Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH

PN	US/MH Name	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)					
S1.000	S1	16.506	0.169	0.000	0.28			6.9	SURCHARGED
S2.000	S2	16.521	0.373	0.000	1.06			14.5	SURCHARGED
S1.001	S3	16.489	0.389	0.000	0.86			59.3	SURCHARGED
S3.000	S4	17.655	0.770	0.000	0.70			10.0	SURCHARGED
S4.000	S5	17.645	0.753	0.000	0.30			4.5	SURCHARGED
S3.001	S6	17.635	0.803	0.000	0.68			42.9	SURCHARGED
S5.000	S7A	17.534	1.129	0.000	0.80			11.5	FLOOD RISK
S6.000	S7B	17.510	1.081	0.000	0.21			3.2	FLOOD RISK
S7.000	S7C	17.517	1.044	0.000	0.24			3.9	SURCHARGED
S3.002	S7	17.500	1.147	0.000	0.83			50.0	FLOOD RISK
S8.000	S8	17.316	1.177	0.000	0.27			4.0	FLOOD RISK
S9.000	S9	17.316	1.067	0.000	0.26			6.8	FLOOD RISK
S3.003	S10	17.302	1.230	0.042	1.23			77.1	FLOOD
S10.000	S10A	16.689	0.663	0.000	0.16			6.4	SURCHARGED
S3.004	S11	16.678	1.046	0.000	2.06			85.4	FLOOD RISK
S11.000	S12	16.323	0.737	0.000	0.87			11.6	SURCHARGED
S1.002	S13	16.302	0.761	0.000	0.90			138.5	SURCHARGED
S12.000	S14	16.048	0.578	0.000	0.34			9.1	SURCHARGED
S13.000	S15	16.058	0.854	0.000	1.00			13.1	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	S1	
S2.000	S2	
S1.001	S3	
S3.000	S4	
S4.000	S5	
S3.001	S6	
S5.000	S7A	
S6.000	S7B	
S7.000	S7C	
S3.002	S7	
S8.000	S8	
S9.000	S9	
S3.003	S10	1
S10.000	S10A	
S3.004	S11	
S11.000	S12	
S1.002	S13	
S12.000	S14	
S13.000	S15	

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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>								
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.003	S16	15 Winter	100	+40%	100/15 Summer			
S14.000	S17	15 Winter	100	+40%	100/15 Summer			
S15.000	S18	15 Winter	100	+40%	100/15 Summer			
S1.004	S19	15 Winter	100	+40%	100/15 Summer			
S16.000	S20	15 Winter	100	+40%	100/15 Summer			
S17.000	S21A	15 Winter	100	+40%	100/15 Summer			
S1.005	S21	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S18.000	S22A	15 Winter	100	+40%	100/15 Summer			
S1.006	S22	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.007	S25	15 Winter	100	+40%	100/15 Summer			
S19.000	S24	15 Winter	100	+40%	100/15 Summer			
S1.008	S25	1440 Winter	100	+40%	100/15 Summer			
S1.009	S26	1440 Winter	100	+40%	100/15 Summer			
S20.000	S27	15 Winter	100	+40%				
S20.001	S28	15 Winter	100	+40%				
S21.000	S29	15 Winter	100	+40%				
S20.002	S30	15 Winter	100	+40%	100/15 Summer			
S20.003	S31	15 Winter	100	+40%				
S22.000	S32	15 Winter	100	+40%	100/15 Summer			
S20.004	S33	15 Winter	100	+40%	100/15 Summer			
S23.000	S34	15 Winter	100	+40%	100/15 Summer			
S23.001	S38	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S24.000	S37	15 Winter	100	+40%	100/15 Summer	100/15 Winter		
S25.000	S38	15 Winter	100	+40%	100/15 Summer			
S24.001	S39	15 Winter	100	+40%	100/15 Summer			
S26.000	S40	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S23.002	S41	15 Winter	100	+40%	100/15 Summer			
S27.000	S42	15 Winter	100	+40%	100/15 Summer			
S28.000	S43	15 Winter	100	+40%	100/15 Summer			
S23.003	S44	15 Winter	100	+40%	100/15 Summer			
S20.005	S45	15 Winter	100	+40%	100/15 Summer			
S29.000	S46	15 Winter	100	+40%	100/15 Summer			
S30.000	S47	15 Winter	100	+40%	100/15 Summer			
S20.006	S48	15 Winter	100	+40%	100/15 Summer			
S31.000	S49	15 Winter	100	+40%				
S32.000	S50	15 Winter	100	+40%				
S31.001	S51	15 Winter	100	+40%				
S33.000	S52	15 Winter	100	+40%				
S34.000	S53	15 Winter	100	+40%				
S31.002	S54	15 Winter	100	+40%				
S35.000	S55	15 Winter	100	+40%	100/15 Winter			
S36.000	S56	15 Winter	100	+40%				
S31.003	S57	15 Winter	100	+40%	100/15 Summer			
S20.007	S58	15 Winter	100	+40%	100/15 Summer			
S37.000	S59	15 Winter	100	+40%	100/15 Summer			
S38.000	S60	15 Winter	100	+40%	100/15 Summer			
S20.008	S61	15 Winter	100	+40%	100/15 Summer			
S20.009	S65	15 Winter	100	+40%	100/15 Summer			
S39.000	S66A	15 Winter	100	+40%	100/15 Winter			
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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.003	S16	16.022	0.862	0.000	0.87			160.0	SURCHARGED
S14.000	S17	15.407	0.996	0.000	0.23			4.1	SURCHARGED
S15.000	S18	15.425	0.896	0.000	0.35			7.9	SURCHARGED
S1.004	S19	15.397	1.079	0.000	0.90			173.3	SURCHARGED
S16.000	S20	14.822	0.950	0.000	0.18			4.5	SURCHARGED
S17.000	S21A	14.840	1.164	0.000	0.60			10.0	FLOOD RISK
S1.005	S21	14.803	1.201	1.337	1.00			175.9	FLOOD
S18.000	S22A	14.376	0.924	0.000	0.38			10.4	SURCHARGED
S1.006	S22	14.311	1.203	1.389	1.66			196.3	FLOOD
S1.007	S25	13.677	0.840	0.000	1.13			205.8	FLOOD RISK
S19.000	S24	13.455	1.081	0.000	2.59			33.4	FLOOD RISK
S1.008	S25	13.304	0.999	0.000	0.21			21.1	FLOOD RISK
S1.009	S26	13.302	1.057	0.000	0.20			21.1	FLOOD RISK
S20.000	S27	17.268	-0.060	0.000	0.67			10.5	OK
S20.001	S28	17.081	-0.150	0.000	0.24			28.5	OK
S21.000	S29	16.447	-0.111	0.000	0.15			7.8	OK
S20.002	S30	15.503	0.013	0.000	1.21			36.1	SURCHARGED
S20.003	S31	15.444	-0.003	0.000	0.36			47.1	OK
S22.000	S32	15.377	0.265	0.000	0.08			3.6	SURCHARGED
S20.004	S33	15.370	0.839	0.000	0.35			42.0	SURCHARGED
S23.000	S34	15.465	1.199	0.000	0.36			4.3	FLOOD RISK
S23.001	S38	15.464	1.235	14.234	2.89			46.4	FLOOD
S24.000	S37	16.074	1.368	0.061	1.20			18.7	FLOOD
S25.000	S38	15.970	0.975	0.000	0.12			4.6	SURCHARGED
S24.001	S39	15.961	1.344	0.000	0.37			37.5	FLOOD RISK
S26.000	S40	15.852	1.154	3.101	0.72			33.3	FLOOD
S23.002	S41	15.887	1.780	0.000	1.52			58.2	FLOOD RISK
S27.000	S42	15.794	1.322	0.000	0.33			15.5	SURCHARGED
S28.000	S43	15.761	1.071	0.000	0.21			10.5	SURCHARGED
S23.003	S44	15.719	1.879	0.000	2.14			75.9	SURCHARGED
S20.005	S45	15.296	1.553	0.000	2.02			113.0	SURCHARGED
S29.000	S46	15.107	0.970	0.000	0.11			4.4	SURCHARGED
S30.000	S47	15.267	0.923	0.000	0.50			24.0	SURCHARGED
S20.006	S48	15.098	1.398	0.000	2.32			147.4	SURCHARGED
S31.000	S49	16.178	-0.054	0.000	0.72			10.9	OK
S32.000	S50	16.160	-0.095	0.000	0.29			5.2	OK
S31.001	S51	16.048	-0.120	0.000	0.44			35.8	OK
S33.000	S52	15.787	-0.097	0.000	0.27			7.6	OK
S34.000	S53	15.668	-0.059	0.000	0.67			7.8	OK
S31.002	S54	15.565	-0.104	0.000	0.56			68.7	OK
S35.000	S55	14.736	0.070	0.000	0.07			2.9	SURCHARGED
S36.000	S56	14.875	-0.125	0.000	0.06			3.1	OK
S31.003	S57	14.733	0.498	0.000	0.60			67.8	SURCHARGED
S20.007	S58	14.554	0.957	0.000	2.46			209.2	SURCHARGED
S37.000	S59	14.292	0.112	0.000	0.06			2.9	SURCHARGED
S38.000	S60	14.307	0.235	0.000	0.24			10.7	SURCHARGED
S20.008	S61	14.285	0.732	0.000	2.81			234.9	SURCHARGED
S20.009	S65	13.931	0.419	0.000	2.72			232.8	SURCHARGED
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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH</u>								
	Water	Surcharged	Flooded			Half Drain	Pipe	
PN	US/MH	Level	Depth	Volume	Flow /	Overflow	Time	Flow
	Name	(m)	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)
								Status
S39.000	S66A	13.595	0.008	0.000	0.51			10.3 SURCHARGED
	US/MH	Level						
PN	Name	Exceeded						
S1.003	S16							
S14.000	S17							
S15.000	S18							
S1.004	S19							
S16.000	S20							
S17.000	S21A							
S1.005	S21	2						
S18.000	S22A							
S1.006	S22	4						
S1.007	S25							
S19.000	S24							
S1.008	S25							
S1.009	S26							
S20.000	S27							
S20.001	S28							
S21.000	S29							
S20.002	S30							
S20.003	S31							
S22.000	S32							
S20.004	S33							
S23.000	S34							
S23.001	S38	6						
S24.000	S37	1						
S25.000	S38							
S24.001	S39							
S26.000	S40	4						
S23.002	S41							
S27.000	S42							
S28.000	S43							
S23.003	S44							
S20.005	S45							
S29.000	S46							
S30.000	S47							
S20.006	S48							
S31.000	S49							
S32.000	S50							
S31.001	S51							
S33.000	S52							
S34.000	S53							
S31.002	S54							
S35.000	S55							
S36.000	S56							
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	<table><tr><td></td><td>US/MH</td><td>Level</td></tr><tr><td>PN</td><td>Name</td><td>Exceeded</td></tr><tr><td>S31.003</td><td>S57</td><td></td></tr><tr><td>S20.007</td><td>S58</td><td></td></tr><tr><td>S37.000</td><td>S59</td><td></td></tr><tr><td>S38.000</td><td>S60</td><td></td></tr><tr><td>S20.008</td><td>S61</td><td></td></tr><tr><td>S20.009</td><td>S65</td><td></td></tr><tr><td>S39.000</td><td>S66A</td><td></td></tr></table>		US/MH	Level	PN	Name	Exceeded	S31.003	S57		S20.007	S58		S37.000	S59		S38.000	S60		S20.008	S61		S20.009	S65		S39.000	S66A		
	US/MH	Level																											
PN	Name	Exceeded																											
S31.003	S57																												
S20.007	S58																												
S37.000	S59																												
S38.000	S60																												
S20.008	S61																												
S20.009	S65																												
S39.000	S66A																												
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Summary of Critical Results by Maximum Level (Rank 1) for STORM NORTH

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S20.010	S66	15 Winter	100	+40%	100/15 Summer			
S40.000	S62	1440 Winter	100	+40%				
S20.011	S63	1440 Winter	100	+40%	100/15 Summer			
S20.012	S64	1440 Winter	100	+40%	100/30 Winter			
S41.000	S65	15 Winter	100	+40%				
S42.000	S66	15 Winter	100	+40%				
S41.001	S67	1440 Winter	100	+40%	100/480 Winter			
S41.002	S68	1440 Winter	100	+40%	100/120 Winter			
S1.010	S69	1440 Winter	100	+40%	100/15 Summer			

PN	US/MH Name	Water Surcharged Flooded			Half Drain		Pipe		Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	
S20.010	S66	13.575	0.109	0.000	1.01			240.6	SURCHARGED
S40.000	S62	13.305	-0.037	0.000	0.02			0.4	OK
S20.011	S63	13.304	0.208	0.000	0.10			21.7	SURCHARGED
S20.012	S64	13.303	0.563	0.000	0.08			21.3	SURCHARGED
S41.000	S65	13.472	-0.121	0.000	0.43			31.7	OK
S42.000	S66	13.430	-0.059	0.000	0.67			22.7	OK
S41.001	S67	13.303	0.104	0.000	0.05			2.9	SURCHARGED
S41.002	S68	13.302	0.413	0.000	0.04			2.9	SURCHARGED
S1.010	S69	13.301	1.126	0.000	0.01			5.8	FLOOD RISK

PN	US/MH Name	Level Exceeded
S20.010	S66	
S40.000	S62	
S20.011	S63	
S20.012	S64	
S41.000	S65	
S42.000	S66	
S41.001	S67	
S41.002	S68	
S1.010	S69	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for STORM SOUTH

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for STORM SOUTH

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	8.350	0.083	100.9	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	45.674	0.270	169.0	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	4.766	0.130	36.7	0.012	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	25.430	0.209	121.7	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	3.700	0.037	100.0	0.016	5.00	0.0	0.600	o	100	Pipe/Conduit	
S3.001	24.713	0.190	130.0	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.002	6.115	0.051	119.9	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	38.916	0.391	99.5	0.036	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.14	17.244	0.023	0.0	0.0	0.0	1.00	17.7	3.1
S1.001	50.00	5.90	17.087	0.051	0.0	0.0	0.0	1.00	39.9	6.9
S2.000	50.00	5.05	17.022	0.012	0.0	0.0	0.0	1.67	29.5	1.6
S1.002	50.00	6.26	16.816	0.091	0.0	0.0	0.0	1.18	47.1	12.3
S3.000	50.00	5.08	17.011	0.016	0.0	0.0	0.0	0.77	6.0	2.2
S3.001	50.00	5.55	16.924	0.041	0.0	0.0	0.0	0.88	15.5	5.6
S3.002	50.00	5.66	16.734	0.054	0.0	0.0	0.0	0.92	16.2	7.3
S1.003	50.00	6.67	16.532	0.181	0.0	0.0	0.0	1.58	111.4	24.5

