BRACKNELL DATA CENTRE

Drainage Design Philosophy
20305B-RPS-00-XX-RP-D-9605

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Bracknell Data Centre
Final
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Approval for issue

Mark Harris	1 March 2021

Prepared by:

RPS

Sherwood House
Sherwood Avenue
Newark
Nottinghamshire
NG24 1QQ
T +44 1636 605 700
E james.chapman@rpsgroup.com

Contents

Tables

Appendices

1 INTRODUCTION

1.1 This drainage design philosophy report accompanies and supports a planning application for the development of land at Cain Road, Amen Corner, Bracknell, Berkshire.

1.2 It forms one of a suite of technical reports forming part of a planning application for a Data Centre on land at Cain Road, Amen Corner, Bracknell (The Application Site).

1.3 This application seeks planning permission for a Data Centre, with associated office administration areas, emergency generators and emission stacks, diesel tanks and filling area, electrical switchroom, a water sprinkler pump room and storage tank, a gate house / security building, site access, internal access roads, drainage infrastructure and hard and soft landscaping

1.4 The development proposals including boundaries and areas are outlined on the Master Site Layout plan RPS drawing 20305B-RPS-00-XX-DR-A-9501 (refer to **Appendix A**).

1.5 The Application Site (hereafter referred to as the site) is located at Cain Road, Bracknell in Berkshire. The site is located within the established Amen Corner Business Park, part of the wider Western Industrial Area.

1.6 The Application Site extends to a total of 9.9 Ha and is made up of 2 distinct sections. The Main site (7.5 Ha) (hereafter called the Site) and an area of land (2.4 Ha) to the south on the opposite side of Beehive Road (the 'Former Recreation Site').

1.7 The site lies within the administrative area of Bracknell Forest Council (BFC).

1.8 This Drainage Strategy supplements a separate Flood Risk Assessment by RPS (20305B-RPS-00-XX-RP-C-9602) and sets out the proposed surface and foul water drainage strategy for the development.

1.9 The report has been written in accordance with the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019), CIRIA C753 'The SuDS Manual' (CIRIA, 2015) and the requirements of the Lead Local Flood Authority (LLFA).

1.10 The contents of this report are to be read in conjunction with all supporting drawings and/or documents referenced herein, appended to this report or submitted in support of the planning application for this development.

2 BASELINE CONDITIONS

Ground Conditions

2.1 Site investigation was undertaken by CBRE in 2018 consisting of a Phase 1 Preliminary Risk Assessment and Phase 2 Site Investigation reports referenced: 50BCD0262442/P1, dated June 2018 and 50BCD0262442/PII, dated October 2018 Respectively.

Geology

2.2 The general geology is anticipated to comprise of hard standing overlying a thickness of Made Ground deposits (locally to depths of up to 11m bgl in the area of the infilled clay pit), underlain by strata of the London Clay Formation. The Phase 2 Site Investigation identified the Made Ground was thickest in the south-eastern portion of the site (6.5-6.8m thick), within the area of the infilled former clay pit, with the thickness decreasing towards the northwest from 2-3m in the centre to 0.5m in the north.

Ground contamination

2.3 Prior to the current site use, the site has a history of agricultural use and excavation of clay for the local brick and tile works.

2.4 The historical use of the site may have resulted in localised contamination to shallow soils.

2.5 A Ground Conditions report (20305B-RPS-XX-XX-RP-P-9734) accompanies the planning submission and also identifies any outstanding pre-occupation requirements in relation to ground contamination and ground gas.

Groundwater

2.6 Groundwater was recorded during intrusive site investigation works between 0.6 and 6.6m bgl. Resting groundwater levels were recorded between 1.21 and 3.44m bgl (or 63.50 and 65.49m AOD). By comparison the proposed FFL is 67.850m AOD and therefore 2.36m above any recorded groundwater strikes.

2.7 The groundwater encountered is anticipated to be perched and laterally discontinuous.

2.8 Detailed design will take into consideration perched groundwater and allow for short term influence on any tanks, where necessary.

2.9 The site is not indicated to be within a groundwater Source Protection Zone (SPZ).

Infiltration Testing

2.10 The site is underlain by cohesive clay strata of the London Clay Formation, which is considered unlikely to be suitable for infiltration drainage.

Flood risk

2.11 The Environment Agency's Flood Map for Planning, indicates that the site is located within Flood Zone 1, whereby the annual probability of flooding from fluvial or tidal sources is classified as less than 1 in 1,000. The site is considered to be of 'low' risk from surface water flooding. Further information on flooding is provided in the Flood Risk Assessment by RPS (20305B-RPS-00-XX-RP-D-9602).

Existing Surface and Foul Water Drainage

2.12 RPS drawing 20305B-RPS-00-XX-DR-D-9610 (Appendix B) illustrates the existing site drainage and levels.

2.13 There is an existing private drain which runs along the southern boundary within the site, this serves a 300mm diameter offsite connection in the South west corner, before taking flows from part of the existing site (increasing in size from 300mm to 750mm dia) before leaving the site in the South East corner. This drain then passes below Beehive Road and discharges into the existing pond located within the 'Former Recreation Site' which provides attenuation before discharging into a Thames Water surface water sewer.

2.14 The existing pond discharges into a Thames Water surface water sewer on its eastern boundary which runs North East adjacent the DELL office complex and connects into the wider drainage network serving the Western Industrial Area.

2.15 There is an existing 375m diameter Thames Water surface water sewer which runs along Cain Road heading south east which also takes flows from part of the existing site. Thames water asset plans can be found in Appendix C.

2.16 The site is currently served by a surface water drainage network, where the larger part of the site, Western Catchment (approximately 4.82 ha), discharges into the existing attenuation pond located on the 'former recreation site'. The smaller Eastern Catchment (approximately 1.58 ha), covering the car park discharges directly into the Thames Water surface water network along Cain Road.

2.17 There is an existing 300mm diameter Thames Water foul water sewer which runs across the north west boundary of the site and then heads south east along Cain Road. The site 'Existing levels and drainage' layout drawing 9610 (appendix B) and Thames Water asset plans (appendix C) confirm that the current office buildings on the site are served by this drain.

Existing Surface Water Drainage Assessment

2.18 We have undertaken the assessment below using the 'Colebrook-white Equation' to estimate the maximum flows within the existing pipes. Calculations can be found in appendix G.

Existing offsite connections - 300mm diameter pipe (South West corner).

2.19 We have surmised from the existing levels and drainage survey (appendix B) that this pipe is running at a gradient of 1 in 150 which will produce a flow rate of 90l/s running full bore

Existing pond connection - 750 diameter to existing Pond outfall (before passing below Beehive Road)

2.20 This existing drain runs along the southern boundary within the site and serves the existing development. There are various connections along the length of the drain serving the existing buildings and impermeable surfaces. The last pipe accepting discharge from the existing site is a 750mm diameter pipe, at a gradient of 1 in 300 this pipe can discharge at a maximum capacity of 711l/s.

2.21 Taking into account the offsite connection of 90l/s it is estimated that an existing discharge rate of 621l/s comes from the existing site.

2.22 This existing flow rate is also supported by the current live application (planning ref 20/00563/FUL) documents; Flood Risk Assessment 19-095 HP dated 26 June 2020 and addendum 19-095 dated 14 October 2020.

Existing connection to TW drain (Cain Road)

2.23 There are 4 no. connections from the existing site which feed into the Thames Water drain along the Northern boundary. We do not propose utilising these connections, however it is understood from the current live application that existing flows total 211 l/s.

Overall flow from site

2.24 The total flow from site is 832 l/s

3 PROPOSED SURFACE WATER DRAINAGE

3.1 The proposed surface water drainage layout for the scheme is shown on RPS drawing 20305B-RPS-00-XX-RP-D-9630 (refer to **Appendix D**).

3.2 The existing site is a brownfield site where a large part of the site is already served by the existing pond located within the 'Former Recreation Site'. The proposed development will decrease the impermeable area compared to the extensive buildings and hardstanding currently on site. The current impermeable area is around 6.4 ha and by comparison the proposed site is 3.3 ha, providing a 50% reduction.

3.3 The proposed catchment areas are shown on RPS drawing 20305B-RPS-00-XX-RP-D-9631 (refer to **Appendix E**)

3.4 As the pond currently serves the western catchment of the site, the proposed site will fully utilise the existing pond outfall and any additional runoff to suit current design standards and climate change factors will be attenuated on site within the drainage network and discharged later.

3.5 The FRA outlines that there is localised flooding on Cain Road due to the capacity of the drain and therefore offline storage has been provided within the drainage network at the main site entrance.