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Network Design Table for STORM SOUTH											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.000	4.738	0.163	29.1	0.094	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	26.259	0.259	101.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	4.699	0.146	32.2	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	21.319	0.088	241.0	0.047	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	4.300	0.211	20.4	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.006	18.914	0.078	241.0	0.003	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	5.536	0.023	241.0	0.032	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	5.500	0.023	241.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.000	4.326	0.549	7.9	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.009	29.749	0.123	241.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.000	5.606	0.603	9.3	0.027	5.00	0.0	0.600	o	150	Pipe/Conduit	
S9.000	13.450	0.090	150.0	0.076	5.00	0.0	0.600	o	150	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S4.000	50.00	5.04	16.455	0.094	0.0	0.0	0.0	1.87	33.1	12.8	
S1.004	50.00	6.95	16.141	0.275	0.0	0.0	0.0	1.56	110.4	37.3	
S5.000	50.00	5.04	16.179	0.014	0.0	0.0	0.0	1.78	31.5	1.9	
S1.005	50.00	7.30	15.882	0.337	0.0	0.0	0.0	1.01	71.3	45.6	
S6.000	50.00	5.03	16.155	0.018	0.0	0.0	0.0	2.24	39.6	2.5	
S1.006	50.00	7.61	15.794	0.359	0.0	0.0	0.0	1.01	71.3	48.6	
S1.007	50.00	7.70	15.715	0.391	0.0	0.0	0.0	1.01	71.3	52.9	
S1.008	50.00	7.80	15.693	0.391	0.0	0.0	0.0	1.01	71.3	52.9	
S7.000	50.00	5.02	16.369	0.015	0.0	0.0	0.0	3.61	63.8	2.0	
S1.009	50.00	8.29	15.670	0.406	0.0	0.0	0.0	1.01	71.3	54.9	
S8.000	50.00	5.03	16.300	0.027	0.0	0.0	0.0	3.32	58.7	3.7	
S9.000	50.00	5.27	16.014	0.076	0.0	0.0	0.0	0.82	14.5	10.3	
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Network Design Table for STORM SOUTH											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S10.000	8.703	0.066	131.9	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit	
S9.001	23.388	0.160	146.2	0.056	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.000	6.668	0.489	13.6	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
S9.002	7.320	0.067	109.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.010	28.649	0.119	241.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.011	19.203	0.080	241.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.012	7.680	0.268	28.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S12.000	7.073	0.071	99.6	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
S13.000	5.650	0.056	100.9	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
S13.001	39.916	0.396	100.9	0.062	0.00	0.0	0.600	o	150	Pipe/Conduit	
S13.002	9.140	0.140	65.3	0.049	0.00	0.0	0.600	o	150	Pipe/Conduit	
S12.001	28.349	0.242	117.1	0.076	0.00	0.0	0.600	o	225	Pipe/Conduit	
S14.000	5.233	0.143	36.6	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
S14.001	14.990	0.149	100.9	0.015	0.00	0.0	0.600	o	150	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S10.000	50.00	5.17	15.990	0.032	0.0	0.0	0.0	0.87	15.4	4.3	
S9.001	50.00	5.64	15.849	0.163	0.0	0.0	0.0	1.08	42.9	22.1	
S11.000	50.00	5.04	16.253	0.008	0.0	0.0	0.0	2.74	48.5	1.1	
S9.002	50.00	5.73	15.689	0.172	0.0	0.0	0.0	1.25	49.7	23.2	
S1.010	50.00	8.70	15.471	0.604	0.0	0.0	0.0	1.16	128.4	81.8	
S1.011	50.00	8.97	15.352	0.604	0.0	0.0	0.0	1.16	128.4	81.8	
S1.012	50.00	9.01	15.273	0.604	0.0	0.0	0.0	3.40	375.1	81.8	
S12.000	50.00	5.12	16.421	0.026	0.0	0.0	0.0	1.01	17.8	3.6	
S13.000	50.00	5.12	16.992	0.018	0.0	0.0	0.0	0.77	6.0	2.4	
S13.001	50.00	5.79	16.886	0.080	0.0	0.0	0.0	1.00	17.7	10.9	
S13.002	50.00	5.91	16.490	0.129	0.0	0.0	0.0	1.25	22.0	17.5	
S12.001	50.00	6.30	16.275	0.232	0.0	0.0	0.0	1.21	48.0	31.4	
S14.000	50.00	5.05	16.400	0.008	0.0	0.0	0.0	1.67	29.5	1.1	
S14.001	50.00	5.30	16.257	0.023	0.0	0.0	0.0	1.00	17.7	3.1	
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<u>Network Design Table for STORM SOUTH</u>												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S12.002	10.370	0.043	241.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
S15.000	7.746	0.573	13.5	0.062	5.00	0.0	0.600	o	150	Pipe/Conduit		
S16.000	5.957	0.427	14.0	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit		
S12.003	26.418	0.109	241.9	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit		
S17.000	6.074	0.061	99.6	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit		
S18.000	6.074	0.065	93.4	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit		
S12.004	17.263	0.071	241.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
S19.000	6.164	0.061	101.0	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit		
S12.005	11.191	0.046	242.0	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit		
S20.000	6.510	0.124	52.5	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit		
S12.006	11.080	0.091	121.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
<u>Network Results Table</u>												
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)		
S12.002	50.00	6.47	15.958	0.255	0.0	0.0	0.0	1.01	71.1	34.5		
S15.000	50.00	5.05	16.638	0.062	0.0	0.0	0.0	2.75	48.7	8.4		
S16.000	50.00	5.04	16.492	0.021	0.0	0.0	0.0	2.71	47.9	2.9		
S12.003	50.00	6.91	15.915	0.368	0.0	0.0	0.0	1.01	71.1	49.8		
S17.000	50.00	5.10	16.017	0.004	0.0	0.0	0.0	1.01	17.8	0.5		
S18.000	50.00	5.10	16.021	0.008	0.0	0.0	0.0	1.04	18.4	1.1		
S12.004	50.00	7.20	15.806	0.379	0.0	0.0	0.0	1.01	71.1	51.4		
S19.000	50.00	5.10	15.946	0.021	0.0	0.0	0.0	1.00	17.7	2.8		
S12.005	50.00	7.38	15.734	0.425	0.0	0.0	0.0	1.01	71.1	57.5		
S20.000	50.00	5.08	15.951	0.018	0.0	0.0	0.0	1.39	24.6	2.4		
S12.006	50.00	7.51	15.677	0.442	0.0	0.0	0.0	1.42	100.6	59.9		
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Network Design Table for STORM SOUTH											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S21.000	13.783	0.336	41.0	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
S12.007	20.387	0.068	300.0	0.085	0.00	0.0	0.600	o	375	Pipe/Conduit	
S22.000	7.697	0.232	33.2	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
S23.000	4.590	0.282	16.3	0.029	5.00	0.0	0.600	o	150	Pipe/Conduit	
S12.008	19.583	0.065	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S24.000	4.516	0.197	22.9	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
S25.000	5.645	0.297	19.0	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
S12.009	17.038	0.057	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S26.000	7.761	0.154	50.4	0.016	5.00	0.0	0.600	o	150	Pipe/Conduit	
S12.010	5.768	0.036	160.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S27.000	4.003	0.090	44.5	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S21.000	50.00	5.15	16.072	0.006	0.0	0.0	0.0	1.58	27.8	0.7	
S12.007	50.00	7.84	15.511	0.533	0.0	0.0	0.0	1.04	115.0	72.2	
S22.000	50.00	5.07	15.900	0.008	0.0	0.0	0.0	1.75	31.0	1.0	
S23.000	50.00	5.03	15.950	0.029	0.0	0.0	0.0	2.51	44.3	3.9	
S12.008	50.00	8.15	15.443	0.570	0.0	0.0	0.0	1.04	115.0	77.1	
S24.000	50.00	5.04	15.800	0.026	0.0	0.0	0.0	2.11	37.3	3.5	
S25.000	50.00	5.04	15.900	0.018	0.0	0.0	0.0	2.32	41.0	2.5	
S12.009	50.00	8.42	15.378	0.614	0.0	0.0	0.0	1.04	115.0	83.1	
S26.000	50.00	5.09	15.700	0.016	0.0	0.0	0.0	1.42	25.1	2.2	
S12.010	50.00	8.49	15.321	0.630	0.0	0.0	0.0	1.43	157.8	85.3	
S27.000	50.00	5.04	15.600	0.008	0.0	0.0	0.0	1.51	26.7	1.1	
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<u>Network Design Table for STORM SOUTH</u> <table><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>I.Area (ha)</th><th>T.E. (mins)</th><th>Base Flow (l/s)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th><th>Section Type</th><th>Auto Design</th></tr><tr><td>S12.011</td><td>21.490</td><td>0.072</td><td>300.0</td><td>0.058</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>375</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S12.012</td><td>21.812</td><td>0.073</td><td>300.0</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>375</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S28.000</td><td>10.696</td><td>0.399</td><td>26.8</td><td>0.073</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S12.013</td><td>17.216</td><td>0.057</td><td>300.0</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>375</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S12.014</td><td>14.721</td><td>0.049</td><td>300.0</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>375</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S12.015</td><td>8.750</td><td>0.029</td><td>300.0</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>375</td><td>Pipe/Conduit</td><td></td></tr><tr><td>S1.013</td><td>3.221</td><td>0.013</td><td>250.0</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>450</td><td>Pipe/Conduit</td><td></td></tr></table> <u>Network Results Table</u> <table><tr><th>PN</th><th>Rain (mm/hr)</th><th>T.C. (mins)</th><th>US/IL (m)</th><th>Σ I.Area (ha)</th><th>Σ Base Flow (l/s)</th><th>Foul (l/s)</th><th>Add Flow (l/s)</th><th>Vel (m/s)</th><th>Cap (l/s)</th><th>Flow (l/s)</th></tr><tr><td>S12.011</td><td>50.00</td><td>8.84</td><td>15.285</td><td>0.696</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.04</td><td>115.0</td><td>94.2</td></tr><tr><td>S12.012</td><td>50.00</td><td>9.19</td><td>15.213</td><td>0.696</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.04</td><td>115.0</td><td>94.2</td></tr><tr><td>S28.000</td><td>50.00</td><td>5.09</td><td>15.765</td><td>0.073</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.95</td><td>34.5</td><td>9.9</td></tr><tr><td>S12.013</td><td>50.00</td><td>9.46</td><td>15.141</td><td>0.769</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.04</td><td>115.0</td><td>104.1</td></tr><tr><td>S12.014</td><td>50.00</td><td>9.70</td><td>15.083</td><td>0.769</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.04</td><td>115.0</td><td>104.1</td></tr><tr><td>S12.015</td><td>50.00</td><td>9.84</td><td>15.034</td><td>0.769</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.04</td><td>115.0</td><td>104.1</td></tr><tr><td>S1.013</td><td>50.00</td><td>9.88</td><td>14.930</td><td>1.373</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.28</td><td>203.8</td><td>186.0</td></tr></table>												PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design	S12.011	21.490	0.072	300.0	0.058	0.00	0.0	0.600	o	375	Pipe/Conduit		S12.012	21.812	0.073	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		S28.000	10.696	0.399	26.8	0.073	5.00	0.0	0.600	o	150	Pipe/Conduit		S12.013	17.216	0.057	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		S12.014	14.721	0.049	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		S12.015	8.750	0.029	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit		S1.013	3.221	0.013	250.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		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)	S12.011	50.00	8.84	15.285	0.696	0.0	0.0	0.0	1.04	115.0	94.2	S12.012	50.00	9.19	15.213	0.696	0.0	0.0	0.0	1.04	115.0	94.2	S28.000	50.00	5.09	15.765	0.073	0.0	0.0	0.0	1.95	34.5	9.9	S12.013	50.00	9.46	15.141	0.769	0.0	0.0	0.0	1.04	115.0	104.1	S12.014	50.00	9.70	15.083	0.769	0.0	0.0	0.0	1.04	115.0	104.1	S12.015	50.00	9.84	15.034	0.769	0.0	0.0	0.0	1.04	115.0	104.1	S1.013	50.00	9.88	14.930	1.373	0.0	0.0	0.0	1.28	203.8	186.0
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design																																																																																																																																																																																								
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S12.015	8.750	0.029	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit																																																																																																																																																																																									
S1.013	3.221	0.013	250.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit																																																																																																																																																																																									
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Manhole Schedules for STORM SOUTH

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)
S1	18.447	1.203	Open Manhole	600	S1.000	17.244	150				
S2	18.705	1.619	Open Manhole	1200	S1.001	17.087	225	S1.000	17.162	150	
S3	18.430	1.408	Open Manhole	600	S2.000	17.022	150				
S4	18.287	1.470	Open Manhole	1200	S1.002	16.816	225	S1.001	16.816	225	
								S2.000	16.892	150	1
S5	18.362	1.351	Open Manhole	600	S3.000	17.011	100				
S6	18.401	1.477	Open Manhole	1200	S3.001	16.924	150	S3.000	16.974	100	
S7	18.192	1.458	Open Manhole	1200	S3.002	16.734	150	S3.001	16.734	150	
S8	18.032	1.500	Open Manhole	1200	S1.003	16.532	300	S1.002	16.607	225	
								S3.002	16.683	150	
S9	17.805	1.350	Open Manhole	600	S4.000	16.455	150				
S10	17.642	1.500	Open Manhole	1200	S1.004	16.141	300	S1.003	16.141	300	
								S4.000	16.292	150	1
S11	17.529	1.350	Open Manhole	600	S5.000	16.179	150				
S12	17.383	1.500	Open Manhole	1200	S1.005	15.882	300	S1.004	15.882	300	
								S5.000	16.033	150	1
S13	17.505	1.350	Open Manhole	600	S6.000	16.155	150				
S14	17.305	1.511	Open Manhole	1200	S1.006	15.794	300	S1.005	15.794	300	
								S6.000	15.944	150	
S15	17.501	1.786	Open Manhole	1200	S1.007	15.715	300	S1.006	15.715	300	
S16	17.554	1.861	Open Manhole	1200	S1.008	15.693	300	S1.007	15.693	300	
S17	17.719	1.350	Open Manhole	600	S7.000	16.369	150				
S18	17.614	1.944	Open Manhole	1200	S1.009	15.670	300	S1.008	15.670	300	
								S7.000	15.820	150	
S19	17.711	1.411	Open Manhole	600	S8.000	16.300	150				
S20	17.364	1.350	Open Manhole	600	S9.000	16.014	150				
S21	17.340	1.350	Open Manhole	600	S10.000	15.990	150				
S22	17.316	1.467	Open Manhole	1200	S9.001	15.849	225	S9.000	15.924	150	
								S10.000	15.924	150	
S23	17.603	1.350	Open Manhole	600	S11.000	16.253	150				
S24	17.560	1.871	Open Manhole	1200	S9.002	15.689	225	S9.001	15.689	225	
								S11.000	15.764	150	
S25	17.636	2.164	Open Manhole	1350	S1.010	15.471	375	S1.009	15.546	300	
								S8.000	15.697	150	1
								S9.002	15.622	225	1
S26	17.090	1.737	Open Manhole	1350	S1.011	15.352	375	S1.010	15.352	375	
S27	17.001	1.729	Open Manhole	1350	S1.012	15.273	375	S1.011	15.273	375	
S28	17.788	1.367	Open Manhole	600	S12.000	16.421	150				

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Manhole Schedules for STORM SOUTH

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)
S29	18.216	1.224	Open Manhole	600	S13.000	16.992	100				
S30	18.326	1.440	Open Manhole	1200	S13.001	16.886	150	S13.000	16.936	100	
S31	17.911	1.420	Open Manhole	1200	S13.002	16.490	150	S13.001	16.490	150	
S32	17.700	1.425	Open Manhole	1200	S12.001	16.275	225	S12.000	16.350	150	
								S13.002	16.350	150	
S33	17.750	1.350	Open Manhole	600	S14.000	16.400	150				
S34	17.607	1.350	Open Manhole	1200	S14.001	16.257	150	S14.000	16.257	150	
S35	17.843	1.885	Open Manhole	1200	S12.002	15.958	300	S12.001	16.033	225	
								S14.001	16.108	150	
S36	17.989	1.351	Open Manhole	1200	S15.000	16.638	150				
S37	17.890	1.398	Open Manhole	600	S16.000	16.492	150				
S38	17.761	1.846	Open Manhole	1200	S12.003	15.915	300	S12.002	15.915	300	
								S15.000	16.065	150	
								S16.000	16.065	150	
S39	17.701	1.684	Open Manhole	600	S17.000	16.017	150				
S40	17.525	1.504	Open Manhole	600	S18.000	16.021	150				
S41	17.505	1.699	Open Manhole	1200	S12.004	15.806	300	S12.003	15.806	300	
								S17.000	15.956	150	
								S18.000	15.956	150	
S42	17.386	1.440	Open Manhole	600	S19.000	15.946	150				
S43	17.323	1.588	Open Manhole	1200	S12.005	15.734	300	S12.004	15.734	300	
								S19.000	15.885	150	
S44	17.301	1.350	Open Manhole	600	S20.000	15.951	150				
S45	17.211	1.534	Open Manhole	1200	S12.006	15.677	300	S12.005	15.688	300	
								S20.000	15.827	150	
S46	17.422	1.350	Open Manhole	600	S21.000	16.072	150				
S47	17.086	1.575	Open Manhole	1350	S12.007	15.511	375	S12.006	15.586	300	
								S21.000	15.736	150	
S48	17.305	1.405	Open Manhole	600	S22.000	15.900	150				
S49	17.321	1.371	Open Manhole	600	S23.000	15.950	150				
S50	17.213	1.770	Open Manhole	1350	S12.008	15.443	375	S12.007	15.443	375	
								S22.000	15.668	150	
								S23.000	15.668	150	
S51	17.209	1.409	Open Manhole	600	S24.000	15.800	150				
S52	17.236	1.336	Open Manhole	600	S25.000	15.900	150				
S53	17.092	1.714	Open Manhole	1350	S12.009	15.378	375	S12.008	15.378	375	
								S24.000	15.603	150	
								S25.000	15.603	150	

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Manhole Schedules for STORM SOUTH

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)
S54	17.030	1.330	Open Manhole	600	S26.000	15.700	150				
S55	16.932	1.611	Open Manhole	1350	S12.010	15.321	375	S12.009	15.321	375	
								S26.000	15.546	150	
S56	16.988	1.388	Open Manhole	600	S27.000	15.600	150				
S57	16.860	1.575	Open Manhole	1350	S12.011	15.285	375	S12.010	15.285	375	
								S27.000	15.510	150	
S58	16.645	1.431	Open Manhole	1350	S12.012	15.213	375	S12.011	15.213	375	
S59	17.115	1.350	Open Manhole	1200	S28.000	15.765	150				
S60	16.871	1.731	Open Manhole	1350	S12.013	15.141	375	S12.012	15.141	375	
								S28.000	15.366	150	
S61	16.964	1.881	Open Manhole	1350	S12.014	15.083	375	S12.013	15.083	375	
S62	16.976	1.942	Open Manhole	1350	S12.015	15.034	375	S12.014	15.034	375	
S63	16.997	2.068	Open Manhole	1350	S1.013	14.930	450	S1.012	15.005	375	
								S12.015	15.005	375	
S	17.005	2.088	Open Manhole	0		OUTFALL		S1.013	14.917	450	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	507600.828	104591.424	507600.828	104591.424	Required	
S2	507609.104	104590.317	507609.104	104590.317	Required	
S3	507600.289	104547.015	507600.289	104547.015	Required	
S4	507604.546	104544.871	507604.546	104544.871	Required	
S5	507574.099	104525.258	507574.099	104525.258	Required	
S6	507573.844	104521.567	507573.844	104521.567	Required	
S7	507598.499	104519.863	507598.499	104519.863	Required	

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<u>Manhole Schedules for STORM SOUTH</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S8	507604.600	104519.441	507604.600	104519.441	Required	
S9	507599.956	104480.858	507599.956	104480.858	Required	
S10	507604.682	104480.526	507604.682	104480.526	Required	
S11	507603.357	104453.503	507603.357	104453.503	Required	
S12	507607.955	104454.471	507607.955	104454.471	Required	
S13	507608.142	104432.723	507608.142	104432.723	Required	
S14	507612.350	104433.610	507612.350	104433.610	Required	
S15	507616.249	104415.101	507616.249	104415.101	Required	
S16	507614.301	104409.919	507614.301	104409.919	Required	
S17	507609.484	104410.300	507609.484	104410.300	Required	
S18	507610.376	104406.067	507610.376	104406.067	Required	
S19	507581.516	104403.042	507581.516	104403.042	Required	
S20	507554.637	104428.599	507554.637	104428.599	Required	
S21	507550.757	104411.354	507550.757	104411.354	Required	
S22	507558.318	104415.662	507558.318	104415.662	Required	
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<u>Manhole Schedules for STORM SOUTH</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S23	507569.874	104394.475	507569.874	104394.475	Required	
S24	507574.752	104399.021	507574.752	104399.021	Required	
S25	507581.902	104397.450	507581.902	104397.450	Required	
S26	507579.084	104368.940	507579.084	104368.940	Required	
S27	507593.568	104356.332	507593.568	104356.332	Required	
S28	507502.827	104517.647	507502.827	104517.647	Required	
S29	507558.206	104528.871	507558.206	104528.871	Required	
S30	507558.639	104523.238	507558.639	104523.238	Required	
S31	507518.841	104520.178	507518.841	104520.178	Required	
S32	507509.813	104518.751	507509.813	104518.751	Required	
S33	507498.786	104499.168	507498.786	104499.168	Required	
S34	507499.603	104493.999	507499.603	104493.999	Required	
S35	507514.237	104490.750	507514.237	104490.750	Required	
S36	507521.618	104479.484	507521.618	104479.484	Required	
S37	507508.046	104481.347	507508.046	104481.347	Required	
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<u>Manhole Schedules for STORM SOUTH</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S38	507513.924	104480.384	507513.924	104480.384	Required	
S39	507515.646	104455.318	507515.646	104455.318	Required	
S40	507503.665	104453.308	507503.665	104453.308	Required	
S41	507509.656	104454.313	507509.656	104454.313	Required	
S42	507506.348	104437.336	507506.348	104437.336	Required	
S43	507512.512	104437.288	507512.512	104437.288	Required	
S44	507506.067	104425.808	507506.067	104425.808	Required	
S45	507512.571	104426.097	507512.571	104426.097	Required	
S46	507524.500	104427.722	507524.500	104427.722	Required	
S47	507517.200	104416.031	507517.200	104416.031	Required	
S48	507520.776	104401.014	507520.776	104401.014	Required	
S49	507510.606	104396.276	507510.606	104396.276	Required	
S50	507515.165	104395.746	507515.165	104395.746	Required	
S51	507508.389	104376.132	507508.389	104376.132	Required	
S52	507518.454	104377.314	507518.454	104377.314	Required	
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<u>Manhole Schedules for STORM SOUTH</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S53	507512.902	104376.294	507512.902	104376.294	Required	
S54	507508.995	104362.719	507508.995	104362.719	Required	
S55	507516.081	104359.555	507516.081	104359.555	Required	
S56	507521.979	104358.487	507521.979	104358.487	Required	
S57	507519.788	104355.136	507519.788	104355.136	Required	
S58	507537.777	104343.378	507537.777	104343.378	Required	
S59	507559.503	104354.247	507559.503	104354.247	Required	
S60	507559.588	104343.552	507559.588	104343.552	Required	
S61	507576.803	104343.689	507576.803	104343.689	Required	
S62	507591.411	104345.507	507591.411	104345.507	Required	
S63	507598.585	104350.517	507598.585	104350.517	Required	
S	507600.120	104347.686			No Entry	
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<u>Online Controls for STORM SOUTH</u> <u>Pump Manhole: S63, DS/PN: S1.013, Volume (m³): 4.5</u> Invert Level (m) 14.930		
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Storage Structures for STORM SOUTH

Infiltration Basin Manhole: S63, DS/PN: S1.013

Invert Level (m) 15.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.83988 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.83988

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	293.0	0.700	487.5	1.400	731.3	2.100	0.0
0.100	317.8	0.800	519.3	1.500	770.2	2.200	0.0
0.200	343.6	0.900	552.2	1.600	810.0	2.300	0.0
0.300	370.3	1.000	586.0	1.700	850.9	2.400	0.0
0.400	398.1	1.100	620.8	1.800	892.7	2.500	0.0
0.500	426.9	1.200	656.6	1.900	935.6		
0.600	456.7	1.300	693.5	2.000	979.5		

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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH</u>								
Simulation Criteria								
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000		
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000		
Hot Start Level (mm)		0		Inlet Coefficient		0.800		
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000		
Foul Sewage per hectare (l/s)		0.000						
Number of Input Hydrographs		0		Number of Storage Structures		1		
Number of Online Controls		1		Number of Time/Area Diagrams		0		
Number of Offline Controls		0		Number of Real Time Controls		0		
Synthetic Rainfall Details								
Rainfall Model		FSR		Ratio R		0.350		
Region England and Wales		Cv (Summer)		0.750				
M5-60 (mm)		19.000		Cv (Winter)		0.840		
Margin for Flood Risk Warning (mm)				300.0				
Analysis Timestep		2.5		Second Increment (Extended)				
DTS Status				ON				
DVD Status				OFF				
Inertia Status				OFF				
Profile(s)				Summer and Winter				
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440						
Return Period(s) (years)				2				
Climate Change (%)				0				
Water								
US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.
S1.000	S1	15 Winter	2	+0%				17.294
S1.001	S2	15 Winter	2	+0%				17.155
S2.000	S3	15 Winter	2	+0%				17.051
S1.002	S4	15 Winter	2	+0%				16.901
S3.000	S5	15 Winter	2	+0%				17.062
S3.001	S6	15 Winter	2	+0%				16.992
S3.002	S7	15 Winter	2	+0%				16.816
S1.003	S8	15 Winter	2	+0%				16.634
S4.000	S9	15 Winter	2	+0%				16.540
S1.004	S10	15 Winter	2	+0%				16.274
S5.000	S11	15 Winter	2	+0%				16.210
S1.005	S12	15 Winter	2	+0%				16.092
S6.000	S13	15 Winter	2	+0%				16.187
S1.006	S14	15 Winter	2	+0%				16.049
S1.007	S15	15 Winter	2	+0%				16.004
S1.008	S16	15 Winter	2	+0%				15.941
S7.000	S17	15 Winter	2	+0%				16.391
S1.009	S18	15 Winter	2	+0%				15.870
S8.000	S19	15 Winter	2	+0%				16.331
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Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH

PN	US/MH Name	Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)				
S1.000	S1	-0.100	0.000	0.24			3.7	OK	
S1.001	S2	-0.157	0.000	0.20			7.4	OK	
S2.000	S3	-0.121	0.000	0.08			1.9	OK	
S1.002	S4	-0.141	0.000	0.30			13.1	OK	
S3.000	S5	-0.049	0.000	0.51			2.6	OK	
S3.001	S6	-0.082	0.000	0.41			6.1	OK	
S3.002	S7	-0.068	0.000	0.58			7.9	OK	
S1.003	S8	-0.199	0.000	0.25			25.4	OK	
S4.000	S9	-0.065	0.000	0.61			15.4	OK	
S1.004	S10	-0.167	0.000	0.40			39.9	OK	
S5.000	S11	-0.119	0.000	0.10			2.3	OK	
S1.005	S12	-0.091	0.000	0.76			47.3	OK	
S6.000	S13	-0.118	0.000	0.10			3.0	OK	
S1.006	S14	-0.045	0.000	0.77			47.5	OK	
S1.007	S15	-0.011	0.000	1.00			48.6	OK	
S1.008	S16	-0.052	0.000	1.00			48.5	OK	
S7.000	S17	-0.128	0.000	0.05			2.4	OK	
S1.009	S18	-0.100	0.000	0.77			50.0	OK	
S8.000	S19	-0.119	0.000	0.09			4.4	OK	

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<table><tr><th>PN</th><th>US/MH Name</th><th>Storm</th><th>Return Period</th><th>Climate Change</th><th>First (X) Surcharge</th><th>First (Y) Flood</th><th>First (Z) Overflow</th><th>Overflow Act.</th><th>Water Level (m)</th></tr><tr><td>S9.000</td><td>S20</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.130</td></tr><tr><td>S10.000</td><td>S21</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.055</td></tr><tr><td>S9.001</td><td>S22</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.981</td></tr><tr><td>S11.000</td><td>S23</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.271</td></tr><tr><td>S9.002</td><td>S24</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.831</td></tr><tr><td>S1.010</td><td>S25</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.700</td></tr><tr><td>S1.011</td><td>S26</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.587</td></tr><tr><td>S1.012</td><td>S27</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.431</td></tr><tr><td>S12.000</td><td>S28</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.475</td></tr><tr><td>S13.000</td><td>S29</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>17.045</td></tr><tr><td>S13.001</td><td>S30</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.977</td></tr><tr><td>S13.002</td><td>S31</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.604</td></tr><tr><td>S12.001</td><td>S32</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.419</td></tr><tr><td>S14.000</td><td>S33</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.423</td></tr><tr><td>S14.001</td><td>S34</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.304</td></tr><tr><td>S12.002</td><td>S35</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.149</td></tr><tr><td>S15.000</td><td>S36</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.688</td></tr><tr><td>S16.000</td><td>S37</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.522</td></tr><tr><td>S12.003</td><td>S38</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.123</td></tr><tr><td>S17.000</td><td>S39</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.040</td></tr><tr><td>S18.000</td><td>S40</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.050</td></tr><tr><td>S12.004</td><td>S41</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.034</td></tr><tr><td>S19.000</td><td>S42</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.995</td></tr><tr><td>S12.005</td><td>S43</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.983</td></tr><tr><td>S20.000</td><td>S44</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.988</td></tr><tr><td>S12.006</td><td>S45</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.878</td></tr><tr><td>S21.000</td><td>S46</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>16.090</td></tr><tr><td>S12.007</td><td>S47</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.754</td></tr><tr><td>S22.000</td><td>S48</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.921</td></tr><tr><td>S23.000</td><td>S49</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.987</td></tr><tr><td>S12.008</td><td>S50</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.694</td></tr><tr><td>S24.000</td><td>S51</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.839</td></tr><tr><td>S25.000</td><td>S52</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.930</td></tr><tr><td>S12.009</td><td>S53</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.634</td></tr><tr><td>S26.000</td><td>S54</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.735</td></tr><tr><td>S12.010</td><td>S55</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.574</td></tr><tr><td>S27.000</td><td>S56</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.626</td></tr><tr><td>S12.011</td><td>S57</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.554</td></tr><tr><td>S12.012</td><td>S58</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.489</td></tr><tr><td>S28.000</td><td>S59</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.830</td></tr><tr><td>S12.013</td><td>S60</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.429</td></tr><tr><td>S12.014</td><td>S61</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.381</td></tr><tr><td>S12.015</td><td>S62</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.337</td></tr><tr><td>S1.013</td><td>S63</td><td>30 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>15.234</td></tr></table>										PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	S9.000	S20	15 Winter	2	+0%					16.130	S10.000	S21	15 Winter	2	+0%					16.055	S9.001	S22	15 Winter	2	+0%					15.981	S11.000	S23	15 Winter	2	+0%					16.271	S9.002	S24	15 Winter	2	+0%					15.831	S1.010	S25	15 Winter	2	+0%					15.700	S1.011	S26	15 Winter	2	+0%					15.587	S1.012	S27	15 Winter	2	+0%					15.431	S12.000	S28	15 Winter	2	+0%					16.475	S13.000	S29	15 Winter	2	+0%					17.045	S13.001	S30	15 Winter	2	+0%					16.977	S13.002	S31	15 Winter	2	+0%					16.604	S12.001	S32	15 Winter	2	+0%					16.419	S14.000	S33	15 Winter	2	+0%					16.423	S14.001	S34	15 Winter	2	+0%					16.304	S12.002	S35	15 Winter	2	+0%					16.149	S15.000	S36	15 Winter	2	+0%					16.688	S16.000	S37	15 Winter	2	+0%					16.522	S12.003	S38	15 Winter	2	+0%					16.123	S17.000	S39	15 Winter	2	+0%					16.040	S18.000	S40	15 Winter	2	+0%					16.050	S12.004	S41	15 Winter	2	+0%					16.034	S19.000	S42	15 Winter	2	+0%					15.995	S12.005	S43	15 Winter	2	+0%					15.983	S20.000	S44	15 Winter	2	+0%					15.988	S12.006	S45	15 Winter	2	+0%					15.878	S21.000	S46	15 Winter	2	+0%					16.090	S12.007	S47	15 Winter	2	+0%					15.754	S22.000	S48	15 Winter	2	+0%					15.921	S23.000	S49	15 Winter	2	+0%					15.987	S12.008	S50	15 Winter	2	+0%					15.694	S24.000	S51	15 Winter	2	+0%					15.839	S25.000	S52	15 Winter	2	+0%					15.930	S12.009	S53	15 Winter	2	+0%					15.634	S26.000	S54	15 Winter	2	+0%					15.735	S12.010	S55	15 Winter	2	+0%					15.574	S27.000	S56	15 Winter	2	+0%					15.626	S12.011	S57	15 Winter	2	+0%					15.554	S12.012	S58	15 Winter	2	+0%					15.489	S28.000	S59	15 Winter	2	+0%					15.830	S12.013	S60	15 Winter	2	+0%					15.429	S12.014	S61	15 Winter	2	+0%					15.381	S12.015	S62	15 Winter	2	+0%					15.337	S1.013	S63	30 Winter	2	+0%					15.234
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S9.000	S20	15 Winter	2	+0%					16.130																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S10.000	S21	15 Winter	2	+0%					16.055																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S9.001	S22	15 Winter	2	+0%					15.981																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S11.000	S23	15 Winter	2	+0%					16.271																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S9.002	S24	15 Winter	2	+0%					15.831																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S1.010	S25	15 Winter	2	+0%					15.700																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S1.011	S26	15 Winter	2	+0%					15.587																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S1.012	S27	15 Winter	2	+0%					15.431																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.000	S28	15 Winter	2	+0%					16.475																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S13.000	S29	15 Winter	2	+0%					17.045																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S13.001	S30	15 Winter	2	+0%					16.977																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S13.002	S31	15 Winter	2	+0%					16.604																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.001	S32	15 Winter	2	+0%					16.419																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S14.000	S33	15 Winter	2	+0%					16.423																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S14.001	S34	15 Winter	2	+0%					16.304																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.002	S35	15 Winter	2	+0%					16.149																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S15.000	S36	15 Winter	2	+0%					16.688																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S16.000	S37	15 Winter	2	+0%					16.522																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.003	S38	15 Winter	2	+0%					16.123																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S17.000	S39	15 Winter	2	+0%					16.040																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S18.000	S40	15 Winter	2	+0%					16.050																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.004	S41	15 Winter	2	+0%					16.034																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S19.000	S42	15 Winter	2	+0%					15.995																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.005	S43	15 Winter	2	+0%					15.983																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S20.000	S44	15 Winter	2	+0%					15.988																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.006	S45	15 Winter	2	+0%					15.878																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S21.000	S46	15 Winter	2	+0%					16.090																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.007	S47	15 Winter	2	+0%					15.754																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S22.000	S48	15 Winter	2	+0%					15.921																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S23.000	S49	15 Winter	2	+0%					15.987																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.008	S50	15 Winter	2	+0%					15.694																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S24.000	S51	15 Winter	2	+0%					15.839																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S25.000	S52	15 Winter	2	+0%					15.930																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.009	S53	15 Winter	2	+0%					15.634																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S26.000	S54	15 Winter	2	+0%					15.735																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.010	S55	15 Winter	2	+0%					15.574																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S27.000	S56	15 Winter	2	+0%					15.626																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.011	S57	15 Winter	2	+0%					15.554																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.012	S58	15 Winter	2	+0%					15.489																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S28.000	S59	15 Winter	2	+0%					15.830																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.013	S60	15 Winter	2	+0%					15.429																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.014	S61	15 Winter	2	+0%					15.381																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S12.015	S62	15 Winter	2	+0%					15.337																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
S1.013	S63	30 Winter	2	+0%					15.234																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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Search House Charnham Lane Hungerford RG17 0EY				Water Lane, Angmering					
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XP Solutions				Network 2020.1					
<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH</u>									
PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S9.000	S20	-0.034	0.000	0.92			12.2	OK	
S10.000	S21	-0.085	0.000	0.38			5.2	OK	
S9.001	S22	-0.093	0.000	0.64			25.1	OK	
S11.000	S23	-0.132	0.000	0.03			1.3	OK	
S9.002	S24	-0.083	0.000	0.72			26.1	OK	
S1.010	S25	-0.146	0.000	0.68			76.7	OK	
S1.011	S26	-0.140	0.000	0.71			75.9	OK	
S1.012	S27	-0.216	0.000	0.37			75.9	OK	
S12.000	S28	-0.096	0.000	0.28			4.3	OK	
S13.000	S29	-0.047	0.000	0.54			2.9	OK	
S13.001	S30	-0.059	0.000	0.66			11.4	OK	
S13.002	S31	-0.036	0.000	0.93			18.1	OK	
S12.001	S32	-0.081	0.000	0.72			32.3	OK	
S14.000	S33	-0.127	0.000	0.06			1.3	OK	
S14.001	S34	-0.103	0.000	0.21			3.4	OK	
S12.002	S35	-0.109	0.000	0.63			35.5	OK	
S15.000	S36	-0.100	0.000	0.24			10.1	OK	
S16.000	S37	-0.120	0.000	0.09			3.4	OK	
S12.003	S38	-0.092	0.000	0.81			51.8	OK	
S17.000	S39	-0.127	0.000	0.04			0.6	OK	
S18.000	S40	-0.121	0.000	0.08			1.3	OK	
S12.004	S41	-0.072	0.000	0.85			51.9	OK	
S19.000	S42	-0.101	0.000	0.23			3.4	OK	
S12.005	S43	-0.051	0.000	1.00			56.8	OK	
S20.000	S44	-0.113	0.000	0.14			2.9	OK	
S12.006	S45	-0.099	0.000	0.78			58.8	OK	
S21.000	S46	-0.132	0.000	0.04			0.9	OK	
S12.007	S47	-0.132	0.000	0.71			68.7	OK	
S22.000	S48	-0.129	0.000	0.05			1.3	OK	
S23.000	S49	-0.113	0.000	0.14			4.7	OK	
S12.008	S50	-0.124	0.000	0.74			71.5	OK	
S24.000	S51	-0.111	0.000	0.15			4.2	OK	
S25.000	S52	-0.120	0.000	0.09			3.0	OK	
S12.009	S53	-0.119	0.000	0.80			75.5	OK	
S26.000	S54	-0.115	0.000	0.12			2.6	OK	
S12.010	S55	-0.122	0.000	0.76			76.3	OK	
S27.000	S56	-0.124	0.000	0.07			1.3	OK	
S12.011	S57	-0.106	0.000	0.84			81.7	OK	
S12.012	S58	-0.100	0.000	0.82			80.4	OK	
S28.000	S59	-0.085	0.000	0.39			11.9	OK	
S12.013	S60	-0.087	0.000	0.88			83.2	OK	
S12.014	S61	-0.077	0.000	0.90			82.2	OK	
S12.015	S62	-0.072	0.000	1.00			81.9	OK	
S1.013	S63	-0.146	0.000	0.00		21	0.0	OK	
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XP Solutions Network 2020.1		

Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	30
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%					17.316
S1.001	S2	15 Winter	30	+0%					17.190
S2.000	S3	15 Winter	30	+0%					17.062
S1.002	S4	15 Winter	30	+0%					16.950
S3.000	S5	15 Winter	30	+0%					17.090
S3.001	S6	15 Winter	30	+0%					17.052
S3.002	S7	15 Winter	30	+0%	30/15 Summer				16.905
S1.003	S8	15 Winter	30	+0%	30/15 Summer				16.776
S4.000	S9	15 Winter	30	+0%	30/15 Summer				16.828
S1.004	S10	15 Winter	30	+0%	30/15 Summer				16.709
S5.000	S11	15 Winter	30	+0%	30/15 Summer				16.609
S1.005	S12	15 Winter	30	+0%	30/15 Summer				16.603
S6.000	S13	15 Winter	30	+0%	30/15 Summer				16.482
S1.006	S14	15 Winter	30	+0%	30/15 Summer				16.475
S1.007	S15	15 Winter	30	+0%	30/15 Summer				16.347
S1.008	S16	15 Winter	30	+0%	30/15 Summer				16.238
S7.000	S17	15 Winter	30	+0%					16.401
S1.009	S18	15 Winter	30	+0%	30/15 Summer				16.127
S8.000	S19	15 Winter	30	+0%					16.342