3.6 The proposed buildings and the associated impermeable external surfaces will have a dedicated below ground network and all catchments will pass through a catch-pit chamber before discharge into a below ground attenuation tank, flows will be restricted to reflect the existing flows before discharge into the existing attenuation pond.

3.7 Roof drainage for the data centre and ancillary buildings will comprise of tradition gravity drainage system with roof gutters and external downpipes. The rainwater downpipes will be connected directly to a below ground drainage network, where flows will be conveyed under gravity into a below ground attenuation tank, flows will be restricted to reflect the existing flows before discharge into the existing attenuation pond.

3.8 The perimeter circulation roads for each unit will fall-away from the building to linear drains or gullies. The linear drains or gullies will convey the run-off to the receiving below ground drainage network, where flows will be conveyed under gravity into a below ground attenuation tank, flows will be restricted to reflect the existing flows before discharge into the existing attenuation pond.

3.9 Vehicle entrances and car parking areas will be constructed of bituminous construction. Levels will be designed to ensure surface water run-off is collected within linear drains or gullies located at the lowest point. These drains will convey the run-off to the receiving below ground drainage into an alarmed by-pass separator. Flows will be conveyed under gravity into a below ground attenuation tank, flows will be restricted to reflect the existing flows before discharge into the existing attenuation pond.

3.10 The loading bay ramp and designated re-fuelling areas will consist of a concrete hardstanding surface, Levels will be designed to ensure surface water run-off is collected within linear drains or gullies located at the lowest point. These drains will convey the run-off to the receiving below ground drainage into a full retention separator. Flows will be conveyed under gravity into a below ground attenuation tank, flows will be restricted to reflect the existing flows before discharge into the existing attenuation pond.

3.11 Low trafficked area's such as the MV compound access road will be constructed from a permeable construction of 'grasscrete' or similar. Perforated drains within the sub-base will convey the run-off to the receiving below ground drainage network and flows will be conveyed

under gravity into a below ground attenuation, flows will be restricted to reflect the existing flows before discharge into the existing attenuation pond.

4 SUSTAINABLE DRANAGE SYSTEMS

Strategy

4.1 Surface water run-off should be managed at source, with flows controlled to mimic the natural pre-development rates to reduce downstream impact wherever possible. Water should be conveyed through SuDS components of the surface water Management Train to ensure effective pre-treatment and appropriate flow control prior to discharge from site, giving due consideration to water quality and water quantity whilst creating and sustaining better places for people and nature, considering the local amenity and biodiversity.

4.2 SuDS mimic natural drainage processes to reduce the effect on the quality and quantity of run-off from developments and provide benefit to amenity and biodiversity.

4.3 Large areas of landscaping are included as part of the overall development proposals reducing the impermeable area by around half compared to the existing site.

4.4 The existing pond and surrounding mature landscaping are retained and supplemented by new planting. The established and new planting provides ecological benefit whilst offering an attractive amenity area.

4.5 The existing pond is sized to accommodate the quantity of water required for attenuation as well as improve the quality of the water discharged from the Application Site.

4.6 The drainage strategy for the proposed development is based on SuDS, in accordance with CIRIA C753 'The SuDS Manual' (CIRIA, 2015) to reduce the impact on the receiving below ground aquifer.

Discharge Rates

4.7 The proposed site will utilise the current outfall and discharge into the existing attenuation pond at an equivalent flow rate of 621 l/s. An assessment has been made to calculate the current flow from site excluding any offsite flows, please refer to section 2 'Existing Surface Water Drainage Assessment' This is a betterment compared to the current flows from site which equate to 832 l/s.

4.8 Part of the existing site discharges to a surface water sewer below Cain Road to maximum discharge of 211 l/s. Overall, the proposed development will result in a 100% reduction in the rate of surface water flows into this sewer. The development is therefore considered to comply with the design guidance produced by Bracknell Forest Council and the Local Flood Risk Management Strategy 2017-2020.

4.9 Further to the above, the FRA outlines that there is localised flooding on Cain Road due to the capacity of the drain and therefore removing any positive connections to the Sewer should alleviate the current flooding issues. In addition storage has been provided within the drainage network at the main site entrance.

4.10 On site SuDS measures will comprise permeable paving to low trafficked area's such as the MV compound access road and filter drains are provided to gravel areas. These drainage features are to be provided as indicated on the RPS Surface Water Drainage Layout 20305B-RPS-00-XX-DR-D-9630 (refer to Appendix D). This layout also identifies pipe size, gradient and flow controls.

Water Quantity and Water Quality / Pollution Control

4.11 Whilst infiltration would not be a suitable means of discharge for the proposed drainage, some interception would be provided by evapotranspiration within the existing pond.

4.12 The proposed development reduces the impermeable area by around 50%, significantly reduces the amount of parking and considerably increases the amount of landscaping. The existing drainage system is likely to be showing some signs of decline and catchpits or drainage channels could have limited capacity to collect any suspended solid runoff. The proposed development will have a new drainage system complete with catchpits at all collection points, combined with the significant reduction in hard paved areas the development will have a positive impact on pollution control with regards to total suspended solids.

4.13 Areas at risk of oil or fuel spillage will be contained and served by proprietary petrol interceptors installed as part of the works. The reduction to impermeable areas and reduced traffic flows will also improve the risk of pollution.

4.14 An isolation valve/penstock will be provided to the drainage system serving the circulation roads and re-fuelling area upstream of the attenuation pond.

Designing for Exceedance

4.15 The surface water drainage network has been designed to accommodate run-off from all storms up to and including the 100-year return period with an additional 40% for future climate change with no above ground flooding or surcharging of the network to within 1m of the Finished Floor Level (FFL).

4.16 Attenuation has been provided for any flows in excess of the existing flow from site.

4.17 A 10% increase in impermeable area for urban creep has been included within the design.

General Construction Phase Pollution Prevention Measures

4.18 In order to protect the surface water interests surrounding the site, the following mitigation measures shall be adopted by the Principal Contractor during the construction process.

1. Pollution prevention equipment will be kept in the main compound at all times and procedures for use put in place.
2. The Principal Contractor will be required to keep spill kits on site at all times and ensure that staff are trained to use them
3. Construction vehicles will be regularly maintained to reduce the risk of leakage or spillage. Maintenance work will be carried out off-site or on impervious drip trays of sufficient capacity to prevent spillage of fuel and oil.
4. Immobile plant, fuels, oils and chemicals will be stood on impervious drip trays or be secured/locked in appropriately bunded areas (at 110% of volume). Refuelling operations will be carried out within a designated construction site compound remote from surface drainage systems. Empty drums will be disposed of appropriately.
5. The washing out of any Ready-Mix Lorries shall be strictly controlled. The effluent from such cleaning shall be disposed of appropriately.
6. Any temporary foul drainage to serve welfare facilities will be provided at the start of works on site. Foul water will be disposed of appropriately.

4.19 All works on site will follow the best practice guidelines outlined in section 5 and 6 of CIRIA C532-Control of Water Pollution from Construction Sites (CIRIA, 2001).

Surface Water Design Criteria

4.20 The new surface water drainage system will be designed to satisfy the following design criteria:

1. Surface water run-off derived from the most onerous 1 in 2 year return period storm will flow unimpeded through the drainage network where practically possible. (Localised surcharging directly upstream of the attenuation ponds / detention basin and flow control is expected to occur).
2. Surface water run-off derived from the most onerous 1 in 30 year return period storm will be accommodated within the drainage system.
3. Surface water run-off derived from the most onerous 1 in 100 + 40% year return period storm will be accommodated within the drainage system. No above ground flooding or surcharging of the network to within 1m of the FFL.

4.21 The drainage calculations have been completed using industry standard MicroDrainage© software, by Innovyze and can be found in appendix I.

Surface Water Hydraulic Design Parameters

Global variables for 'Flood Estimation Handbook' (FEH) rainfall data:

Rainfall:	Storm intensities are based upon the FEH method for events ranging from 60 minutes to 1440 minute duration.
Design Return Period:	2, 30 and 100 years.
Climate change:	Rainfall profiles increased by 40% during the 1 in 100 year event
	C = -0.028, D3 = 0.325
	D1 = 0.258, E = 0.301
	D2 = 0.282, F = 2.726
Volumetric Run-off coefficient:	1.0 (summer); 1.0 (winter)

Global time of entry:	4 minutes
Infiltration:	Ignore for peak flow design
Backdrops:	Allow in design; maximum depth of 1.5m
Depth:	0.600m / 0.900m / 1.200m minimum cover (Landscaping / service yard / highway; typically)
Surcharge:	No surcharging of pipes during 1:2 year event, where practicably possible

5 FOUL WATER DRAINAGE

5.1 The proposed foul water drainage for the site is shown on RPS drawing 'Foul Water Drainage Layout' 20305B-RPS-00-XX-DR-D-9635 (refer to **Appendix F**).