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XP Solutions				Network 2020.1					
<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH</u>									
PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.079	0.000	0.45			7.0	OK	
S1.001	S2	-0.122	0.000	0.41			15.6	OK	
S2.000	S3	-0.110	0.000	0.16			3.6	OK	
S1.002	S4	-0.092	0.000	0.64			27.9	OK	
S3.000	S5	-0.021	0.000	0.97			4.9	OK	
S3.001	S6	-0.022	0.000	0.86			12.8	OK	
S3.002	S7	0.021	0.000	1.23			16.7	SURCHARGED	
S1.003	S8	-0.056	0.000	0.52			53.9	OK	
S4.000	S9	0.223	0.000	1.09			27.6	SURCHARGED	
S1.004	S10	0.268	0.000	0.66			65.3	SURCHARGED	
S5.000	S11	0.280	0.000	0.15			3.6	SURCHARGED	
S1.005	S12	0.421	0.000	1.21			75.8	SURCHARGED	
S6.000	S13	0.177	0.000	0.18			5.2	SURCHARGED	
S1.006	S14	0.381	0.000	1.28			79.0	SURCHARGED	
S1.007	S15	0.332	0.000	1.72			83.5	SURCHARGED	
S1.008	S16	0.245	0.000	1.72			83.3	SURCHARGED	
S7.000	S17	-0.118	0.000	0.10			4.6	OK	
S1.009	S18	0.157	0.000	1.32			85.8	SURCHARGED	
S8.000	S19	-0.108	0.000	0.17			8.4	OK	
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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S9.000	S20 15 Winter		30	+0%	30/15 Summer				16.433
S10.000	S21 15 Winter		30	+0%	30/15 Summer				16.215
S9.001	S22 15 Winter		30	+0%	30/15 Summer				16.186
S11.000	S23 15 Winter		30	+0%					16.277
S9.002	S24 15 Winter		30	+0%	30/15 Summer				15.995
S1.010	S25 15 Winter		30	+0%	30/15 Summer				15.908
S1.011	S26 15 Winter		30	+0%	30/15 Summer				15.749
S1.012	S27 60 Winter		30	+0%					15.497
S12.000	S28 15 Winter		30	+0%	30/15 Summer				16.946
S13.000	S29 15 Winter		30	+0%	30/15 Summer				17.619
S13.001	S30 15 Winter		30	+0%	30/15 Summer				17.582
S13.002	S31 15 Winter		30	+0%	30/15 Summer				17.190
S12.001	S32 15 Winter		30	+0%	30/15 Summer				16.931
S14.000	S33 15 Winter		30	+0%	30/15 Summer				16.687
S14.001	S34 15 Winter		30	+0%	30/15 Summer				16.684
S12.002	S35 15 Winter		30	+0%	30/15 Summer				16.672
S15.000	S36 15 Winter		30	+0%					16.710
S16.000	S37 15 Winter		30	+0%	30/15 Winter				16.649
S12.003	S38 15 Winter		30	+0%	30/15 Summer				16.639
S17.000	S39 15 Winter		30	+0%	30/15 Summer				16.511
S18.000	S40 15 Winter		30	+0%	30/15 Summer				16.512
S12.004	S41 15 Winter		30	+0%	30/15 Summer				16.509
S19.000	S42 15 Winter		30	+0%	30/15 Summer				16.419
S12.005	S43 15 Winter		30	+0%	30/15 Summer				16.410
S20.000	S44 15 Winter		30	+0%	30/15 Summer				16.317
S12.006	S45 15 Winter		30	+0%	30/15 Summer				16.309
S21.000	S46 15 Winter		30	+0%					16.203
S12.007	S47 15 Winter		30	+0%	30/15 Summer				16.200
S22.000	S48 15 Winter		30	+0%	30/15 Winter				16.138
S23.000	S49 15 Winter		30	+0%	30/15 Winter				16.143
S12.008	S50 15 Winter		30	+0%	30/15 Summer				16.134
S24.000	S51 15 Winter		30	+0%	30/15 Summer				16.070
S25.000	S52 15 Winter		30	+0%	30/15 Winter				16.068
S12.009	S53 15 Winter		30	+0%	30/15 Summer				16.061
S26.000	S54 15 Winter		30	+0%	30/15 Summer				15.993
S12.010	S55 15 Winter		30	+0%	30/15 Summer				15.985
S27.000	S56 15 Winter		30	+0%	30/15 Summer				15.907
S12.011	S57 15 Winter		30	+0%	30/15 Summer				15.904
S12.012	S58 15 Winter		30	+0%	30/15 Summer				15.797
S28.000	S59 15 Winter		30	+0%					15.862
S12.013	S60 15 Winter		30	+0%	30/15 Summer				15.690
S12.014	S61 15 Winter		30	+0%	30/15 Summer				15.579
S12.015	S62 60 Winter		30	+0%	30/15 Summer				15.504
S1.013	S63 60 Winter		30	+0%	30/15 Winter				15.488
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Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S9.000	S20	0.269	0.000	1.65			21.9	SURCHARGED	
S10.000	S21	0.075	0.000	0.68			9.2	SURCHARGED	
S9.001	S22	0.112	0.000	1.17			46.2	SURCHARGED	
S11.000	S23	-0.126	0.000	0.06			2.5	OK	
S9.002	S24	0.081	0.000	1.28			46.8	SURCHARGED	
S1.010	S25	0.062	0.000	1.16			131.1	SURCHARGED	
S1.011	S26	0.021	0.000	1.22			130.8	SURCHARGED	
S1.012	S27	-0.151	0.000	0.47			95.7	OK	
S12.000	S28	0.375	0.000	0.42			6.4	SURCHARGED	
S13.000	S29	0.527	0.000	0.81			4.3	SURCHARGED	
S13.001	S30	0.546	0.000	1.03			17.6	SURCHARGED	
S13.002	S31	0.549	0.000	1.40			27.2	SURCHARGED	
S12.001	S32	0.431	0.000	1.14			50.8	SURCHARGED	
S14.000	S33	0.137	0.000	0.10			2.3	SURCHARGED	
S14.001	S34	0.277	0.000	0.40			6.6	SURCHARGED	
S12.002	S35	0.414	0.000	0.90			50.2	SURCHARGED	
S15.000	S36	-0.078	0.000	0.46			19.2	OK	
S16.000	S37	0.007	0.000	0.16			6.5	SURCHARGED	
S12.003	S38	0.424	0.000	1.23			78.9	SURCHARGED	
S17.000	S39	0.344	0.000	0.06			0.8	SURCHARGED	
S18.000	S40	0.341	0.000	0.12			1.8	SURCHARGED	
S12.004	S41	0.403	0.000	1.27			77.2	SURCHARGED	
S19.000	S42	0.323	0.000	0.39			5.7	SURCHARGED	
S12.005	S43	0.376	0.000	1.49			84.7	SURCHARGED	
S20.000	S44	0.216	0.000	0.25			5.3	SURCHARGED	
S12.006	S45	0.332	0.000	1.12			84.9	SURCHARGED	
S21.000	S46	-0.019	0.000	0.07			1.7	OK	
S12.007	S47	0.314	0.000	1.04			100.2	SURCHARGED	
S22.000	S48	0.088	0.000	0.09			2.4	SURCHARGED	
S23.000	S49	0.043	0.000	0.27			8.8	SURCHARGED	
S12.008	S50	0.316	0.000	1.07			103.2	SURCHARGED	
S24.000	S51	0.120	0.000	0.29			8.0	SURCHARGED	
S25.000	S52	0.018	0.000	0.17			5.7	SURCHARGED	
S12.009	S53	0.309	0.000	1.15			108.5	SURCHARGED	
S26.000	S54	0.143	0.000	0.23			5.0	SURCHARGED	
S12.010	S55	0.289	0.000	1.10			110.6	SURCHARGED	
S27.000	S56	0.157	0.000	0.12			2.3	SURCHARGED	
S12.011	S57	0.244	0.000	1.21			118.3	SURCHARGED	
S12.012	S58	0.208	0.000	1.21			118.2	SURCHARGED	
S28.000	S59	-0.053	0.000	0.73			22.6	OK	
S12.013	S60	0.174	0.000	1.37			129.2	SURCHARGED	
S12.014	S61	0.121	0.000	1.41			129.3	SURCHARGED	
S12.015	S62	0.094	0.000	1.31			107.2	SURCHARGED	
S1.013	S63	0.109	0.000	0.00		40	0.0	SURCHARGED	
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Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	100	+40%	100/15 Summer			
S1.001	S2	15 Winter	100	+40%	100/15 Summer			
S2.000	S3	15 Winter	100	+40%	100/15 Summer			
S1.002	S4	15 Winter	100	+40%	100/15 Summer			
S3.000	S5	15 Winter	100	+40%	100/15 Summer			
S3.001	S6	15 Winter	100	+40%	100/15 Summer			
S3.002	S7	15 Winter	100	+40%	100/15 Summer			
S1.003	S8	15 Winter	100	+40%	100/15 Summer			
S4.000	S9	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.004	S10	15 Winter	100	+40%	100/15 Summer			
S5.000	S11	15 Winter	100	+40%	100/15 Summer			
S1.005	S12	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S6.000	S13	15 Winter	100	+40%	100/15 Summer			
S1.006	S14	15 Winter	100	+40%	100/15 Summer			
S1.007	S15	15 Winter	100	+40%	100/15 Summer			
S1.008	S16	15 Winter	100	+40%	100/15 Summer			
S7.000	S17	15 Winter	100	+40%	100/15 Summer			
S1.009	S18	15 Winter	100	+40%	100/15 Summer			
S8.000	S19	15 Winter	100	+40%				

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Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH

PN	US/MH Name	Water Surcharged		Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
		Level (m)	Depth (m)	Volume (m³)	Flow					
S1.000	S1	17.950	0.555	0.000	0.75				11.6	SURCHARGED
S1.001	S2	17.919	0.607	0.000	0.63				24.1	SURCHARGED
S2.000	S3	17.862	0.690	0.000	0.26				5.9	SURCHARGED
S1.002	S4	17.852	0.811	0.000	0.80				34.8	SURCHARGED
S3.000	S5	18.058	0.947	0.000	1.32				6.7	SURCHARGED
S3.001	S6	17.998	0.924	0.000	1.13				16.7	SURCHARGED
S3.002	S7	17.822	0.938	0.000	1.33				18.0	SURCHARGED
S1.003	S8	17.735	0.902	0.000	0.58				59.7	FLOOD RISK
S4.000	S9	17.807	1.202	1.777	1.48				37.5	FLOOD
S1.004	S10	17.594	1.153	0.000	0.90				88.7	FLOOD RISK
S5.000	S11	17.398	1.069	0.000	0.27				6.4	FLOOD RISK
S1.005	S12	17.386	1.203	2.884	1.68				105.4	FLOOD
S6.000	S13	17.244	0.939	0.000	0.29				8.3	FLOOD RISK
S1.006	S14	17.226	1.133	0.000	1.74				107.4	FLOOD RISK
S1.007	S15	17.029	1.013	0.000	2.30				111.6	SURCHARGED
S1.008	S16	16.844	0.851	0.000	2.33				112.8	SURCHARGED
S7.000	S17	16.668	0.149	0.000	0.18				8.2	SURCHARGED
S1.009	S18	16.656	0.686	0.000	1.78				115.2	SURCHARGED
S8.000	S19	16.358	-0.092	0.000	0.31				15.2	OK

PN	US/MH Name	Level Exceeded
S1.000	S1	
S1.001	S2	
S2.000	S3	
S1.002	S4	
S3.000	S5	
S3.001	S6	
S3.002	S7	
S1.003	S8	
S4.000	S9	4
S1.004	S10	
S5.000	S11	
S1.005	S12	4
S6.000	S13	
S1.006	S14	
S1.007	S15	
S1.008	S16	
S7.000	S17	
S1.009	S18	
S8.000	S19	

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<u>Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH</u>								
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow Overflow	Overflow Act.
S9.000	S20	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S10.000	S21	15 Winter	100	+40%	100/15 Summer			
S9.001	S22	15 Winter	100	+40%	100/15 Summer			
S11.000	S23	15 Winter	100	+40%	100/15 Summer			
S9.002	S24	15 Winter	100	+40%	100/15 Summer			
S1.010	S25	15 Winter	100	+40%	100/15 Summer			
S1.011	S26	60 Winter	100	+40%	100/15 Summer			
S1.012	S27	60 Winter	100	+40%	100/30 Summer			
S12.000	S28	15 Winter	100	+40%	100/15 Summer			
S13.000	S29	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S13.001	S30	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S13.002	S31	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S12.001	S32	30 Winter	100	+40%	100/15 Summer	100/15 Summer		
S14.000	S33	15 Winter	100	+40%	100/15 Summer			
S14.001	S34	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S12.002	S35	15 Winter	100	+40%	100/15 Summer			
S15.000	S36	15 Winter	100	+40%	100/15 Summer			
S16.000	S37	15 Winter	100	+40%	100/15 Summer			
S12.003	S38	15 Winter	100	+40%	100/15 Summer			
S17.000	S39	15 Winter	100	+40%	100/15 Summer			
S18.000	S40	15 Winter	100	+40%	100/15 Summer			
S12.004	S41	15 Winter	100	+40%	100/15 Summer			
S19.000	S42	15 Winter	100	+40%	100/15 Summer			
S12.005	S43	15 Winter	100	+40%	100/15 Summer	100/15 Winter		
S20.000	S44	15 Winter	100	+40%	100/15 Summer			
S12.006	S45	15 Winter	100	+40%	100/15 Summer	100/15 Winter		
S21.000	S46	15 Winter	100	+40%	100/15 Summer			
S12.007	S47	15 Winter	100	+40%	100/15 Summer	100/15 Winter		
S22.000	S48	15 Winter	100	+40%	100/15 Summer			
S23.000	S49	15 Winter	100	+40%	100/15 Summer			
S12.008	S50	15 Winter	100	+40%	100/15 Summer			
S24.000	S51	15 Winter	100	+40%	100/15 Summer			
S25.000	S52	15 Winter	100	+40%	100/15 Summer			
S12.009	S53	15 Winter	100	+40%	100/15 Summer			
S26.000	S54	15 Winter	100	+40%	100/15 Summer			
S12.010	S55	15 Winter	100	+40%	100/15 Summer			
S27.000	S56	15 Winter	100	+40%	100/15 Summer			
S12.011	S57	30 Winter	100	+40%	100/15 Summer			
S12.012	S58	30 Winter	100	+40%	100/15 Summer			
S28.000	S59	15 Winter	100	+40%	100/15 Summer			
S12.013	S60	30 Winter	100	+40%	100/15 Summer			
S12.014	S61	60 Winter	100	+40%	100/15 Summer			
S12.015	S62	60 Winter	100	+40%	100/15 Summer			
S1.013	S63	60 Winter	100	+40%	100/15 Summer			
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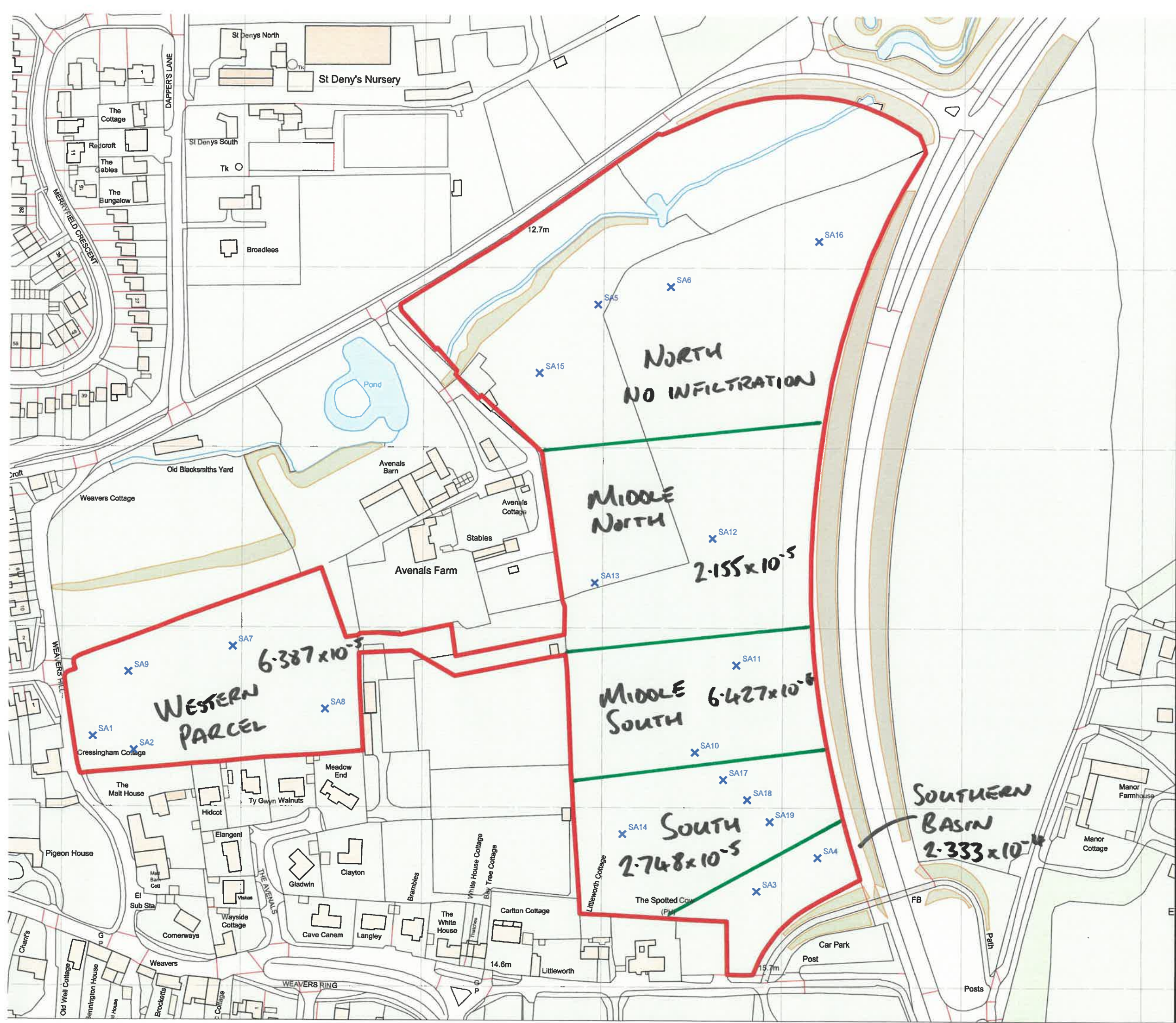
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Summary of Critical Results by Maximum Level (Rank 1) for STORM SOUTH									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap.	Half Drain Time (mins)	Pipe Flow (l/s)	Status	
S9.000	S20	17.365	1.201	1.272	2.56		33.9	FLOOD	
S10.000	S21	17.075	0.935	0.000	1.13		15.3	FLOOD RISK	
S9.001	S22	16.984	0.910	0.000	1.78		70.2	SURCHARGED	
S11.000	S23	16.508	0.105	0.000	0.10		4.2	SURCHARGED	
S9.002	S24	16.499	0.585	0.000	1.96		71.5	SURCHARGED	
S1.010	S25	16.258	0.412	0.000	1.73		195.2	SURCHARGED	
S1.011	S26	15.922	0.195	0.000	1.43		153.6	SURCHARGED	
S1.012	S27	15.885	0.238	0.000	0.74		150.1	SURCHARGED	
S12.000	S28	17.775	1.204	0.000	0.94		14.3	FLOOD RISK	
S13.000	S29	18.220	1.128	4.518	3.05		16.3	FLOOD	
S13.001	S30	18.327	1.291	1.327	1.24		21.3	FLOOD	
S13.002	S31	17.914	1.274	3.552	1.67		32.5	FLOOD	
S12.001	S32	17.708	1.208	8.198	1.45		64.9	FLOOD	
S14.000	S33	17.617	1.067	0.000	0.16		3.7	FLOOD RISK	
S14.001	S34	17.608	1.201	1.092	0.94		15.3	FLOOD	
S12.002	S35	17.633	1.375	0.000	1.29		72.5	FLOOD RISK	
S15.000	S36	17.845	1.057	0.000	0.61		25.7	FLOOD RISK	
S16.000	S37	17.636	0.994	0.000	0.24		9.5	FLOOD RISK	
S12.003	S38	17.613	1.398	0.000	1.38		88.5	FLOOD RISK	
S17.000	S39	17.452	1.285	0.000	0.09		1.4	FLOOD RISK	
S18.000	S40	17.457	1.286	0.000	0.22		3.3	FLOOD RISK	
S12.004	S41	17.449	1.343	0.000	1.40		84.9	FLOOD RISK	
S19.000	S42	17.347	1.251	0.000	0.60		8.8	FLOOD RISK	
S12.005	S43	17.324	1.290	1.272	1.72		97.5	FLOOD	
S20.000	S44	17.231	1.130	0.000	0.34		7.1	FLOOD RISK	
S12.006	S45	17.211	1.234	0.132	1.38		104.1	FLOOD	
S21.000	S46	17.097	0.875	0.000	0.09		2.3	SURCHARGED	
S12.007	S47	17.087	1.201	0.116	1.33		128.7	FLOOD	
S22.000	S48	17.001	0.951	0.000	0.12		3.3	SURCHARGED	
S23.000	S49	17.026	0.926	0.000	0.37		12.2	FLOOD RISK	
S12.008	S50	16.993	1.175	0.000	1.44		138.8	FLOOD RISK	
S24.000	S51	16.885	0.935	0.000	0.39		10.9	SURCHARGED	
S25.000	S52	16.877	0.827	0.000	0.24		8.0	SURCHARGED	
S12.009	S53	16.862	1.109	0.000	1.60		150.6	FLOOD RISK	
S26.000	S54	16.738	0.888	0.000	0.31		6.8	FLOOD RISK	
S12.010	S55	16.722	1.026	0.000	1.55		155.7	FLOOD RISK	
S27.000	S56	16.576	0.826	0.000	0.17		3.2	SURCHARGED	
S12.011	S57	16.572	0.912	0.000	1.76		171.9	FLOOD RISK	
S12.012	S58	16.358	0.770	0.000	1.74		170.1	FLOOD RISK	
S28.000	S59	16.481	0.566	0.000	1.05		32.6	SURCHARGED	
S12.013	S60	16.148	0.632	0.000	2.06		194.0	SURCHARGED	
S12.014	S61	16.000	0.542	0.000	1.78		163.2	SURCHARGED	
S12.015	S62	15.911	0.502	0.000	1.98		162.4	SURCHARGED	
S1.013	S63	15.875	0.495	0.000	0.00	51	0.0	SURCHARGED	
©1982-2020 Innovyze									

Abley Letchford Partnership Ltd		Page 5
Search House Charnham Lane Hungerford RG17 0EY	Water Lane, Angmering	
Date 20/10/2020 File NETWORK 2 V5.MDX	Designed by JS Checked by SL	
XP Solutions		



Appendix 2 – Infiltration Report

Infiltration Report



LEGEND:

- Site boundary
- Soakaway locations

A	12.03.20	FIRST ISSUE	HD	KF	KF
REV	DATE	DESCRIPTION	BY	CHD	APF
Dimensions		Projection	Scale	Orig Size	
m			1:2,000	A3	

Unit 26
Basepoint Abbey Enterprise Centre
Premier Way
Abbey Park Industrial Estate
Romsey SO51 9AQ

Tel: +44 (0)1794 329276

CLIENT	BARRATT DAVID WILSON SOUTHERN COUNTIES				
PROJECT	WATER LANE, ANGMERING				
TITLE	SOAKAWAY LOCATION PLAN				
JOB No.:	305145		DRAWING FILE: 305145-R01(00)D002		
BY:	DATE:	CONTRACT NO.	REV:		
HD	12.03.20		FIGURE 2 A		

Scale 1 : 2,000

ARUN DISTRICT COUNCIL A1109/20/RES

Our Ref: 3050145 L01 (00)

19th March 2020

Barratt David Wilson Southern Counties

Walnut Tree Close

Guildford

GU1 4SW

For the attention of Sean Havis

Dear Sean,

RE: WATER LANE, ANGMERING, BN16 4EP, SOAKAWAY TESTING

1. INTRODUCTION

RSK Environment Limited (RSK) was commissioned by Barratt David Wilson (BDW) Southern Counties (the client) via email on 20th February 2020 to carry out soakaway testing at land off Water Lane, Angmering, West Sussex, BN16 4EP (the site). This letter report is subject to the service constraints laid out in **Appendix A**.