5.2 It is intended that domestic foul and process water flows will discharge to the existing 300mm diameter Thames Water Sewer which runs through the western part of the site.

5.3 It is proposed that the existing sewer will be diverted to follow closely to the North west boundary before leaving the site as outlined on the proposed 'Foul Water Drainage Layout'.

5.4 Current foul flow volumes are likely to be significantly higher than required by the data centre, however any connections will be subject to a formal section 106 agreement with Thames Water and a separate trade effluent application for process water.

5.5 The Operator has provided the following data for the anticipated process and domestic foul water flows and these will form the basis of the Sewer Connection Application to be made to Thames Water;

Process Water Flows

5.6 Flows for each building (representative for a peak instantaneous flow):

Table 5.6: Overall process water flows

Item / Plant	Flow (l/s)
AHU's	2.5
Total Peak Flow	**2.5 l/s**

Domestic Flows

5.7 Calculation of Foul Water Flow Rates to BS EN 752 pt4 - Annex C

Table 5.7: Calculation of Foul Water Flow Rates

Location	WC	WHB	Urinal	Sink	Shower	DW	Coffee	Condensate	DU Total
SVP 01	8	6	3	1	1			5	17.7
SVP 02	1	1						1	2.0
SVP 03								5	1.0
SVP 04								7	1.4
SVP 05								5	1.0
SVP 06								12	2.4
SVP 07								11	2.2
SVP 08								9	1.8
SVP 09								9	1.8
SVP 10								18	3.6
								Total	**34.9**

(for full calculation sheet refer to **Appendix H**)

Table 5.8: Loading Units

Loading Units	
WC	1.5
WHB	0.3
Urinal	0.4
Sink	1.3
Shower	0.4
Dishwasher	0.2
Coffee	0.2
Condensate	0.2

Table 5.9: Design Flow

Frequency Factor KDU =	**0.5**	
Design Flow Rate Q =	3.0	l/s
Dry Weather Flow =	0.4	l/s

Table 5.10: Summary of overall foul flows

Domestic Foul	3.0
Process water	2.5
Total	**5.5**

5.8 Based on the preliminary assessments above, it is anticipated that peak foul flows from the proposed development will not exceed **5.5 l/s.**

5.9 The foul water pipes within the on-plot drainage scheme have been designed to be 150mm diameter pipework laid to a minimum fall of 1:150. This satisfies the local peak flow rate as well as the minimum flow velocity to satisfy the self-cleansing requirements, in accordance with clause B4 9a '*Sewers for Adoption 7th Edition*'.

6 MAINTENANCE REGIME

6.1 On site drainage systems and SuDS features would remain under private ownership and would be maintained by an Estates management company or the owner/occupier in accordance with the following guidance:

Main Drainage System

6.2 Gutters, rainwater pipes, outlets, gullies and drainage channels would be inspected and thoroughly cleaned once a year.

6.3 All manholes would be inspected once a year and where necessary cleaned out at the same time. Any defects to the brickwork, benching cover or frame would be made good. Attention would be made to the Confined Spaces Regulations 1997 and the provisions contained therein for access to confined spaces. Details for entrance to manholes and separator tanks are contained in the above legislation.

Cleaning of the Drainage System

6.4 The following operations would be carried out during the periodic cleaning of the drainage system:

1. Covers of inspection chambers and manholes would be removed and the sides, benching and channels cleaned.
2. Intercepting traps, if fitted, would be plunged and flushed with clean water. Care would be taken to see that the stopper in the rodding eye is securely replaced.
3. Main and branch drains should be cleaned and afterwards would be flushed with clean water. Any obstructions found would be removed and not flushed into the system.
4. Periodically, accumulated deposits in gullies would be removed. The traps would then be plunged and thoroughly flushed out with clean water.
5. Covers of inspection chambers and gullies would be replaced, bedded unsuitable grease or other sealing material and/or bolted down as appropriate to the type. Missing bolts and broken items would be renewed.

Methods of Cleaning

6.5 The drainage system would be cleaned, as appropriate, using one or more of the following methods:

a. Rodding.

Appropriate cleaning tools and techniques should be chosen to avoid damage to the pipework to be cleaned. A set of rods with appropriate ends is basic useful equipment. It is important that correctly designed proprietary ends are used on the rods. Makeshift devices attached to the ends of rods should be avoided as they are not as effective as the correctly designed article and could become detached and create a blockage which would be difficult to remove. Furthermore, it is possible that such devices could cause damage to the pipeline. If the rods have brass ferrules, they should be checked to ensure that their fastenings are secure and that there are no protruding shoulders or fastenings as these can cause damage to drain lines, especially when entering through rodding eyes.

b. Jetting.

High pressure jetting techniques are suitable for use with all currently available pipe materials and should also be considered.

c. Hydraulic rams compressed air or other gases.

Equipment is available for use with all sizes of drain likely to be encountered in building drainage and is suitable for use with all currently available pipe materials. The principle of operation is that a shock wave is induced and is transmitted by water to the point of blockage, and the technique is effective where the pipe is surcharged or can be filled with water from the blockage to a point where the equipment can be used.

Penstocks

6.6 Penstocks to be checked and maintained in accordance with the manufacturer's recommendations. But in general penstock manholes should be inspected every 3 months to clean out any debris and silt, to check condition of the system (including fixing bolts), to operate the system through a full cycle and ensure all moving parts are sufficiently oiled/greased.

SuDS Drainage

Proprietary Treatment Systems

6.7 Treatment systems such as oil separators and silt traps require regular maintenance. Routine inspections would be undertaken at least every six months and a log maintained of inspection date, depth of oil / silt and any cleaning that is undertaken. All systems on the site would be accessible for cleaning purposes. Proprietary treatment devices would have different operation and maintenance requirements and specific reference would be made to the manufacturer's guidelines. However, for generic guidance reference can be made to the guidance set out within the CIRIA Guide C753 SUDS Manual section 14.12.1 and table 14.2 for operation and maintenance (extract show below).

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

Attenuation Pond

6.8 The existing attenuation pond (on the Former Recreation area) would require ongoing regular maintenance to ensure continuing operation to design performance standards. A maintenance plan is to be developed during the detailed design phase, to suit any environmental constraints, landscaping requirements, proprietary systems etc, but in general operation and maintenance will follow the guidance set out within the CIRIA Guide C753 SUDS Manual section 22.12 and table 22.1 (extract show below).

TABLE 22.1 Operation and maintenance requirements for detention basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

7 REFERENCES

20305B-RPS-00-XX-RP-D-9602 – Flood Risk Assessment

CIRIA, 2001. Control of Water Pollution from Construction Sites C532

CIRIA, 2015. SuDS Manual C753

Ministry of Housing, Communities and Local Government, 2019. National Planning Policy Framework.

WRC Sewers For Adoption 7th Edition

Sewage Sector Guidance Appendix C (Approved version 2.0)

Bracknell Forest Council – Planning application drainage strategy information.

CBRE Phase 1 Preliminary Risk Assessment 50BCD0262442/P1, dated June 2018

CBRE Phase 2 Site Investigation 50BCD0262442/PII, dated October 2018

Appendix A
20305B-RPS-00-XX-DR-A-9501-Master Site Plan

Site Furniture

Entrance Canopy (Image shown for illustration)

Length: 4.9m
Width: 5.1m
Height: 3.0m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

Smoking Shelter (Image shown for illustration)

Length: 3.135m
Width: 1.540m
Height: 2.25m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

Security Kiosk (Image shown for illustration)

Length:1.9m
Width: 1.2m
Height:2.25m
Finish: Plastic coated steel
Colour: Grey

Cycle Shelter (Image shown for illustration)
Capacity: 10 cycles

Length:5m
Width: 2.75m
Height: 2.66m
Finish: PPC powder coated steel
Colour: Anthracite (RAL 7016)

Bin Store (Image shown for illustration)

Length: 3.5m
Width: 4.3m
Height: 2.4m
Finish: Treated softwood timber fence with double gate
Colour: Natural

Building Dimensions

	Length	Width	Height	Total Area (GEA)		Drawing references
Data Centre	139.2m	67.4m	12.2m	8,892m²	Breakdown	20305B-RPS-01-XX-DR-A-9515 20305B-RPS-01-XX-DR-A-9516 20305B-RPS-01-XX-DR-A-9515 20305B-RPS-01-XX-DR-A-9521 20305B-RPS-01-XX-DR-A-9522
					Office and Personnel Space: 1,425m²	
					Technical Space: 7,267m²	

Ancillary Structures

Water Tanks	6.1m Ø	n/a	10.9m	50m²	20305B-RPS-01-XX-DR-A-9515 20305B-RPS-01-XX-DR-A-9522
Sprinkler Tank	11.0m Ø	n/a	5.8m	95m²	20305B-RPS-02-XX-DR-A-9542
Pumphouse	9.7m	8.7m	4.8m	85m²	20305B-RPS-03-XX-DR-A-9542
Gatehouse	10.4m	8.2m	5.4m	85m²	20305B-RPS-03-XX-DR-A-9540 20305B-RPS-03-XX-DR-A-9546
MV Room	13.0m	16.6m	6.9m	216m²	20305B-RPS-04-XX-DR-A-9544
Fuel Tank	9.5m	7.5m	4.7m	72 m²	20305B-RPS-05-XX-DR-A-9543
Temporary MV Building	16.6m	12.1m	5.6m	199m²	20305B-RPS-40-XX-DR-A-9546
Permanent Utility MV Building	16.1m	9.6m	5.6m	165m²	20305B-RPS-50-XX-DR-A-9545
Permanent Occupier MV Building	17.1m	12.4m	5.6m	230m²	20305B-RPS-50-XX-DR-A-9545
Transformers	17.0m	6.9m	4.6m	124m²	20305B-RPS-50-XX-DR-A-9545

NOTES

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2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used
3. This drawing should be read in conjunction with all other relevant drawings and specifications.
4. Aerial imagery (c) Google 2021

10m SCALE 1:1000

Key

- Development boundary
- Outer perimeter fence
- Inner perimeter fence
- Existing tree to be retained
- Additional trees to be planted

Rev	Description	By	Ckd	Date
P01	Planning Issue	LTS	KF	15.02.21

MAKING COMPLEX EASY

Sherwood House, Sherwood Avenue,
Newark, Nottinghamshire, NG24 1QQ
T:01636 605 700 E: rpsnewark@rpsgroup.com

Client

Project: Bracknell Data Centre

Title: Master Site Plan

Status	Scale	Date Created
Preliminary	1:1000@A1	15.02.21

Task Team Manager	Information Author	Task Information Manager
KF	LTS	KF

Document Number
20305B-RPS-00-XX-DR-A-9501
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

RPS Project Number: NK020305B
Revision: P01

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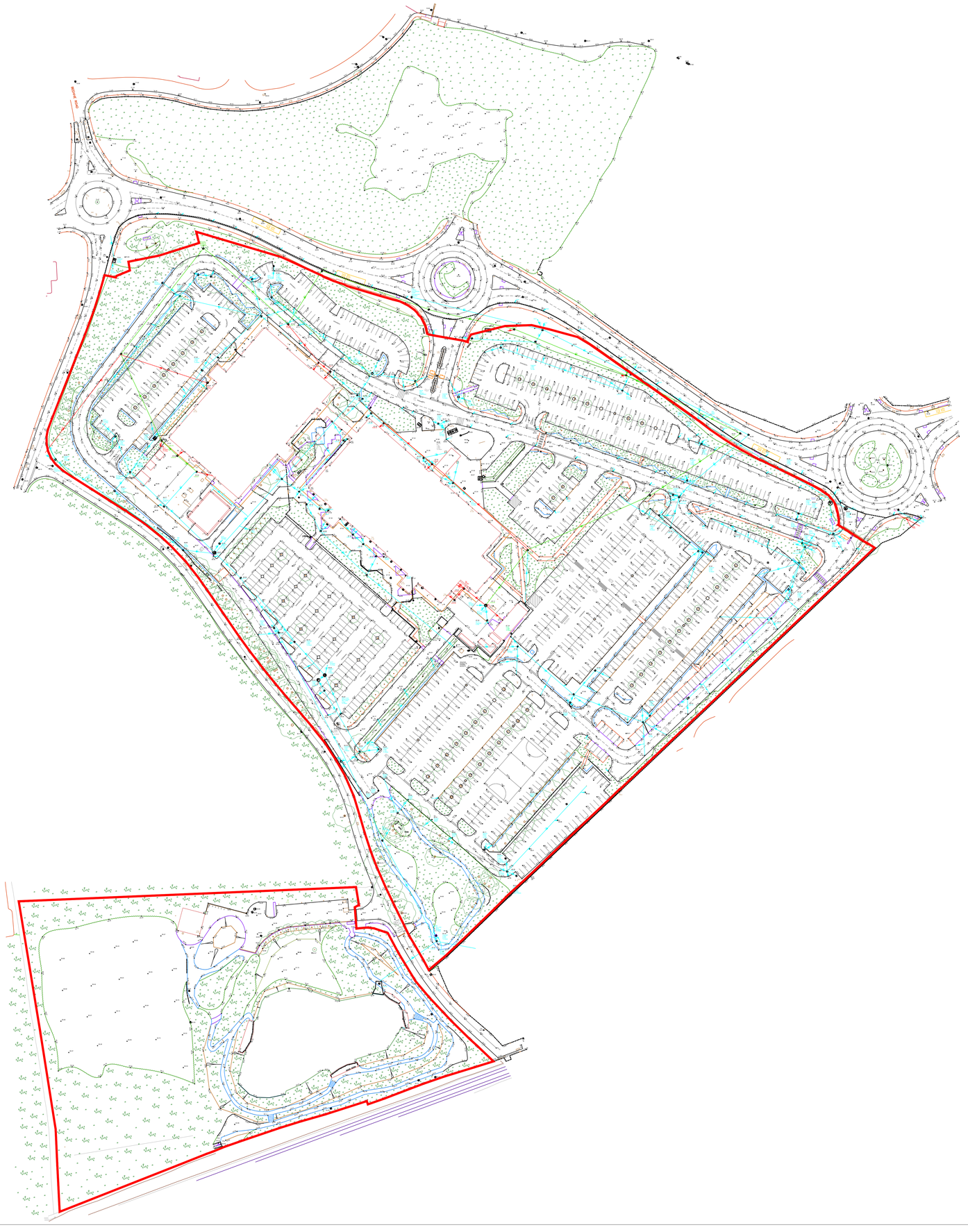
Appendix B

20305B-RPS-00-XX-DR-C-9610 Existing Levels and Drainage



NOTES

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2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

10m SCALE 1:500

UTILITY KEY

- FOUL DRAINAGE
- CONTAMINATED SURFACE DAINAGE
- SURFACE DRAINAGE
- COMBINED DRAINAGE

P01	Planning Issue	RB	JDC	17.02.21
Rev	Description	By	Ckd	Date

Sherwood House, Sherwood Avenue,
Newark, Nottinghamshire, NG24 1QQ
T: 01636 605 700 E: rpsnewark@rpsgroup.com

Client

Project: Bracknell Data Centre

Title: Existing Drainage & Levels

RPS Project Number	Scale @ A0	Date Created
NK02035B	1:750	17.02.2021
Task Team Manager	**Information Author**	**Task Information Manager**
MRH	MH	JDC

Status: S1 (Suitable for Information)

Document Number: 20305B-RPS-00-XX-DR-C-9610 (Project Code - Originator - Zone - Level - Type - Role - Drawing Number)

Revision: P01

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Appendix C

Thames Water Asset Plans

Asset location search

Property Searches

Arcadis Consulting Uk Ltd
Craven Court New market,Craven Court

SUFFOLK
CB8 7FA

Search address supplied

Highland
Cain Road
Amen Corner, Binfield
Bracknell
London
RG12 1HN

Your reference 108 - Highland

Our reference ALS/ALS Standard/2020_4189764

Search date 18 May 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Asset location search

Property Searches

Search address supplied: Highland, Cain Road, Amen Corner, Binfield, Bracknell, London, RG12 1HN

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset location search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

With regard to the fresh water supply, this site falls within the boundary of another water company. For more information, please redirect your enquiry to the following address:

South East Water
Rocfort Road
Snodland

Asset location search

Property Searches

Kent
ME6 5AH

Tel: 0845 301 0845

www.southeastwater.co.uk.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

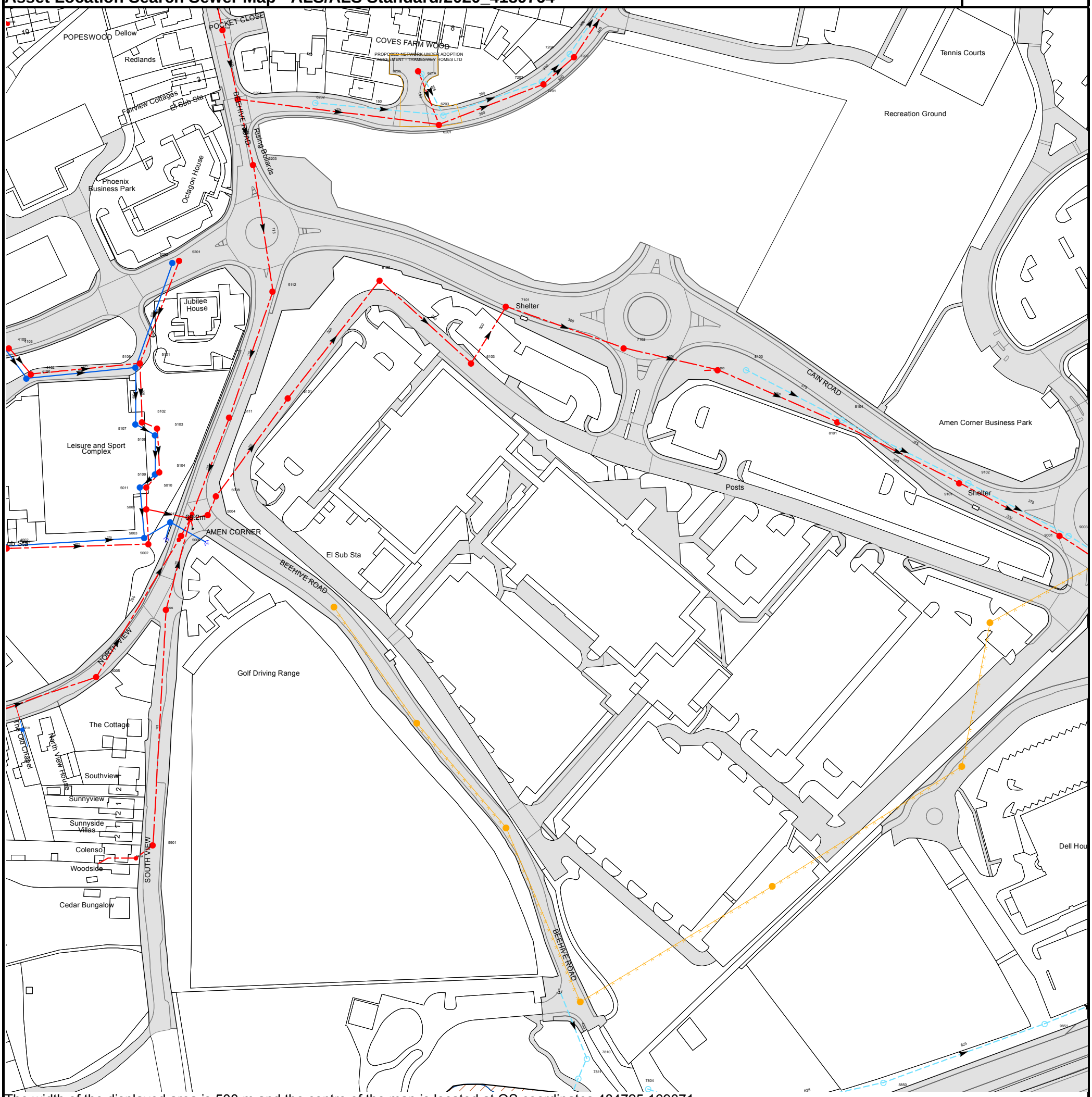
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2020_4189764



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 484725,169071

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5312	n/a	n/a
7202	70.64	67.41
7204	70.6	67.78
431B	n/a	n/a
4103	72.22	69.37
4106	70.84	69.27
7203	70.47	67.86
7201	70.5	67.48
7102	66.86	62.75
8106	65.82	62.36
8103	65.59	63.73
8101	65.83	61.91
8104	65.84	63.42
9101	65.02	61.52
9102	65.08	62.57
4102	70.87	69.05
5106	70.83	68.62
5107	70.83	68.08
5011	70.75	67.69
5101	70.81	68.32
5102	70.76	67.8
5010	70.64	67.32
5108	70.57	67.9
5109	70.44	67.84
5103	70.55	67.67
5104	70.33	67.44
5202	71.1	69.21
5201	71.11	68.94
5008	68.28	65.36
5111	69.03	66.78
5204	72.28	69.97
5203	71.49	68.7
5112	70.25	67.96
6101	68.2	64.86
6202	71.07	69.34
6102	68.27	64.3
6205	70.12	68.2
621A	70.08	68.5
6201	69.63	67.64
6203	69.53	68.07
6103	67.26	63.78
7101	67.99	63.26
9001	65.53	61
9003	65.53	62.02
7804	63.03	59.63
8850	63.92	59.17
7811	61.69	60.22
7810	64.01	60.4
9851	63.88	58.9
4002	71.11	67.83
4001	71.11	68.82
491A	n/a	n/a
5005	69.59	68.1
591A	n/a	n/a
5003	70.54	67.19
5001	70.547	67.017
5002	70.36	68.2
5901	68.11	66.59
5006	68.97	65.7
5012	68.67	66.35
5009	68.24	65.74
5007	68.138	65.488
5004	68.11	65.44

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Trunk Surface Water
- Trunk Foul
- Storm Relief
- Trunk Combined
- Vent Pipe
- Bio-solids (Sludge)
- Proposed Thames Surface Water Sewer
- Proposed Thames Water Foul Sewer
- Gallery
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Sludge Rising Main
- Proposed Thames Water Rising Main
- Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Dam Chase
- Fitting
- Meter
- Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Control Valve
- Drop Pipe
- Ancillary
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Outfall
- Undefined End
- Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

- Public/Private Pumping Station
- Change of characteristic indicator (C.O.C.I.)
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Operational Site
- Chamber
- Tunnel
- Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

- Foul Sewer
- Surface Water Sewer
- Combined Sewer
- Gulley
- Culverted Watercourse
- Proposed
- Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Appendix D

20305B-RPS-00-XX-DR-D-9630 Surface Water Drainage Layout

NOTES

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

10m SCALE 1:500

10m SCALE 1:750

Key:

- 375Ø @ 1:300 — SW Drain (I/D & Gradient)
- Existing infrastructure SW Drain
- Existing infrastructure SW Manhole
- S1 — SW Manhole
- CP1 — Catchpit Manhole C/W 300mm Sump
- P — Penstock Isolation Valve Chamber
- HD — Hydrobrake - Flow Control Chamber
- Gatic Castslot Slot drain
- Kerb Drain
- KO — Kerb Outfall Unit
- OB — Gatic Outfall Unit
- RWP — Rainwater Down Pipe
- SDG — Sprinkler Discharge Gully
- G — Road Gully
- Filter Drain
- Drainage Easement

All kerb drains to be Beany Kerbs by Marshalls. Size & specification to be determined by manufacturer. And designed to accommodate the 1:100 year event + 40% CC. With a rainfall intensity of 171mm/10 minute duration.

Existing utility surface drain and easement extents to be confirmed.

30m Long 600Ø Offline Pipe to prevent surface ponding during 1:100 year event +40%cc

150m³ Attenuation required to contain historical ponding at main site entrance.

Note: All branches for roof downpipes to be 225Ø

SPEL Puraceptor FRI1 (Class 1 Full Retention) P056/1CSC accommodates area of 333m² Catchment area = Docks = 330m² Pipe in IL = 65.105 (225Ø) Pipe out IL = 65.005 (225Ø)

SPEL Stormceptor BPS1 (Class 1 By-Pass Seperator) 103 C1/SC accommodates area of 1,667m² Catchment area = Car parking = 1,025m² Pipe in IL = 64.440 (225Ø) Pipe out IL = 64.340 (225Ø)

SPEL Puraceptor FCS1 (Class 1 Full Retention) FP1CSC accommodates area of 1111m² Catchment area = Refueling = 90m² Pipe in IL = 65.060 (150Ø) Pipe out IL = 64.960 (150Ø)

1000m³ Attenuation tank required to accommodate excess run-off from current design practices

Existing utility surface drain and easement extents to be confirmed.

Flow control manhole restricting discharge to 621l/s to match existing run-off rates.

New penstock manhole C/W lockable lid.

Existing utility surface drain and easement extents to be confirmed.

Existing Surface Water manhole Cover Level = 63.700 Invert Level = 60.460.

Existing 750Ø Drain to serve proposed development. Condition survey to be carried out.