The site comprises approximately 9 hectares and is divided into two sections – a large field to the south of Water Lane and a small field to the west of the main field. A stream is located within the northern portion of the larger field. A site location plan is given in **Figure 1**.

2. SUMMARY OF SITE SETTING

The published BGS geological records of the area indicate that the site is underlain by Superficial Deposits comprising Alluvium, at the northernmost tip of the site only, Head Deposits across the north of the site and River Terrace Deposits within the south of the site. These are underlain by the bedrock London Clay Formation within the north of the site and the Lambeth Group within the south. These are underlain in turn by the bedrock White Chalk.

The site does not lie within an EA designated Source Protection Zone and there are no groundwater abstraction boreholes within 500m of the site.

The superficial geology at the site is classified as a Superficial Aquifer Undifferentiated with respect to the Head and Alluvium and a Secondary A Aquifer with respect to the River Terrace Deposits noted within the south of the site. The bedrock geology is noted as Unproductive Strata with respect to the London Clay Formation, Secondary A Aquifer with respect to the Lambeth Group and Principal Aquifer with respect to the bedrock White Chalk.

3. SITE INVESTIGATION METHODOLOGY

RSK carried out intrusive investigation work on 3rd – 6th March 2020. The initial instructions comprised the excavation of 6 soakaway locations. Following assessment of how these were performing during the works, BDW added an additional 10 locations totalling 16 locations. Due to the recorded infiltration rates and site works logistics 3 fills were not achieved in all locations. During the works exceptionally heavy rainfall was experienced causing the fields to become soft and boggy, notably the northern half of the main field which prevented access to this area with the water filled bowser. A number of additional locations determined by RSK were undertaken within the southern portion of the site which was accessible during the wet weather. The tests were carried out in accordance with the method described in BRE Digest 365 (BRE, 2016), albeit for some locations it was not logistically possible to complete the 3 tests. A summary of the locations is presented in Error! Reference source not found. below:

Table 1: Exploratory location rationale

Location	Proposed depth (m bgl)	Actual Depth (m bgl)	Test attempted	Comments
SA1	2.0 – 3.0	2.0	Yes	Initial scope
SA2	2.0 – 3.0	2.2	Yes	Initial scope
SA3	2.0 – 3.0	2.4	Yes	Initial scope
SA4	2.0 – 3.0	2.3	Yes	Initial scope
SA5	2.0 – 3.0	2.3	Yes	Initial scope
SA6	2.0 – 3.0	2.3	Yes	Initial scope
SA7	1.0	2.0	Yes	Excavated before additional plan showing depths was received
SA8	1.0	2.3	Yes	Excavated before additional plan showing depths was received
SA9	0.5	-	No	Not undertaken due to logistical constraints
SA10	1.0	1.10	Yes	
SA11	1.0	1.0	Yes	
SA12	1.0	1.0	Yes	
SA13	1.0	1.0	Yes	
SA14	0.5	0.6	Yes	
SA15	0.5	-	No	No access to northern part of site due to wet conditions
SA16	0.5	-	No	No access to northern part of site due to wet conditions
SA17	2.0	2.0	Yes	RSK additional location
SA18	1.5	1.5	Yes	RSK additional location
SA19	0.5	0.5	Yes	RSK additional location

4. GROUND CONDITIONS

Ground conditions encountered during the investigation comprised Topsoil in all locations to a maximum depth of 0.2 m bgl overlying Superficial Deposits to a maximum depth of 2.3 m bgl. The Superficial Deposits varied in composition but generally comprised a variable combination of sand, gravel and silt. No groundwater was encountered during the investigation. Logs of the encountered ground conditions are presented within **Appendix B**.

5. SOAKAWAY TESTS

In-situ trial pit soakaway tests were undertaken in locations as detailed in Table 1 above. A summary of the calculated infiltration rate is given in **Table 2** below.

Table 2: Summary of calculated infiltration rate

Trial Pit	Test Number	Infiltration Rate (m/s)	Comment
SA1	1	4.67×10^{-5}	
	2	4.52×10^{-5}	
	3	4.93×10^{-5}	
SA2	1	8.51×10^{-5}	1 test completed due to time constraints
SA3	1	2.27×10^{-4}	
	2	1.93×10^{-4}	
	3	2.79×10^{-4}	
SA4	1	2.00×10^{-3}	
	2	1.17×10^{-3}	
	3	1.03×10^{-3}	
SA5	1	-	Test fail after >24 hours
SA6	1	-	Test fail after >24 hours
SA7	1	7.21×10^{-5}	
	2	5.78×10^{-5}	
	3	4.86×10^{-5}	
SA8	1	4.75×10^{-4}	1 test completed due to time constraints
SA10	1	1.02×10^{-5}	
	2	4.24×10^{-6}	Extrapolated result - pit left overnight
	3	Fail	Pit left for 6 hours 75-25% head of water not reached over this duration

SA11	1	5.59×10^{-6}	1 test completed due to time constraints
SA12	1	2.59×10^{-5}	
	2	2.09×10^{-5}	
	3	1.69×10^{-5}	
SA13	1	6.75×10^{-4}	
	2	6.24×10^{-4}	
	3	6.65×10^{-4}	
SA14	1	3.57×10^{-5}	
	2	4.20×10^{-5}	
	3	-	Insufficient time to complete test
SA17	1	2.18×10^{-5}	
	2	2.27×10^{-5}	
	3	2.46×10^{-5}	
SA18	1	-	Insufficient time to complete test
SA19	1	2.05×10^{-5}	1 test completed due to time constraints
Notes: m bgl – metres below ground level, m/s – metres per second.			

6. DISCUSSION AND CONCLUSION

As outlined in the table above infiltration rates varied across the site, with the greater infiltration occurring with the more granular soils and broadly in line with the underlying geology. Within pits where an infiltration rate has been calculated the infiltration rates recorded range between 2.0×10^{-3} m/s and 4.24×10^{-6} m/s.

It is noted that within the northern portion of the site SA5 and SA6 were left to run for over 24 hours and a negligible infiltration rate was recorded. In addition, ground conditions within the northern portion of the site precluded access to this area following prolonged rainfall. Given the proximity of the stream and the lack of infiltration recorded this area is unlikely to be suitable for soakaway drainage.

The data provided should allow the drainage engineer to select the appropriate infiltration rate for the areas of proposed soakaway drainage, where soakage has been shown to be feasible. It is considered that the conditions in which these tests were conducted (i.e. during heavy rain, and after the wettest February on record, and one of the wettest winters) provides a worst case scenario for the site in terms of likely infiltration rates.

We trust that the information provided above meets your requirements. Should you have any queries or require additional information, please do not hesitate to contact the undersigned.

Yours sincerely,

For RSK Environment Limited



Kirsten Fairall

Principal Geo-environmental Consultant

Enc.

Figures:

Figure 1	Site Location Plan
Figure 2	Exploratory Hole Location Plan

Appendices:

Appendix A	Service Constraints
Appendix B	Exploratory Hole Logs
Appendix C	Trial Pit Soakaway Test Data



Nigel Austin

Director – Geosciences

FIGURES



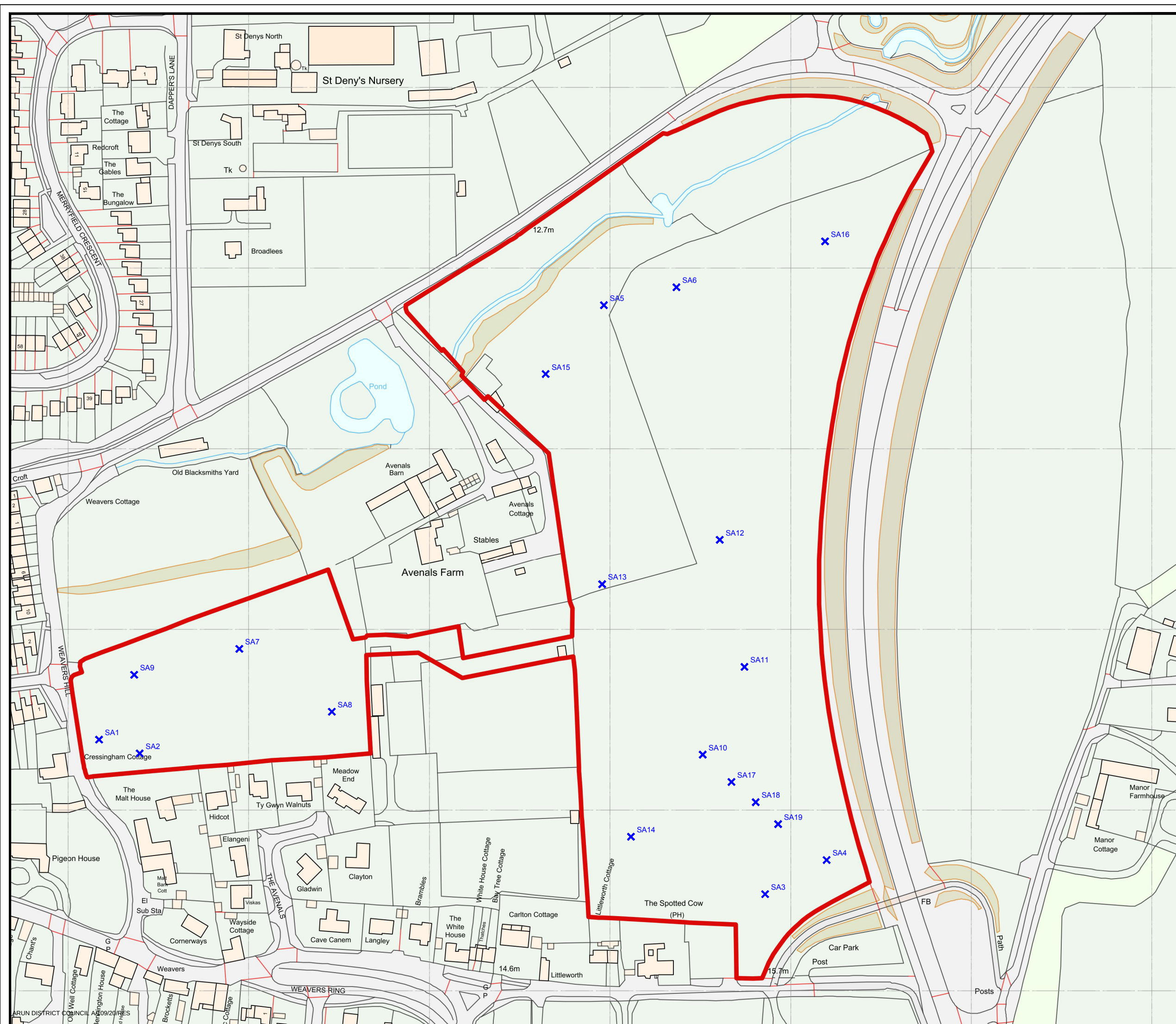
Contains Ordnance Survey data © Crown copyright and database right 2013



Unit 26
Basepoint Abbey Enterprise Centre
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Abbey Park Industrial Estate
Romsey S051 9AQ

Tel: +44 1794 329276

Client	BARRATT DAVID WILSON SOUTHERN COUNTIES		
Project Title	WATER LANE, ANGMERING		
Drawing Title	SITE LOCATION PLAN		
Drawn	Date	Checked	Date
HD	12.03.20	KF	12.03.20
Approved	Date	Project No.	Drawing File
KF	12.03.20	305145	305145-R01(00)D001A
Scale	Orig Size	Dimensions	Drawing No.
NTS	A4	—	FIGURE 1
ARON DISTRICT COUNCIL A/109/20/RES			Rev.
			A



LEGEND:

- Site boundary
- Soakaway locations

A	12.03.20	FIRST ISSUE	HD	KF	KF
REV	DATE	DESCRIPTION	BY	CHD	APR
Dimensions		Projection	Scale	Orig Size	
m			1:2,000	A3	

Unit 26
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Abbey Park Industrial Estate
Romsey SO51 9AQ

Tel: +44 1794 329276

CLIENT			
BARRATT DAVID WILSON SOUTHERN COUNTIES			
PROJECT			
WATER LANE, ANGMERING			
TITLE			
SOAKAWAY LOCATION PLAN			
JOB No.:			
DRAWING FILE:			
305145			
305145-R01(00)D002A			
BY:	DATE:	CONTRACT NO.	REV:
HD	12.03.20		A

Scale 1 : 2,000

APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Barratt David Wilson Southern Counties (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services that were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walkover survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.

APPENDIX B

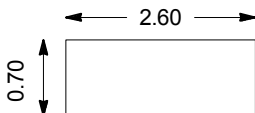
EXPLORATORY HOLE LOGS



TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA1	
Contract Ref: 305145	Start: 04.03.20 End: 04.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.15	
						Dark brown gravelly fine SAND / SILT. Gravel is fine to medium subrounded to subangular flint. (Superficial Deposits)	(1.85)	
							2.00	
						Trial pit terminated at 2.0		

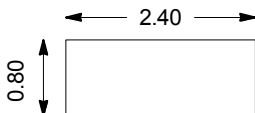
Plan (Not to Scale)		General Remarks	
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. Initial depth 2.00m. Trial pit collapsed to 1.70m during test. 4. No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF 



TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA2	
Contract Ref: 305145		Start: 04.03.20 End: 04.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1

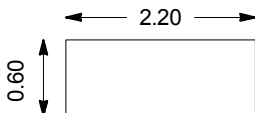
Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL	0.10	
						Dark brown sandy gravelly SILT. Sand is fine. Gravel is fine to medium subrounded to subangular flint.		
						(Superficial Deposits)	(2.10)	
							2.20	
						Trial pit terminated at 2.20m.		

Plan (Not to Scale) 		General Remarks	
		- Services cleared by GPR. - Trial pit backfilled with arisings. - Initial depth 2.20m. Trial pit collapsed to 1.80m during test. - No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF



Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA3
Contract Ref: 305145	Start: 03.03.20 End: 03.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.20	
						Brown gravelly SAND / SILT. Sand is fine. Gravel is fine to coarse subrounded to subangular flint. Rare chalk fragments present. (Superficial Deposits)	(2.20)	
						Trial pit terminated at 2.40m.	2.40	

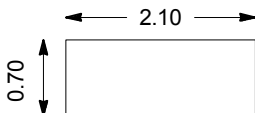
Plan (Not to Scale) 		General Remarks 1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. Initial depth 2.40m. Trial pit collapsed to 2.05m during test. 4. No groundwater encountered	
Method Used: Inspection pit + Machine dug		Plant Used: JCB 8080	
Logged By: GTsoutsis		Checked By: KF	
Scale: 1:25			



TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA4	
Contract Ref: 305145	Start: 03.03.20 End: 03.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.10	
						Brown gravelly SAND / SILT. Sand is fine. Gravel is fine to medium subrounded to subangular flint with rare chalk fragments (Superficial Deposits)	(2.20)	
						Trial pit terminated at 2.3m.	2.30	

Plan (Not to Scale)		General Remarks	
		- Services cleared by GPR. - Trial pit backfilled with arisings. - Initial depth 2.30m. Trial pit collapsed to 2.10m during test. - No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF 



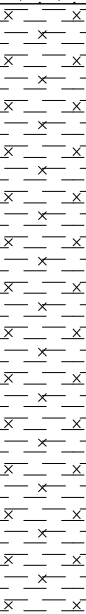
TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA5	
Contract Ref: 305145	Start: 03.03.20 End: 04.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.15	
						Brown slightly silty CLAY. (Superficial Deposits)	(2.15)	
						Trial pit terminated at 2.30m.	2.30	

Plan (Not to Scale)		General Remarks	
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF



Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.20	
						Brown slightly silty CLAY. (Superficial Deposits)	(2.10)	
						Trial pit terminated at 2.30m.	2.30	

ARUN DIST
GNT_LIBRARY v8_07_001 PjVersion: v8_07 | Log TRIAL PIT LOG - A4P | 305145 ANGMERING WATER LANE.GPJ - v8_07_19/03/20 - 07:29 | KF2

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA7
Contract Ref: 305145	Start: 04.03.02 End: 04.03.02	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.20	
						Brown gravelly sandy SILT. Sand is fine. Gravel is fine to coarse subrounded to subangular flint. (Superficial Deposits)	(1.80)	
						Trial pit terminated at 2.0m.	2.00	

Plan (Not to Scale) 		General Remarks 1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. Initial depth 2.00m. Trial pit collapsed to 1.85m during test. 4. No groundwater encountered	
Method Used: Inspection pit + Machine dug		Plant Used: JCB 8080	
Logged By: GTsoutsis		Checked By: KF	
Scale: 1:25			



Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.10	
						Brown gravelly sandy SILT. Sand is fine. Gravel is fine to coarse subrounded to subangular flint. (Superficial Deposits)	(2.20)	
						Trial pit terminated at 2.30m.	2.30	

ARUN DISTRICT LIBRARY_V8_07.GLB PitVersion: v8_07 | Log TRIAL PIT LOG - A4P | 305145 ANGMERING WATER LANE.GPJ - v8_07.
19/03/20 - 07:29 | KF2 |



TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA10	
Contract Ref: 305145	Start: 05.03.20 End: 05.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.20	
						Brown sandy gravelly SILT. Sand is fine, gravel comprises angular to sub angular flint. (Superficial Deposits)	(0.90)	
						Trial pit terminated at 1.10m	1.10	

Plan (Not to Scale)		General Remarks	
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF



TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA11	
Contract Ref: 305145	Start: 05.03.20 End: 05.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.10	
						Brown slightly sandy CLAY.		
						(Superficial Deposits)	(0.90)	
							1.00	
						Trial pit terminated at 1.00m.		

Plan (Not to Scale)		General Remarks	
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF



TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA12
Contract Ref: 305145	Start: 05.03.20 End: 05.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.10	
						Dark brown sandy gravelly SILT. Sand is fine. Gravel is fine to medium subrounded to subangular flint.		
						(Superficial Deposits)	(0.90)	
							1.00	
						Trial pit terminated at 1.00m.		