Inset plan - Former Recreational Site
(Scale 1:750)

Rev	Description	By	Ckd	Date
P01	Planning Issue	RB	JDC	17.02.21

Sherwood House, Sherwood Avenue,
Newark, Nottinghamshire, NG24 1QQ
T: 01636 605 700 E: rpsnewark@rpsgroup.com

Client

Project: Bracknell Data Centre

Title: Surface Water Drainage Layout

RPS Project Number	Scale @ A0	Date Created
NK02030SB	1:500	17.02.2021
Task Team Manager: MRH	Information Author: MH	Task Information Manager: JDC

Status: S1 (Suitable for Information)

Document Number: 20305B-RPS-00-XX-DR-D-9630 Revision: P01

Project Code - Originator - Zone - Level - Type - Role - Drawing Number

rpsgroup.com

Appendix E

20305B-RPS-00-XX-DR-D-9631 Surface Water Catchment Plan

NOTES

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

10m SCALE 1:500

10m SCALE 1:750

Unit 1

Surface Water Catchment Key:

55,950m² : Soft Landscaping (Inc. Existing Pond)

6,616m² : Hard Landscaping

Total Permeable Area = 62,566m² (74%)

9,800m² : Roof / Structure

11,803m² : Paved Areas

Total Impermeable Area = 21,603m² (26%)

Former Recreation Pond site
(Scale 1:750)

P01	Planning Issue	RB	JDC	17.02.21
Rev	Description	By	Ckd	Date

Sherwood House, Sherwood Avenue,
Newark, Nottinghamshire, NG24 1QQ
T: 01636 605 700 E: rpsnewark@rpsgroup.com

Client

Project: Bracknell Data Centre

Title: Surface Water Catchment Plan

RPS Project Number	Scale @ A0	Date Created
NK020305B	1:500	17.02.2021
Task Team Manager	**Information Author**	**Task Information Manager**
MRH	MH	JDC

Status: S1 (Suitable for Information)

Document Number: 20305B-RPS-00-XX-DR-C-9631

Revision: P01

Project Code - Originator - Zone - Level - Type - Role - Drawing Number

rpsgroup.com

Appendix F

20305B-RPS-00-XX-DR-D-9635 Foul Water Drainage Layout

NOTES

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2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

10m SCALE 1:500

N

Key:

- 150Ø @ 1:150 — FW Sewer (I/D & Gradient)
- Existing infrastructure FW Sewer
- Existing infrastructure FW Manhole
- F1 — FW Manhole C/W Non Return Valve - Please refer to RPS drawing NCL061-RPS-XX-00-DR-C-3101 for details.
- F1 — FW Manhole
- FW Package Pumping Station
- Foul Rising Main
- SDG — Sprinkler Discharge Gully
- G — Road Gully
- Drainage Easement

New outfall manhole F21 built on line of existing foul sewer.

SPEL Puraceptor BPS3
(Class 2 By-Pass Separator)
103 C2/SC accommodates area of 1.667m²
Catchment area = Transformer Pit = 120m²
Pipe in IL = 65.300 (150Ø)
Pipe out IL = 65.200 (150Ø)

Existing Foul Manhole IL=63.260.

Existing 300Ø sewer to be removed.

New 300Ø foul diversion.

F21
CL=68.000
IL=63.365

225Ø @ 1:170

F20
CL=67.500
IL=63.670

225Ø @ 1:200

BPS3

Existing foul manhole to be removed.

Existing foul manhole to be removed.

Existing 300Ø sewer to be removed.

New manhole F21a built on line of existing foul sewer.

F21a
CL=68.250
IL=64.385

Existing Utility foul sewer and easement extents to be confirmed.

F18
CL=67.320
IL=63.965

150Ø @ 1:130

F12
CL=67.600
IL=64.515

NRV
F11
CL=67.650
IL=64.545

F10
CL=67.650
IL=64.725

F9
CL=67.650
IL=64.830

F8
CL=67.650
IL=65.080

F7
CL=67.650
IL=65.240

NRV
F17
CL=67.480
IL=65.650

NRV
F16
CL=67.480
IL=65.885

F15
CL=67.480
IL=66.030

F14
CL=67.400
IL=66.190

F13
CL=67.480
IL=66.160

F1
CL=67.820
IL=66.665

F2
CL=67.660
IL=66.500

F3
CL=67.660
IL=66.323

F4
CL=67.650
IL=66.163

F5
CL=67.650
IL=65.990

F6
CL=67.660
IL=65.805

BPS2

SPEL Puraceptor BPS2
(Class 2 By-Pass Separator)
103 C2/SC accommodates area of 1.667m²
Catchment area = Fuel Pit = 70m²
Pipe in IL = 66.660 (150Ø)
Pipe out IL = 66.560 (150Ø)

Inset plan - Former Recreational Site
(Scale 1:750)

Rev	Description	By	Ckd	Date
P01	Planning Issue	RB	JDC	17.02.21

RPS MAKING COMPLEX EASY

Sherwood House, Sherwood Avenue,
Newark, Nottinghamshire, NG24 1QQ
T: 01636 605 700 E: rpsnewark@rpsgroup.com

Client

Project: Bracknell Data Centre

Title: Foul Water Drainage Layout

RPS Project Number	Scale @ A0	Date Created
NK020305B	1:500	17.02.2021
Task Team Manager	**Information Author**	**Task Information Manager**
MRH	MH	JDC

Status: S1 (Suitable for Information)

Document Number: 20305B-RPS-00-XX-DR-D-9635

Revision: P01

Project Code - Originator - Zone - Level - Type - Role - Drawing Number

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Appendix G

Existing Surface Water Flow Calculations

Colebrook-White Formula

All charts in AS2200-2006, have been developed using the formulae below:

$$V = -2\left(2gDS\right)^{0.5} \log\left(\frac{k}{3.7D} + \frac{2.5\nu}{D\left(2gDS\right)^{0.5}}\right)$$

k = Colebrook-White roughness coefficient, in metres
V = velocity, in metres per second
D = circular cross-section pipe, inside diameter, in metres
S = slope, in metres per metre
ν = kinematic viscosity of water, in square metres per second.

g = Gravity = 9.81 m/s2
ν = kinematic viscosity of water = 1.010E-06 m2/s

k = Colebrook-White roughness coeff = 0.600 mm = 6.000E-04 m
D = Inside diameter = 300 mm = 0.300 m
S = Slope, in metres per metre = 0.667% = 0.0067 m/m = 0.667 m/100m = 1 : 150
= (Hydraulic Gradient)
V = Velocity = 1.28 m/s

Discharge:
Q = V x A A = 0.071 m2
Q = 0.0906 m/s = 90.6 L/s

Colebrook-White Formula

All charts in AS2200-2006, have been developed using the formulae below:

$$V = -2\left(2gDS\right)^{0.5} \log\left(\frac{k}{3.7D} + \frac{2.5\nu}{D\left(2gDS\right)^{0.5}}\right)$$

k = Colebrook-White roughness coefficient, in metres
V = velocity, in metres per second
D = circular cross-section pipe, inside diameter, in metres
S = slope, in metres per metre
ν = kinematic viscosity of water, in square metres per second.

g = Gravity = 9.81 m/s2
ν = kinematic viscosity of water = 1.010E-06 m2/s

k = Colebrook-White roughness coeff = 0.600 mm = 6.000E-04 m
D = Inside diameter = 750 mm = 0.750 m
S = Slope, in metres per metre = 0.333% = 0.0033 m/m = 0.333 m/100m = 1 : 300
= (Hydraulic Gradient)
V = Velocity = 1.61 m/s

Discharge:
Q = V x A A = 0.442 m2
Q = 0.7113 m/s = 711.3 L/s

Appendix H

Domestic Foul Water Calculations to BS EN 752 pt4 Annex C

Calculation of Foul Water Flow Rates

BS EN 752 pt4 - Annex C

Emperical Equation Q = kDU*(sumDU)^0.5

Q = Design Flow Rate (l/s), kDU = Frequency Factor, DU = Discharge Unit

Typical Frequency Factors (kDU)

Type of Building		kDU
Dwelling, guesthouse, office (intermittent use)		0.5
Hospital, school, restaurant, hotel (frequent use)		0.7
Toilets and/or shower open to the public (congested use)		1.0
Laboratory buildings (special use)		1.2

Typical Values of Discharge Units (DU)

Type of	DU	Type of appliance	DU
Washbasin, shower	0.3 to 0.6	Household washing machine	0.5 to 0.8
Urinal	0.3 to 0.8	Commercial washing machine	1.0 to 1.5
Bath, kitchen sink	0.8 to 1.3	WCs (4.0l to 9.0l cistern)	1.2 to 2.5
Dishwasher	0.2 to 0.8	Floor drains (DN	0.6 to 2.0