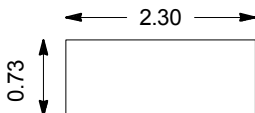
Plan (Not to Scale)		General Remarks		
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered		
All dimensions in metres		Scale: 1:25		
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF	



TRIAL PIT LOG

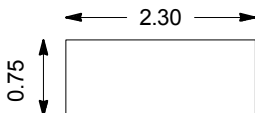
Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA13
Contract Ref: 305145	Start: 05.03.20 End: 05.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.10	
						Dark brown sandy gravelly SILT Sand is fine. Gravel is fine to medium subrounded to subangular flint.	(0.90)	
						(Superficial Deposits)	1.00	
						Trial pit terminated at 1.00m.		

Plan (Not to Scale)		General Remarks		
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered		
All dimensions in metres		Scale: 1:25		
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF	

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA14
Contract Ref: 305145	Start: 05.03.20 End: 05.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.15	
						Brown sandy gravelly SILT. Gravel is fine subrounded to subangular flint.	(0.45)	
						(Superficial Deposits)	0.60	
						Trial pit terminated at 0.60m.		

Plan (Not to Scale) 		General Remarks 1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered	
Method Used: Inspection pit + Machine dug		Plant Used: JCB 8080	
Logged By: GTsoutsis		Checked By: KF	
Scale: 1:25			



TRIAL PIT LOG

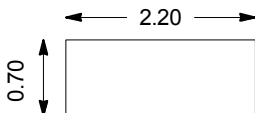
Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA17	
Contract Ref: 305145	Start: 06.03.20 End: 06.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.10	
						Brown sandy gravelly SILT. Gravel comprises medium to fine angular to sub rounded flint		
						(Superficial Deposits)	(1.90)	
							2.00	
						Trial pit terminated at 2.00m.		

Plan (Not to Scale)		General Remarks	
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA18
Contract Ref: 305145	Start: 06.03.20 End: 06.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.20	
						Brown sandy SILT. Sand is fine. (Superficial Deposits)	(1.30)	
						Trial pit terminated at 1.50m	1.50	

Plan (Not to Scale) 		General Remarks 1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered	
Method Used: Inspection pit + Machine dug		Plant Used: JCB 8080	
Logged By: GTsoutsis		Checked By: KF	
Scale: 1:25			



TRIAL PIT LOG

Contract: Angmering Water Lane		Client: BDW Southern Counties		Trial Pit: SA19	
Contract Ref: 305145	Start: 06.03.20 End: 06.03.20	Ground Level: ---	National Grid Co-ordinate: ---	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Grass over TOPSOIL.	0.10	
						Brown sandy slightly gravelly SILT. Sand is fine. Gravel comprises subrounded to subangular flint	(0.40)	
						(Superficial Deposits)	0.50	
						Trial pit terminated at 0.50m.		

Plan (Not to Scale)		General Remarks	
		1. Services cleared by GPR. 2. Trial pit backfilled with arisings. 3. No groundwater encountered	
All dimensions in metres		Scale: 1:25	
Method Used: Inspection pit + Machine dug	Plant Used: JCB 8080	Logged By: GTsoutsis	Checked By: KF

APPENDIX C

TRIAL PIT SOAKAWAY TEST DATA

ARUN DISTRICT COUNCIL A/109/20/RES

Soakaway Calculations



Soakaway Test No.	SA1 test 3
Contract:	Water Lane Angmering
Contract No.	305145

Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record.

Depth of Pit	1.70 m
Width of Pit	0.70 m
Length of Pit	2.60 m
Depth of Pit Soaked	1.23 m
ap50	5.879 m2
Vp75-25	1.1193 m3
t75-25	64.3 min
water used	2.2386 m3
f	4.934E-05 m/sec.

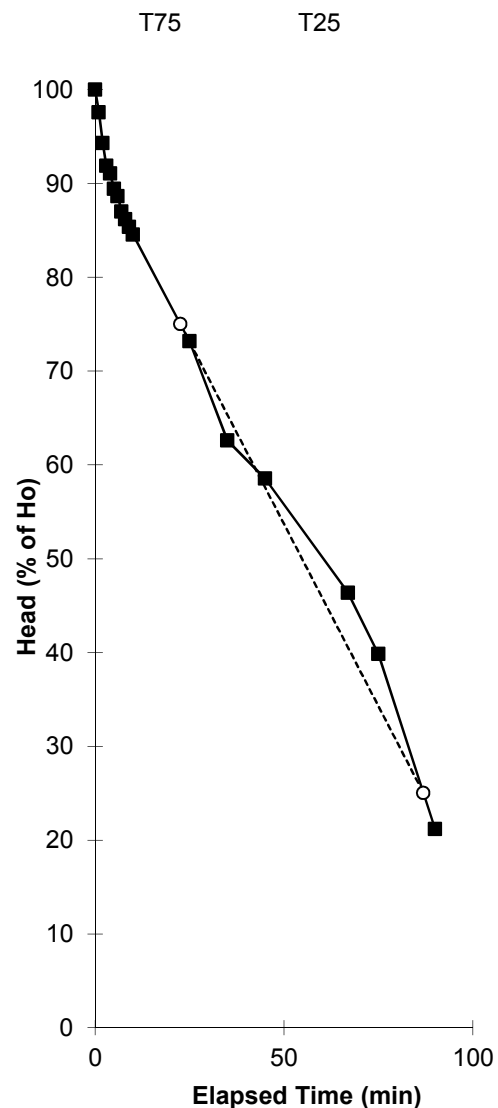
Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.47	0	100	1.23
0.5	1	98	1.20
0.54	2	94	1.16
0.57	3	92	1.13
0.58	4	91	1.12
0.6	5	89	1.10
0.61	6	89	1.09
0.63	7	87	1.07
0.64	8	86	1.06
0.65	9.00	85	1.05
0.66	10.00	85	1.04
0.8	25.00	73	0.90
0.93	35.00	63	0.77
0.98	45.00	59	0.72
1.13	67.00	46	0.57
1.21	75.00	40	0.49
1.44	90.00	21	0.26

T75	22.589	75
T25	86.902	25
T75-25	64.313	Derived from Best Fit

Comments

Trail pit collapse to 1.7m bgl



ARUN DISTRICT COUNCIL A/109/20/RES

Soakaway Calculations



Soakaway Test No.	SA3 test 1
Contract:	Water Lane Angmering
Contract No.	305145

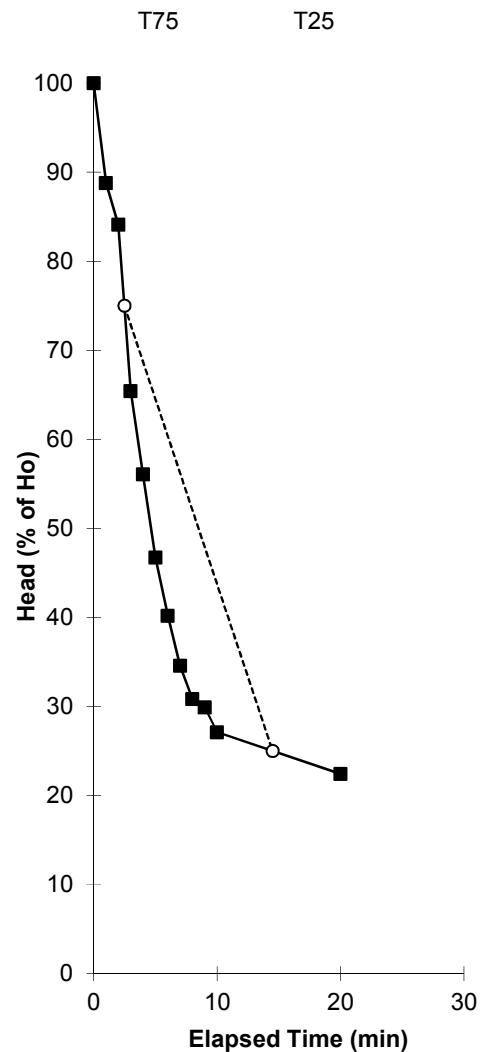
Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record.

Depth of Pit	2.10 m
Width of Pit	0.60 m
Length of Pit	2.20 m
Depth of Pit Soaked	1.07 m
ap50	4.316 m ²
Vp75-25	0.7062 m ³
t75-25	12.0 min
water used	1.4124 m ³
f	2.270E-04 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
1.03	0	100	1.07
1.15	1	89	0.95
1.2	2	84	0.90
1.4	3	65	0.70
1.5	4	56	0.60
1.6	5	47	0.50
1.67	6	40	0.43
1.73	7	35	0.37
1.77	8.00	31	0.33
1.78	9.00	30	0.32
1.81	10.00	27	0.29
1.86	20.00	22	0.24



T75	2.488	75
T25	14.500	25
T75-25	12.013	Derived from Best Fit

Comments

Initial depth 2.40m, collapse to 2.10m during test.

ARUN DISTRICT COUNCIL A/109/20/RES

Soakaway Calculations



Soakaway Test No.	SA4 test 1
Contract:	Water Lane Angmering
Contract No.	305145

Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record.

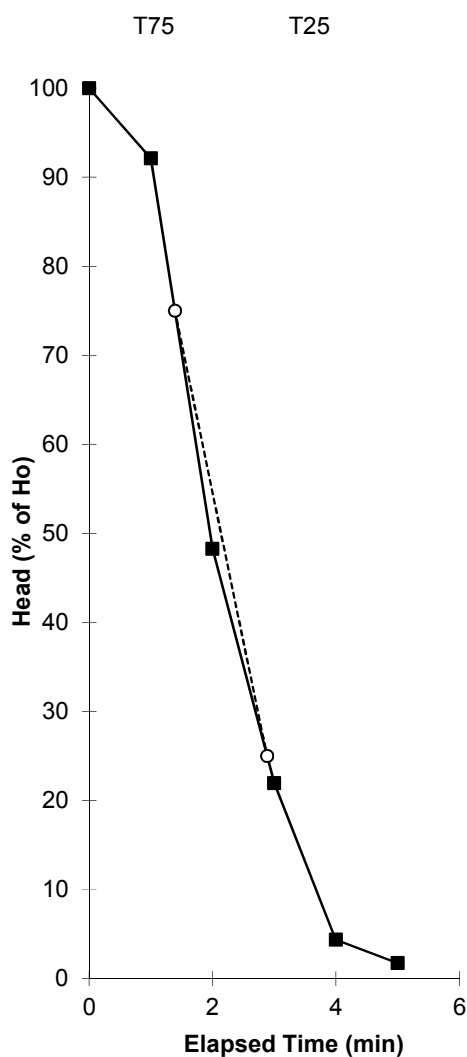
Depth of Pit	2.20 m
Width of Pit	0.70 m
Length of Pit	2.10 m
Depth of Pit Soaked	1.14 m
ap50	4.662 m2
Vp75-25	0.8379 m3
t75-25	1.5 min
water used	1.6758 m3
f	2.006E-03 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
1.06	0	100	1.14
1.15	1	92	1.05
1.65	2	48	0.55
1.95	3	22	0.25
2.15	4	4	0.05
2.18	5	2	0.02

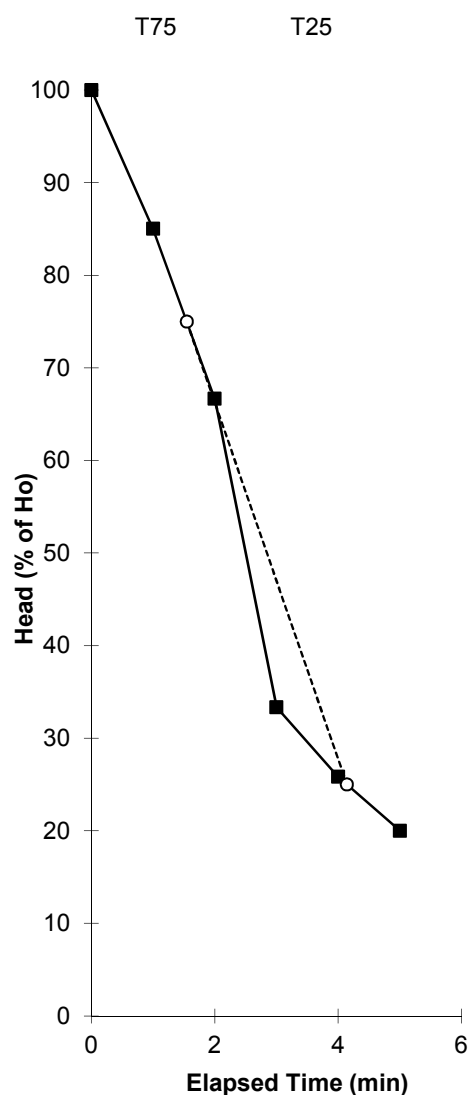
T75	1.390	75
T25	2.883	25
T75-25	1.493	Derived from Best Fit

Comments



Field Test

Depth of Pit	2.20 m
Width of Pit	0.70 m
Length of Pit	2.10 m
Depth of Pit Soaked	1.20 m
ap50	4.83 m2
Vp75-25	0.882 m3
t75-25	2.6 min
water used	1.7640 m3
f	1.172E-03 m/sec.

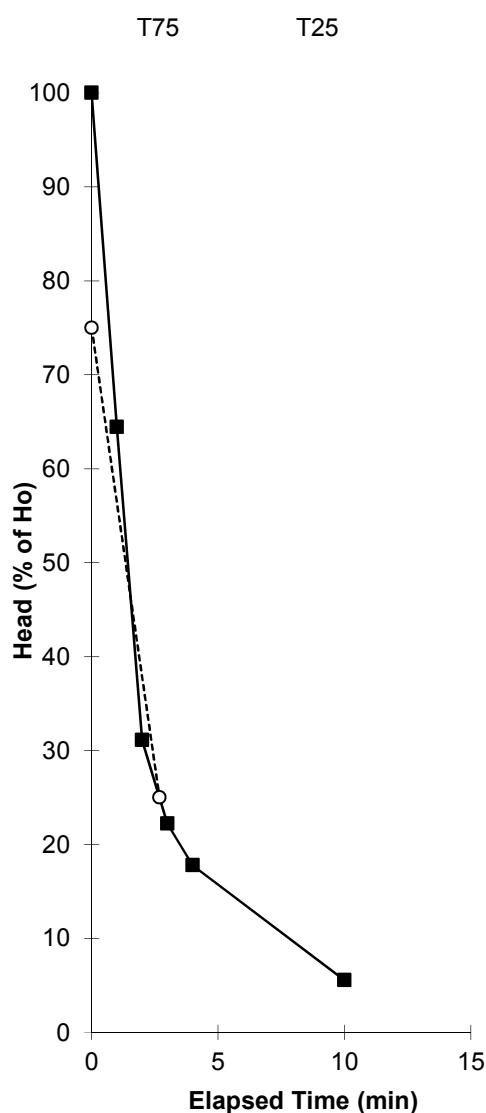
[illegible]

Field Test

See trial Pit record.

Field Data

T75	0.000	75
T25	2.688	25
T75-25	2.688	Derived from Best Fit



Comments

RSK

RSKARUN DISTRICT COUNCIL A/109/20/RES

Soakaway Calculations



Soakaway Test No.	SA7 test 3
Contract:	Water Lane Angmering
Contract No.	305145

Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record.

Depth of Pit	1.85 m
Width of Pit	0.75 m
Length of Pit	2.70 m
Depth of Pit Soaked	1.42 m
ap50	6.924 m ²
Vp75-25	1.43775 m ³
t75-25	71.3 min
water used	2.8755 m ³
f	4.857E-05 m/sec.

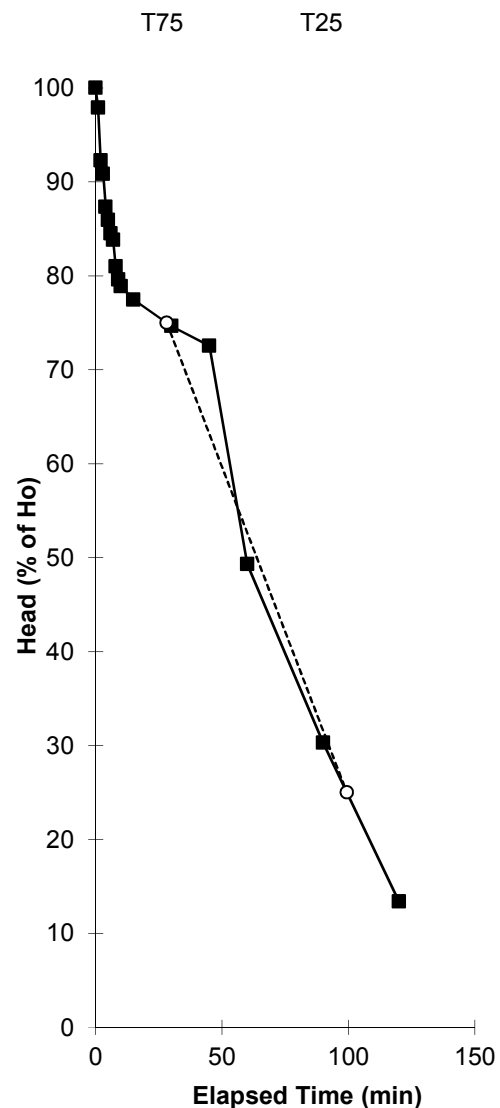
Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.43	0	100	1.42
0.46	1	98	1.39
0.54	2	92	1.31
0.56	3	91	1.29
0.61	4	87	1.24
0.63	5	86	1.22
0.65	6	85	1.20
0.66	7	84	1.19
0.7	8	81	1.15
0.72	9.00	80	1.13
0.73	10.00	79	1.12
0.75	15.00	77	1.10
0.79	30.00	75	1.06
0.82	45.00	73	1.03
1.15	60.00	49	0.70
1.42	90.00	30	0.43
1.66	120.00	13	0.19

T75	28.125	75
T25	99.375	25
T75-25	71.250	Derived from Best Fit

Comments

Trial pit collapse to 1.85m



Soakaway Calculations



Soakaway Test No.	SA8 test 1
Contract:	Water Lane Angmering
Contract No.	305145

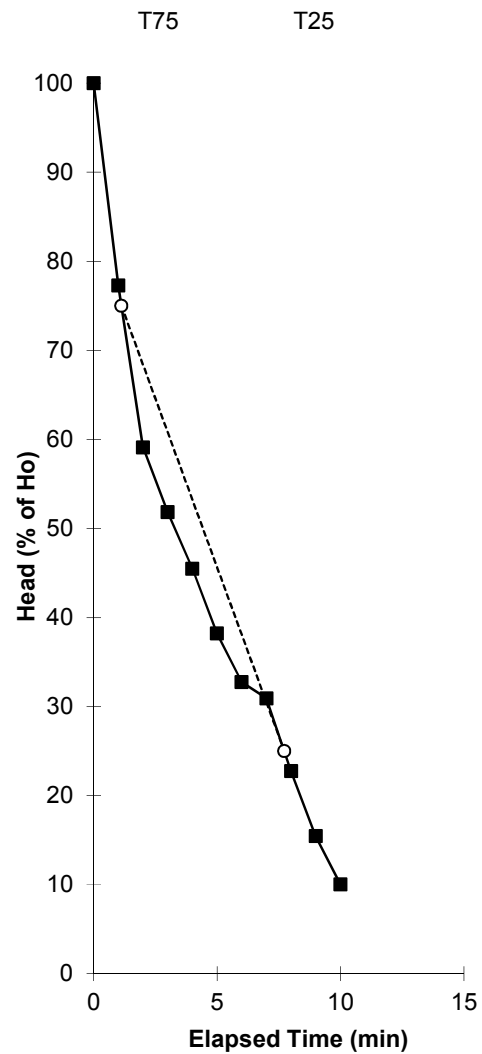
Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record.