Estimated numbers of toilets and washbasins (Source HSE website)

Women Only

Number of People at Work		Number of Toilets	Number of Washbasins
1-5		1	1
6-25		2	2
26-50		3	3
51-75		4	4
76-100		5	5

Men Only

Number of People at Work	Number of Toilets	Number of Urinals
1-15	1	1
16-30	2	1
31-45	2	2
46-60	3	2
61-75	3	3
76-90	4	3
91-100	4	4

	Location		Sum of	Discharge	Sum of
Item	GF	FF	Items	Unit	Discharge Units
Washbasin	7	0	7	0.3	2.1
Urinal	4	0	4	0.4	1.6
Sink	1	0	1	1.3	1.3
WC	9	0	9	1.5	13.5
Condensate	66	0	82	0.2	16.4
				Total	***34.9***

Frequency Factor kDU = 0.5

Peak Flow — Design Flow Rate Q = 3.0 l/s

Dry Weather Flow = 0.4 l/s

Design Check - Suggested Dry Weather Flow Rates 1500 l/day/100m^2 Offices

Office Area 1300 m^2

Dry Weather Flow Rate 19500 l/day

Dry Weather Flow Rate 0.226 l/s

Peak Flow Rate 1.490 l/s

Appendix I
RPS Micro Drainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	25.900	0.260	99.6	0.026	4.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	8.455	0.085	100.0	0.017	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	24.745	0.250	99.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	12.565	0.125	100.5	0.016	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	35.635	0.215	165.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	12.415	0.125	99.3	0.015	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	14.580	0.090	162.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	12.275	0.125	98.2	0.096	4.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	17.760	0.180	98.7	0.022	4.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	26.169	0.170	153.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.43	64.740	0.026	0.0	0.0	0.0	1.01	17.8	3.5
2.000	50.00	4.14	64.565	0.017	0.0	0.0	0.0	1.00	17.8	2.3
1.001	50.00	4.84	64.480	0.043	0.0	0.0	0.0	1.01	17.8	5.8
3.000	50.00	4.21	64.355	0.016	0.0	0.0	0.0	1.00	17.7	2.2
1.002	50.00	5.42	64.155	0.059	0.0	0.0	0.0	1.01	40.3	8.0
4.000	50.00	4.21	64.140	0.015	0.0	0.0	0.0	1.01	17.8	2.0
1.003	50.00	5.66	63.940	0.074	0.0	0.0	0.0	1.02	40.7	10.0
5.000	50.00	4.16	65.970	0.096	0.0	0.0	0.0	1.32	52.5	13.0
6.000	50.00	4.29	66.100	0.022	0.0	0.0	0.0	1.01	17.9	3.0
5.001	50.00	4.64	65.770	0.118	0.0	0.0	0.0	1.26	89.4	16.0

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
7.000	11.024	0.115	95.9	0.112	4.00	0.0	0.600	o	225	Pipe/Conduit	
8.000	14.061	0.155	90.7	0.053	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	32.385	0.105	308.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.000	8.765	0.175	50.1	0.085	4.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	15.930	0.320	49.8	0.047	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.003	25.395	0.085	298.8	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
11.000	10.765	0.215	50.0	0.098	4.00	0.0	0.600	o	225	Pipe/Conduit	
12.000	11.730	0.235	50.0	0.047	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.004	29.300	0.100	293.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
13.000	8.815	0.175	50.4	0.064	4.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
7.000	50.00	4.14	65.790	0.112	0.0	0.0	0.0	1.34	53.1	15.2
8.000	50.00	4.17	65.830	0.053	0.0	0.0	0.0	1.37	54.6	7.2
5.002	50.00	5.11	65.450	0.283	0.0	0.0	0.0	1.15	183.3	38.3
9.000	50.00	4.08	65.745	0.085	0.0	0.0	0.0	1.85	73.7	11.5
10.000	50.00	4.14	65.890	0.047	0.0	0.0	0.0	1.86	73.9	6.4
5.003	50.00	5.43	65.270	0.415	0.0	0.0	0.0	1.29	279.4	56.2
11.000	50.00	4.10	65.700	0.098	0.0	0.0	0.0	1.85	73.7	13.3
12.000	50.00	4.11	65.720	0.047	0.0	0.0	0.0	1.85	73.7	6.4
5.004	50.00	5.78	65.110	0.560	0.0	0.0	0.0	1.42	400.8	75.8
13.000	50.00	4.08	65.560	0.064	0.0	0.0	0.0	1.85	73.5	8.7

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
14.000	10.950	0.220	49.8	0.043	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.005	35.245	0.120	293.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
15.000	24.910	0.500	49.8	0.031	4.00	0.0	0.600	o	225	Pipe/Conduit	
16.000	13.850	0.275	50.4	0.015	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	30.160	0.100	301.6	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
17.000	10.350	0.210	49.3	0.044	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	25.170	0.065	387.2	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
18.000	10.350	0.210	49.3	0.037	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	22.370	0.055	406.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
19.000	8.290	0.210	39.5	0.032	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	23.950	0.060	400.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
14.000	50.00	4.10	65.605	0.043	0.0	0.0	0.0	1.86	73.9	5.8
5.005	50.00	6.19	65.010	0.667	0.0	0.0	0.0	1.42	400.3	90.3
15.000	50.00	4.22	65.765	0.031	0.0	0.0	0.0	1.86	73.9	4.2
16.000	50.00	4.16	65.615	0.015	0.0	0.0	0.0	1.42	25.1	2.0
1.004	50.00	6.55	63.475	0.787	0.0	0.0	0.0	1.40	395.0	106.6
17.000	50.00	4.09	65.460	0.044	0.0	0.0	0.0	1.87	74.3	6.0
1.005	50.00	6.89	63.375	0.831	0.0	0.0	0.0	1.23	348.2	112.5
18.000	50.00	4.09	65.395	0.037	0.0	0.0	0.0	1.87	74.3	5.0
1.006	50.00	7.20	63.310	0.868	0.0	0.0	0.0	1.20	339.6	117.5
19.000	50.00	4.07	65.320	0.032	0.0	0.0	0.0	2.09	83.0	4.3
1.007	50.00	7.53	63.255	0.900	0.0	0.0	0.0	1.21	342.5	121.9

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
20.000	12.820	0.320	40.1	0.013	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	29.990	0.075	400.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
21.000	6.540	0.165	39.6	0.035	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.009	19.975	0.050	400.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
22.000	5.365	0.180	29.8	0.021	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.010	22.640	0.045	500.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
23.000	5.365	0.180	29.8	0.021	4.00	0.0	0.600	o	150	Pipe/Conduit	
24.000	15.880	0.320	49.6	0.252	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.011	24.310	0.050	486.2	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
25.000	6.950	0.235	29.6	0.028	4.00	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)
20.000	50.00	4.13	65.425	0.013	0.0	0.0	0.0	1.59	28.2	1.8
1.008	50.00	7.95	63.195	0.913	0.0	0.0	0.0	1.21	342.5	123.6
21.000	50.00	4.07	65.235	0.035	0.0	0.0	0.0	1.60	28.3	4.7
1.009	50.00	8.22	63.120	0.948	0.0	0.0	0.0	1.21	342.5	128.4
22.000	50.00	4.05	65.200	0.021	0.0	0.0	0.0	1.85	32.7	2.8
1.010	50.00	8.54	62.995	0.969	0.0	0.0	0.0	1.17	417.0	131.2
23.000	50.00	4.05	65.155	0.021	0.0	0.0	0.0	1.85	32.7	2.8
24.000	50.00	4.12	65.145	0.252	0.0	0.0	0.0	2.24	158.1	34.1
1.011	50.00	8.89	62.950	1.242	0.0	0.0	0.0	1.18	422.9	168.2
25.000	50.00	4.06	65.160	0.028	0.0	0.0	0.0	1.86	32.8	3.8