Depth of Pit	2.10 m
Width of Pit	0.75 m
Length of Pit	2.40 m
Depth of Pit Soaked	1.10 m
ap50	5.265 m ²
Vp75-25	0.99 m ³
t75-25	6.6 min
water used	1.9800 m ³
f	4.750E-04 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
1	0	100	1.10
1.25	1	77	0.85
1.45	2	59	0.65
1.53	3	52	0.57
1.6	4	45	0.50
1.68	5	38	0.42
1.74	6	33	0.36
1.76	7	31	0.34
1.85	8.00	23	0.25
1.93	9.00	15	0.17
1.99	10.00	10	0.11



T75	1.125	75
T25	7.722	25
T75-25	6.597	Derived from Best Fit

Comments

Initial depth 2.3m pit collapse to 2.1m

Soakaway Calculations



Soakaway Test No.	SA10 test 1
Contract:	Water Lane Angmering
Contract No.	305145

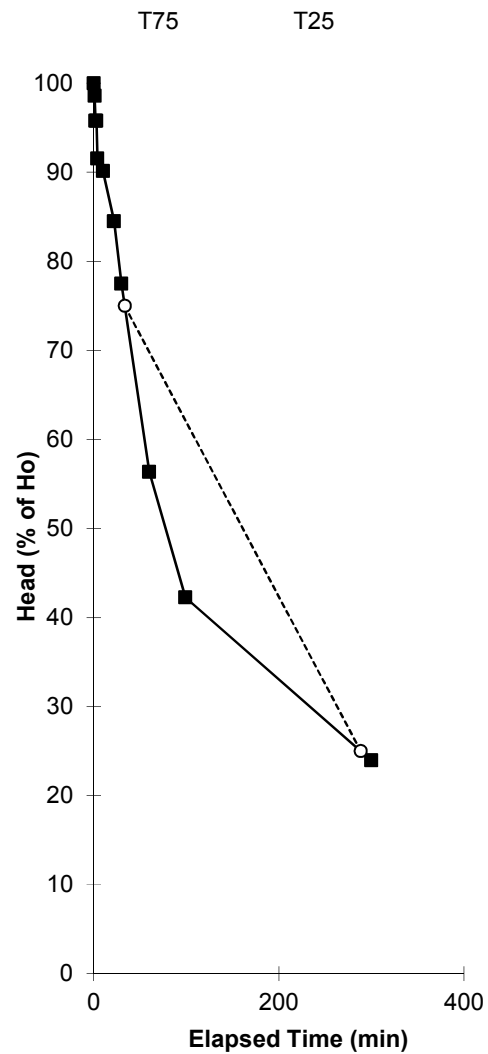
Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record.

Depth of Pit	1.00 m
Width of Pit	0.70 m
Length of Pit	2.70 m
Depth of Pit Soaked	0.71 m
ap50	4.304 m2
Vp75-25	0.67095 m3
t75-25	254.9 min
water used	1.3419 m3
f	1.019E-05 m/sec.

Field Data

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
0.29	0	100	0.71
0.3	1	99	0.70
0.32	2	96	0.68
0.32	3	96	0.68
0.35	4	92	0.65
0.36	10	90	0.64
0.4	22	85	0.60
0.45	30	77	0.55
0.6	60.00	56	0.40
0.7	99.00	42	0.30
0.83	300.00	24	0.17



T75	33.500	75
T25	288.404	25
T75-25	254.904	Derived from Best Fit

Comments

Soakaway Calculations

Soakaway Test No.	SA10 test 2
Contract:	Water Lane Angmering
Contract No.	305145

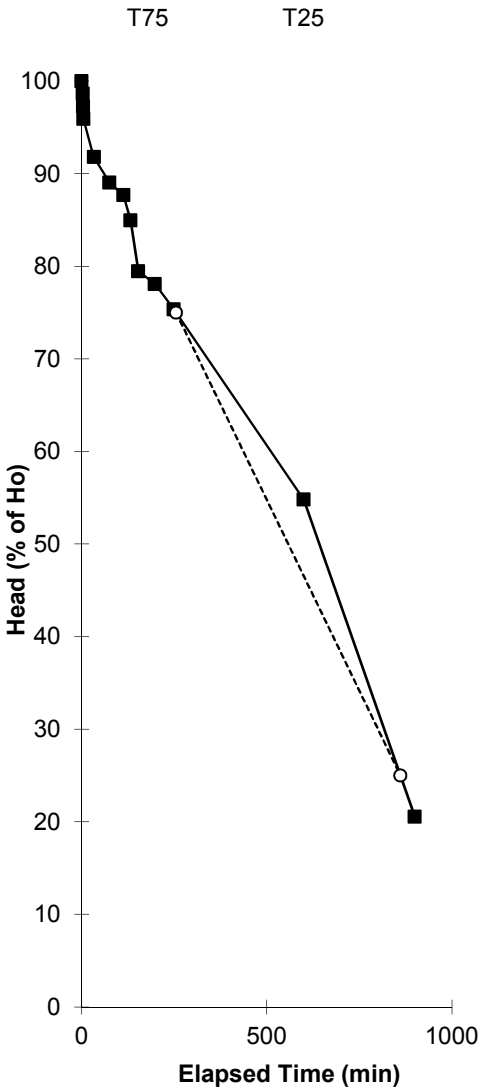
Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record.

Depth of Pit	1.00 m
Width of Pit	0.70 m
Length of Pit	2.70 m
Depth of Pit Soaked	0.73 m
ap50	4.372 m2
Vp75-25	0.68985 m3
t75-25	606.2 min
water used	1.3797 m3
f	4.339E-06 m/sec.

Field Data

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
0.27	0	100	0.73
0.28	3	99	0.72
0.29	4	97	0.71
0.3	5	96	0.70
0.33	33	92	0.67
0.35	75	89	0.65
0.36	113	88	0.64
0.38	132	85	0.62
0.42	153.00	79	0.58
0.43	198.00	78	0.57
0.45	249.00	75	0.55
0.6	600.00	55	0.40
0.85	900.00	21	0.15
T75	254.850	75	
T25	861.000	25	
T75-25	606.150	Derived from Best Fit	



Comments

Extrapolated below 0.45m- pit was left overnight

Soakaway Calculations



Soakaway Test No.	SA10 test 3
Contract:	Water Lane Angmering
Contract No.	305145

Field Test

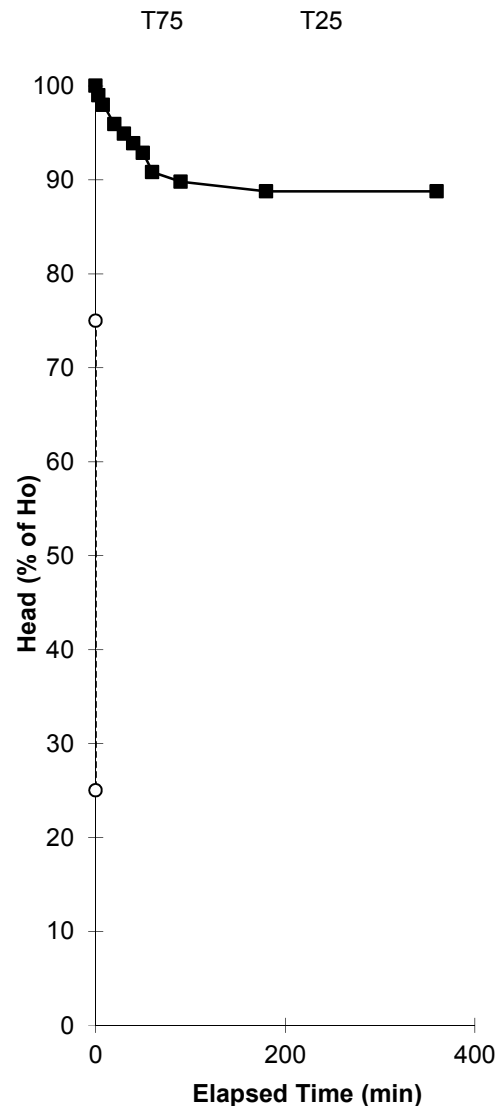
Trial Pit Log (include details of groundwater):

See trial Pit record

Depth of Pit	1.10 m
Width of Pit	0.70 m
Length of Pit	2.70 m
Depth of Pit Soaked	0.98 m
ap50	5.222 m ²
Vp75-25	0.9261 m ³
t75-25	0.0 min
water used	1.8522 m ³
f	#DIV/0! m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.12	0	100	0.98
0.13	3	99	0.97
0.14	8	98	0.96
0.16	20	96	0.94
0.17	30	95	0.93
0.18	40	94	0.92
0.19	50	93	0.91
0.21	60	91	0.89
0.22	90	90	0.88
0.23	180.00	89	0.87
0.23	360.00	89	0.87



T75	0.000	75
T25	0.000	25
T75-25	0.000	Derived from Best Fit

Comments

Test failed

Soakaway Calculations

Soakaway Test No.	SA12 test 1
Contract:	Water Lane Angmering
Contract No.	305145

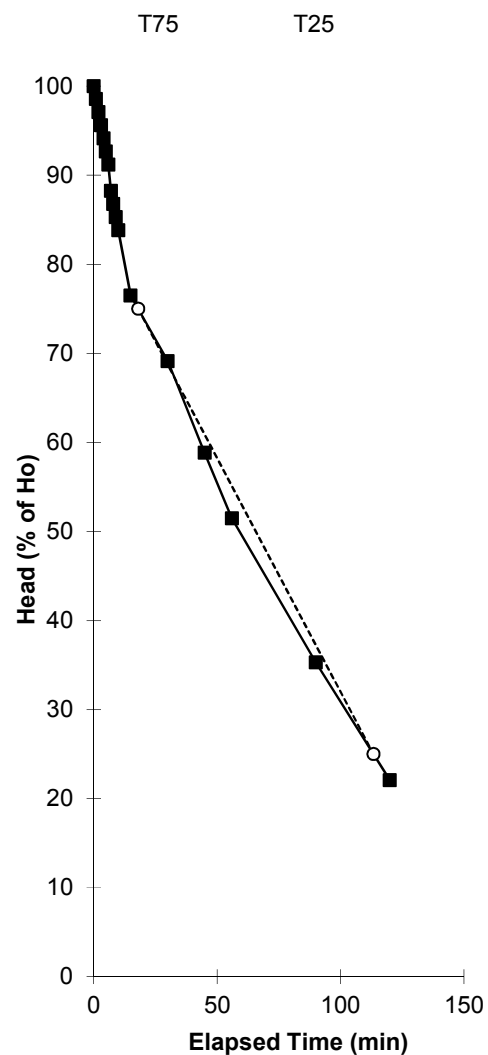
Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	1.00 m
Width of Pit	0.70 m
Length of Pit	2.10 m
Depth of Pit Soaked	0.68 m
ap50	3.374 m2
Vp75-25	0.4998 m3
t75-25	95.3 min
water used	0.9996 m3
f	2.590E-05 m/sec.

Field Data

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
0.32	0	100	0.68
0.33	1	99	0.67
0.34	2	97	0.66
0.35	3	96	0.65
0.36	4	94	0.64
0.37	5	93	0.63
0.38	6	91	0.62
0.4	7	88	0.60
0.41	8.00	87	0.59
0.42	9.00	85	0.58
0.43	10.00	84	0.57
0.48	15.00	76	0.52
0.53	30.00	69	0.47
0.6	45.00	59	0.40
0.65	56.00	51	0.35
0.76	90.00	35	0.24
0.85	120.00	22	0.15
T75	18.000	75	
T25	113.333	25	
T75-25	95.333	Derived from Best Fit	



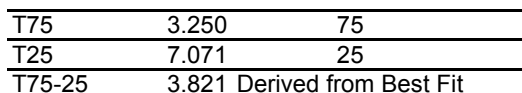
Comments

RSK

Field Test

Depth of Pit	1.00 m
Width of Pit	0.73 m
Length of Pit	2.30 m
Depth of Pit Soaked	0.70 m
ap50	3.8 m2
Vp75-25	0.58765 m3
t75-25	3.8 min
water used	1.1753 m3
f	6.745E-04 m/sec.

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.3	0	100	0.70
0.33	1	96	0.67
0.39	2	87	0.61
0.45	3	79	0.55
0.55	4	64	0.45
0.68	5	46	0.32
0.75	6	36	0.25
0.82	7	26	0.18
0.89	8.00	16	0.11



ARUN DISTRICT COUNCIL A/109/20/RES

Soakaway Calculations



Soakaway Test No.	SA13 test 3
Contract:	Water Lane Angmering
Contract No.	305145

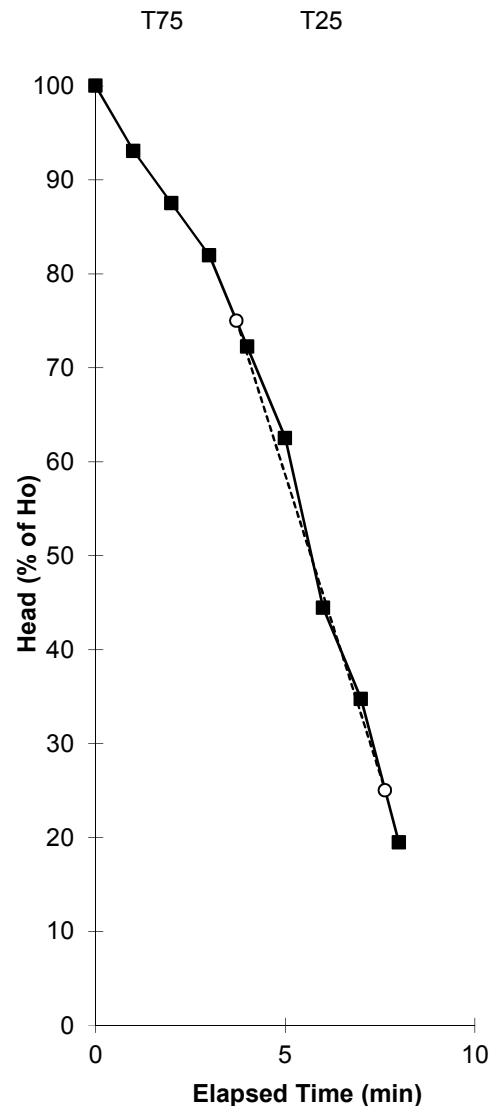
Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	1.00 m
Width of Pit	0.73 m
Length of Pit	2.30 m
Depth of Pit Soaked	0.72 m
ap50	3.8606 m2
Vp75-25	0.60444 m3
t75-25	3.9 min
water used	1.2089 m3
f	6.653E-04 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.28	0	100	0.72
0.33	1	93	0.67
0.37	2	88	0.63
0.41	3	82	0.59
0.48	4	72	0.52
0.55	5	63	0.45
0.68	6	44	0.32
0.75	7	35	0.25
0.86	8	19	0.14



Comments

Partial pit collapse during test

Field Test

ap50	2.823 m2
Vp75-25	0.3105 m3
t75-25	51.3 min
water used	0.6210 m3
f	3.571E-05 m/sec.

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
0.14	0	100	0.36
0.15	1	97	0.35
0.16	2	94	0.34
0.17	3	92	0.33
0.18	5	89	0.32
0.19	6	86	0.31
0.2	7	83	0.30
0.21	9	81	0.29
0.22	10.00	78	0.28
0.25	21.00	69	0.25
0.28	30.00	61	0.22
0.3	41.00	56	0.20
0.38	60.00	33	0.12
0.44	70.00	17	0.06

Figure 1 is a line graph showing the decay of head pressure over time for two temperatures, T75 and T25. The y-axis is labeled 'Head (% of Ho)' and ranges from 0 to 100. The x-axis is labeled 'Elapsed Time (min)' and ranges from 0 to 100. The T75 data is represented by a solid line with square markers, and the T25 data is represented by a dashed line with circle markers. Both curves show a linear decay on this semi-log scale, with T75 decaying faster than T25.

Elapsed Time (min)	Head (% of Ho) at T75	Head (% of Ho) at T25
0	100	100
2	98	-
4	95	-
6	92	-
8	89	-
10	86	-
12	83	-
14	80	-
16	77	-
18	-	75
20	74	-
25	69	-
30	61	-
40	55	-
60	33	-
65	-	25
70	17	-

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ARUN DISTRICT COUNCIL A/109/20/RES

ARUN DISTRICT COUNCIL A/109/20/RES

Soakaway Calculations



Soakaway Test No.	SA17 test 2
Contract:	Water Lane Angmering
Contract No.	305145

Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record

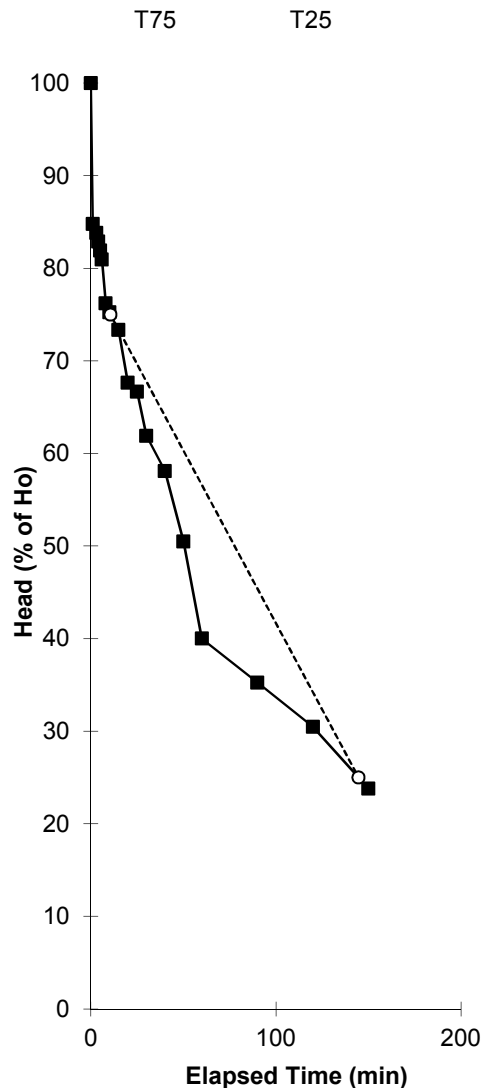
Depth of Pit	2.00 m
Width of Pit	0.73 m
Length of Pit	2.40 m
Depth of Pit Soaked	1.05 m
ap50	5.0385 m ²
Vp75-25	0.9198 m ³
t75-25	134.0 min
water used	1.8396 m ³
f	2.270E-05 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.95	0	100	1.05
1.11	1	85	0.89
1.12	3	84	0.88
1.13	4	83	0.87
1.14	5	82	0.86
1.15	6	81	0.85
1.2	8	76	0.80
1.21	10	75	0.79
1.23	15.00	73	0.77
1.29	20.00	68	0.71
1.3	25.00	67	0.70
1.35	30.00	62	0.65
1.39	40.00	58	0.61
1.47	50.00	50	0.53
1.58	60.00	40	0.42
1.63	90.00	35	0.37
1.68	120.00	30	0.32
1.75	150.00	24	0.25

T75	10.625	75
T25	144.643	25
T75-25	134.018	Derived from Best Fit

Comments



Soakaway Calculations



Soakaway Test No.	SA17 test 3
Contract:	Water Lane Angmering
Contract No.	305145

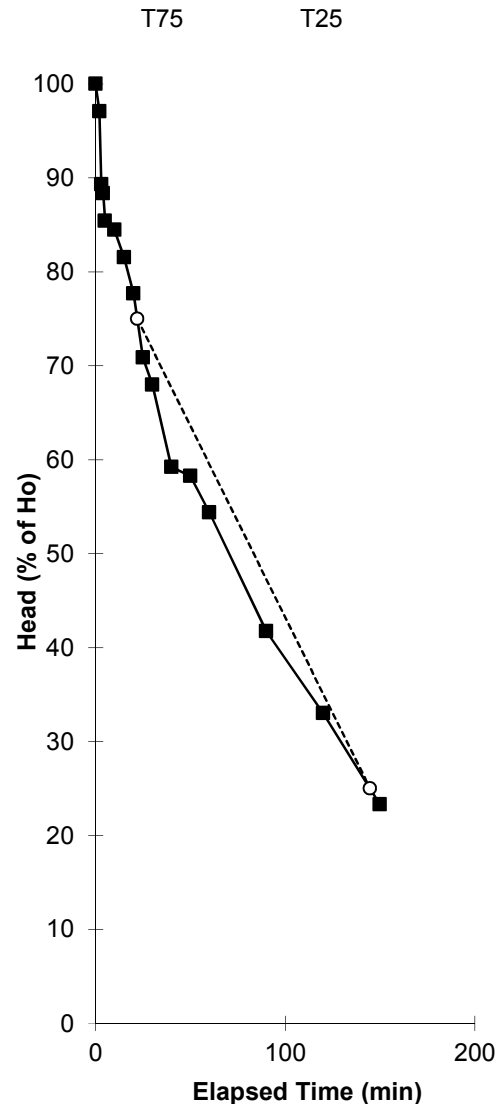
Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	2.00 m
Width of Pit	0.73 m
Length of Pit	2.40 m
Depth of Pit Soaked	1.03 m
ap50	4.9759 m2
Vp75-25	0.90228 m3
t75-25	122.8 min
water used	1.8046 m3
f	2.461E-05 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.97	0	100	1.03
1	2	97	1.00
1.08	3	89	0.92
1.09	4	88	0.91
1.12	5	85	0.88
1.13	10	84	0.87
1.16	15	82	0.84
1.2	20	78	0.80
1.27	25	71	0.73
1.3	30.00	68	0.70
1.39	40.00	59	0.61
1.4	50.00	58	0.60
1.44	60.00	54	0.56
1.57	90.00	42	0.43
1.66	120.00	33	0.34
1.76	150.00	23	0.24



Comments

Soakaway Test No.	SA19 test 1
Contract:	Water Lane Angmering
Contract No.	305145

Field Test

Trial Pit Log (include details of groundwater):

See trial Pit record

Depth of Pit	0.50 m
Width of Pit	0.75 m
Length of Pit	2.30 m
Depth of Pit Soaked	0.49 m

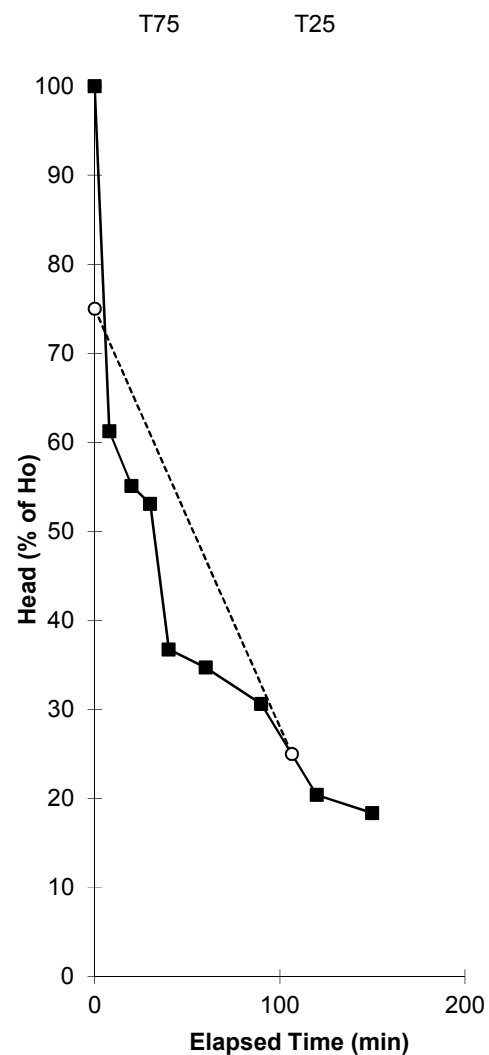
ap50	3.2195 m2
Vp75-25	0.422625 m3
t75-25	106.5 min
water used	0.8453 m3
f	2.054E-05 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.01	0	100	0.49
0.2	8	61	0.30
0.23	20	55	0.27
0.24	30	53	0.26
0.32	40	37	0.18
0.33	60	35	0.17
0.35	90	31	0.15
0.4	120	20	0.10
0.41	150.00	18	0.09

T75	0.000	75
T25	106.500	25
T75-25	106.500	Derived from Best Fit

Comments





Appendix 3 – Local Authority Correspondence

Technical Note A290-TN001

Project Title: Water Lane, Angmering

Project No/ Document Reference: A290-TN001

Date: 10 September 2020

Author: Shaun Letchford

DRAINAGE – HOLDING OBJECTION

1. Introduction

Further to your email, in response to our clients reserved matters and discharge of conditions application, please find below further information regarding your comments from Laura Gibbons, Engineer, on behalf of Adur & Worthing Councils. This response refers to Application Reference A/109/20/RES. We also refer you to the idom merebrook, Flood Risk Assessment, Ref: FRA-19495-16-139 Rev R2 approved at outline planning (A/99/17/OUT) and which we adhere to throughout.

2. Comments

We have responded to each of your comments below:

The food risk assessment submitted at outline application was not approved from a surface water drainage perspective. A plan showing the pre-development catchment areas is requested, this plan should show the natural catchment delineation within the site and their respective areas.

For clarification the Flood Risk Assessment (FRA) was approved at outline planning in its entirety. The FRA included a drainage strategy drawing, Sth-301-001 A, as well as a whole chapter on surface water drainage. This has formed the basis of our drainage strategy and we have closely followed the surface water drainage strategy drawing approved at outline planning as part of the FRA.

The approved FRA and drainage strategy included information on existing catchments. However, for clarification we have included drawing A290-RM-511 P1, Pre Development Catchment Areas, providing existing catchments and their respective areas.

A plan showing proposed levels and catchments must be provided.

Drawing's A290-RM-401 P2 and 402 P2, Engineering Layouts Sheets 1 and 2, submitted with the RM submission provides all proposed site levels. Drawing's A290-RM-501 P2 and 502 P2, Drainage Layouts Sheets 1 and 2, submitted with the RM submission provides all proposed drainage levels. There are also numerous other drawings relating to levels and drainage.

Catchment plans are also provided in this response as stated above and below.



An impermeable areas plan, clearly identifying areas draining to each surface water drainage area is required. This should also be broken down further to areas draining to pipe numbers.

We have included drawing A290-RM-512 P1, Post Development Catchment Areas and Basins, providing the impermeable area plan. Within the RM submission we included drawings A290-RM-501 P2 and 502 P2, Drainage Layouts Sheets 1 and 2, providing all proposed drainage levels and manhole numbers. In addition, within the submitted Drainage Statement (A290-R007) we included all Micro Drainage calculations including impermeable areas draining to each manhole. Therefore, all information has been previously submitted.

A surcharged outfall must be applied to the network draining to the black ditch. With surcharged levels set to 1 in 100 plus climate change levels for the black ditch in this location.

Drawing A290-RM-501 P2 Drainage Layout Sheet 1 clearly provides an invert level for Attenuation Basin North at 11.80m and the outfall to black ditch (SOUT-North) at an invert level of 11.685.

The site entrance bridge design undertaken by Stantec required agreement with the EA and LPA on flood levels for the black Ditch at the site entrance. Stantec have provided an approved flood level of 11.04m for the 1:100 year plus 45% climate change and 11.09m for the 1:100 year plus 105% climate change.

As the outfall invert level is some 645mm above the 1:100 year plus 45% climate change level of black ditch, with the basin invert level some 760mm above, there is no requirement for a surcharged outfall.

Drainage layout plans need to be provided.

Drawing's A290-RM-501 P2 and 502 P2, Drainage Layouts Sheets 1 and 2, were submitted with the RM submission, showing full drainage layouts. Private drainage will be provided at detailed design following a successful RM submission.

Two perpendicular cross sections per basin are required to verify modelled areas/ volumes.

We have included drawing A290-RM-512 P1, Post Development Catchment Areas and Basins, providing cross sections of both Basin North and South

Layout plans with main river predicted flood extents shown must be supplied to evidence that the basin is located outside of predicted flooding extents.



For clarification the Flood Risk Assessment (FRA) was approved at outline planning in its entirety.

This included evidence of flood plain extents for all forms including fluvial and pluvial flooding, with the drainage strategy drawing showing flood extents of the black ditch. We confirm all development, including SuDS, is located in Flood Zone 1 as stated in the FRA and Drainage Statement.

As stated above the site entrance bridge design undertaken by Stantec required agreement with the EA and LPA on flood levels for the black Ditch at the site entrance. Stantec have provided an approved flood level of 11.04m for the 1:100 year plus 45% climate change and 11.09m for the 1:100 year plus 105% climate change.

Drawing's A290-RM-401 P2 and 402 P2, Engineering Layouts Sheets 1 and 2, submitted with the RM submission provides all proposed site levels. Drawing's A290-RM-501 P2 and 502 P2, Drainage Layouts Sheets 1 and 2, submitted with the RM submission provides all proposed drainage levels.

These drawings clearly show all development to be way in excess of the approved flood levels, including, the basin which has proposed and existing levels on it.

It is noted that a pump is included within one of the calculation printouts, pumping must not occur, it is not sustainable and drainage should be designed to follow natural topography. Please remove this.

You are correct that a pump is included in the Micro Drainage calculations. However, pumping does not occur, and you will note there is not one located or stated on the drawings. All drainage is designed to follow natural topography and no pumping is required.

The western catchment drains entirely to infiltration through cellular storage and a swale. The recommended method of modelling this within Micro Drainage, as stated by the software manufacturers and included within the software's 'How to model an Outfall to an Infiltration Structure' guidance is to, and we quote, "Design an online pump in the final manhole before the dummy pipe. The flow rate should be left blank, the only outflow from the manhole should be through infiltration. This will prevent any continuation flow along the dummy pipe".

Therefore, the whole design is modelled to industry standard and we cannot remove the pump in the modelling.

Please remove the proposed trees from within basin extents, especially the attenuation basin.

There are no trees shown on any of our drawings.

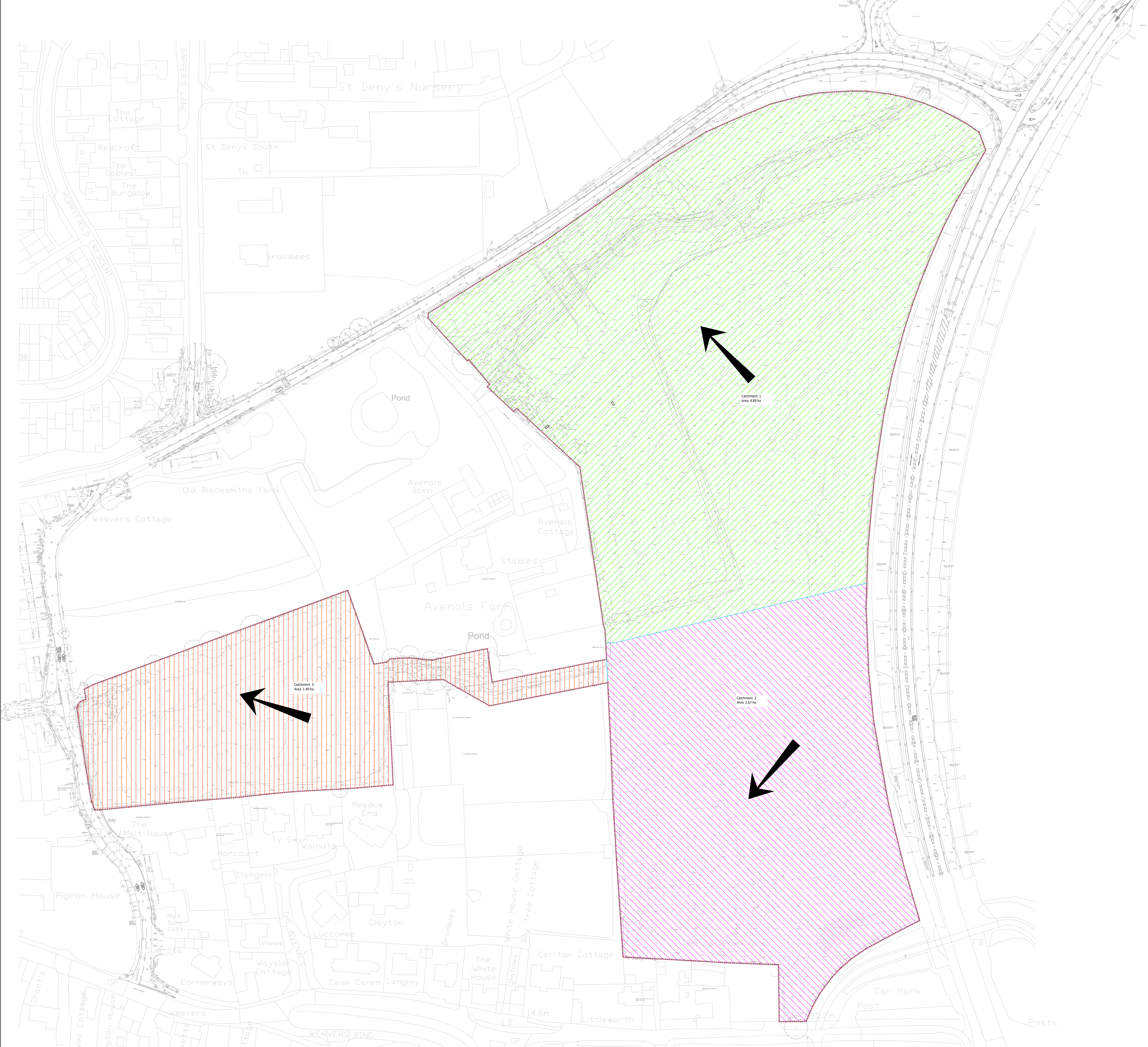


A plan is required showing that a clear 3m buffer is provided around all attenuation and infiltration basins to facilitate future maintenance.

We confirm that adequate space, 3m minimum from top of water level, plus 300mm freeboard, and/or basin cover level, around all attenuation and infiltration basins, in line with Ciria guidance, has been allowed for in the design



Appendix 1 - Drawings



- Catchment 1
- Catchment 2
- Catchment 3
- General Direction of Overland Flow

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DRAWING NOTES:
1. Do not scale.
2. Refer to all other Project Drawings and supporting notes.

PL	01/20	First Issue	JS	SL
Drawn		Reviewed	JS	SL

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Client:
**BARRATT
DAVID WILSON HOMES**

Project:
**WATER LANE
ANGMERING**

Drawn:
**PRE-DEVELOPMENT
CATCHMENT AREAS**

Status:
FOR INFORMATION

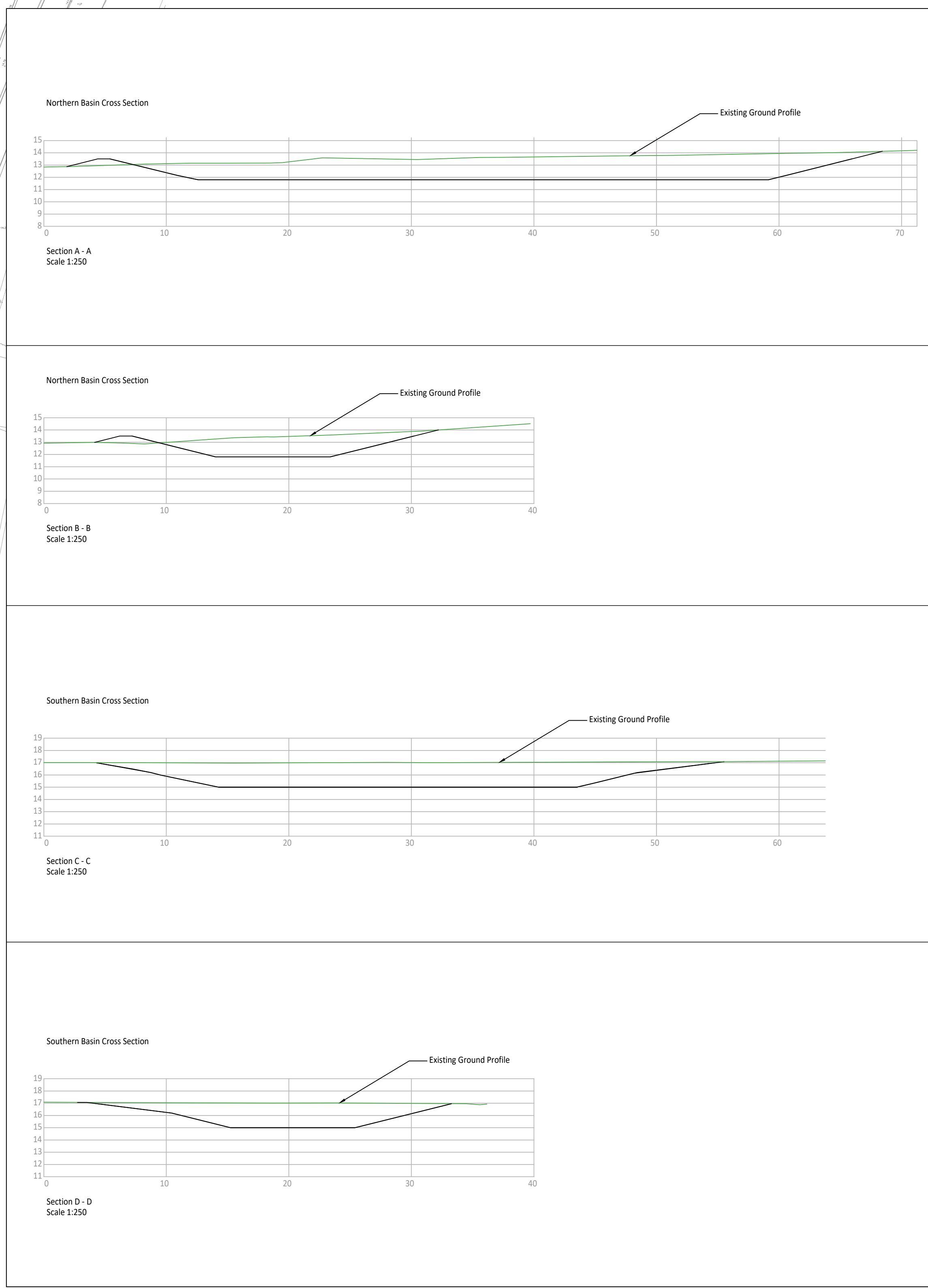
Drawn	NTS @ A0	Date	SEPT '20	Project	JS	Checked	SL
Drawn by	A290-RM-511					Reviewed	P1



- Northern Basin
- Southern Basin
- Western Attenuation

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DRAINAGE NOTES:
1. Do not scale.
2. Refer to all other Project Drawings and supporting notes.



PL 09/20	First Issue	JS	SL
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Client: BARRATT DAVID WILSON HOMES			
Project: WATER LANE ANGMERING			
Title: POST-DEVELOPMENT CATCHMENT AREAS & BASIN CROSS SECTIONS			
Status: FOR INFORMATION			
Drawn: NTS @ AD	Date: SEPT '20	Checked: JS	SL
Drawing No: A290-RM-512			Revision: P1

development planning
infrastructure design
transport HIGHWAYS
drainage
CIVIL ENGINEERING
site appraisal
flood risk assessment
travel plans
masterplanning

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