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.012	21.675	0.045	481.7	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
26.000	2.970	0.060	49.5	0.024	4.00	0.0	0.600	o	150	Pipe/Conduit	
26.001	3.975	0.080	49.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.013	25.445	0.050	508.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
27.000	9.150	0.305	30.0	0.019	4.00	0.0	0.600	o	150	Pipe/Conduit	
28.000	3.260	0.065	50.0	0.070	4.00	0.0	0.600	o	225	Pipe/Conduit	
28.001	20.610	0.205	100.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
29.000	3.130	0.065	48.2	0.106	4.00	0.0	0.600	o	225	Pipe/Conduit	
28.002	31.495	0.160	196.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
30.000	2.930	0.075	39.1	0.107	4.00	0.0	0.600	o	225	Pipe/Conduit	
28.003	36.280	0.120	302.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
31.000	5.220	0.130	40.2	0.077	4.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.012	50.00	9.17	62.825	1.270	0.0	0.0	0.0	1.27	560.3	172.0
26.000	50.00	4.03	65.120	0.024	0.0	0.0	0.0	1.43	25.3	3.2
26.001	50.00	4.08	64.960	0.024	0.0	0.0	0.0	1.43	25.3	3.2
1.013	50.00	9.52	62.780	1.294	0.0	0.0	0.0	1.23	545.0	175.2
27.000	50.00	4.08	65.135	0.019	0.0	0.0	0.0	1.84	32.6	2.6
28.000	50.00	4.03	66.300	0.070	0.0	0.0	0.0	1.85	73.7	9.5
28.001	50.00	4.29	66.235	0.070	0.0	0.0	0.0	1.30	51.8	9.5
29.000	50.00	4.03	66.095	0.106	0.0	0.0	0.0	1.89	75.1	14.4
28.002	50.00	4.76	65.955	0.176	0.0	0.0	0.0	1.12	79.0	23.8
30.000	50.00	4.02	65.945	0.107	0.0	0.0	0.0	2.10	83.5	14.5
28.003	50.00	5.35	65.720	0.283	0.0	0.0	0.0	1.04	114.5	38.3
31.000	50.00	4.04	65.880	0.077	0.0	0.0	0.0	2.07	82.3	10.4

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
28.004	24.805	0.085	291.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
32.000	5.865	0.120	48.9	0.027	4.00	0.0	0.600	o	225	Pipe/Conduit	
32.001	13.365	0.135	99.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
33.000	3.915	0.080	48.9	0.030	4.00	0.0	0.600	o	225	Pipe/Conduit	
34.000	5.720	0.115	49.7	0.022	4.00	0.0	0.600	o	150	Pipe/Conduit	
28.005	41.965	2.330	18.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	16.070	0.035	459.1	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
35.000	6.840	0.070	97.7	0.034	4.00	0.0	0.600	o	225	Pipe/Conduit	
35.001	24.595	0.245	100.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
36.000	8.865	0.175	50.7	0.027	4.00	0.0	0.600	o	225	Pipe/Conduit	
37.000	4.085	0.080	51.1	0.026	4.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
28.004	50.00	5.69	65.525	0.360	0.0	0.0	0.0	1.18	188.5	48.7
32.000	50.00	4.05	65.920	0.027	0.0	0.0	0.0	1.88	74.6	3.7
32.001	50.00	4.22	65.800	0.027	0.0	0.0	0.0	1.31	52.2	3.7
33.000	50.00	4.03	65.740	0.030	0.0	0.0	0.0	1.87	74.5	4.1
34.000	50.00	4.07	65.855	0.022	0.0	0.0	0.0	1.43	25.3	3.0
28.005	50.00	5.84	65.435	0.439	0.0	0.0	0.0	4.81	764.7	59.4
1.014	49.46	9.72	62.730	1.752	0.0	0.0	0.0	1.30	574.0	234.7
35.000	50.00	4.09	65.175	0.034	0.0	0.0	0.0	1.32	52.6	4.6
35.001	50.00	4.40	65.005	0.034	0.0	0.0	0.0	1.30	51.9	4.6
36.000	50.00	4.08	65.260	0.027	0.0	0.0	0.0	1.84	73.2	3.7
37.000	50.00	4.04	65.165	0.026	0.0	0.0	0.0	1.83	72.9	3.5

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
38.000	4.665	0.095	49.1	0.012	4.00	0.0	0.600	o	150	Pipe/Conduit	
36.001	27.690	0.275	100.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
39.000	11.010	0.220	50.0	0.012	4.00	0.0	0.600	o	150	Pipe/Conduit	
36.002	5.130	0.050	102.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
35.002	22.250	0.225	98.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
40.000	7.945	0.265	30.0	0.037	4.00	0.0	0.600	o	225	Pipe/Conduit	
41.000	15.880	0.180	88.2	0.197	4.00	0.0	0.600	o	300	Pipe/Conduit	
42.000	4.615	0.035	131.9	0.045	4.00	0.0	0.600	o	225	Pipe/Conduit	
41.001	33.451	0.240	139.4	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	
43.000	17.785	0.120	148.2	0.048	4.00	0.0	0.600	o	225	Pipe/Conduit	
44.000	13.360	0.090	148.4	0.040	4.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
38.000	50.00	4.05	65.255	0.012	0.0	0.0	0.0	1.44	25.4	1.6
36.001	50.00	4.43	65.085	0.065	0.0	0.0	0.0	1.30	51.8	8.8
39.000	50.00	4.13	65.105	0.012	0.0	0.0	0.0	1.43	25.2	1.6
36.002	50.00	4.50	64.810	0.077	0.0	0.0	0.0	1.29	51.3	10.4
35.002	50.00	4.74	64.685	0.111	0.0	0.0	0.0	1.58	111.8	15.0
40.000	50.00	4.06	64.985	0.037	0.0	0.0	0.0	2.40	95.3	5.0
41.000	50.00	4.16	65.305	0.197	0.0	0.0	0.0	1.67	118.4	26.7
42.000	50.00	4.07	65.235	0.045	0.0	0.0	0.0	1.14	45.2	6.1
41.001	50.00	4.58	65.125	0.287	0.0	0.0	0.0	1.33	94.0	38.9
43.000	50.00	4.28	65.080	0.048	0.0	0.0	0.0	1.07	42.6	6.5
44.000	50.00	4.21	65.050	0.040	0.0	0.0	0.0	1.07	42.6	5.4

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
45.000	7.105	0.070	101.5	0.020	4.00	0.0	0.600	o	150	Pipe/Conduit	
45.001	16.735	0.170	98.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
45.002	16.550	0.165	100.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
46.000	7.805	0.080	97.6	0.040	4.00	0.0	0.600	o	150	Pipe/Conduit	
47.000	3.275	0.065	50.4	0.019	4.00	0.0	0.600	o	150	Pipe/Conduit	
45.003	29.900	0.200	149.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
48.000	5.430	0.055	98.7	0.013	4.00	0.0	0.600	o	150	Pipe/Conduit	
45.004	21.830	0.145	150.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
41.002	22.495	0.115	195.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
49.000	17.635	0.355	49.7	0.051	4.00	0.0	0.600	o	225	Pipe/Conduit	
50.000	15.980	0.320	49.9	0.052	4.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
45.000	50.00	4.12	65.785	0.020	0.0	0.0	0.0	1.00	17.6	2.7
45.001	50.00	4.39	65.715	0.020	0.0	0.0	0.0	1.01	17.9	2.7
45.002	50.00	4.67	65.545	0.020	0.0	0.0	0.0	1.00	17.7	2.7
46.000	50.00	4.13	65.460	0.040	0.0	0.0	0.0	1.02	18.0	5.4
47.000	50.00	4.04	65.445	0.019	0.0	0.0	0.0	1.42	25.1	2.6
45.003	50.00	5.14	65.305	0.079	0.0	0.0	0.0	1.07	42.4	10.7
48.000	50.00	4.09	65.235	0.013	0.0	0.0	0.0	1.01	17.9	1.8
45.004	50.00	5.48	65.105	0.092	0.0	0.0	0.0	1.06	42.3	12.5
41.002	50.00	5.81	64.885	0.467	0.0	0.0	0.0	1.12	79.2	63.2
49.000	50.00	4.16	65.200	0.051	0.0	0.0	0.0	1.86	74.0	6.9
50.000	50.00	4.14	65.165	0.052	0.0	0.0	0.0	1.86	73.8	7.0

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
41.003	29.099	0.520	56.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
51.000	16.065	0.160	100.4	0.008	4.00	0.0	0.600	o	150	Pipe/Conduit	
51.001	15.170	0.150	101.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
51.002	17.750	0.355	50.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
52.000	6.030	0.120	50.3	0.012	4.00	0.0	0.600	o	150	Pipe/Conduit	
53.000	9.885	0.200	49.4	0.010	4.00	0.0	0.600	o	150	Pipe/Conduit	
54.000	8.195	0.080	102.4	0.118	4.00	0.0	0.600	o	225	Pipe/Conduit	
53.001	22.700	0.325	69.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
51.003	17.785	0.580	30.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
51.004	35.811	0.390	91.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
55.000	16.260	0.110	147.8	0.043	4.00	0.0	0.600	o	225	Pipe/Conduit	
56.000	15.620	0.155	100.8	0.000	4.00	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)
41.003	50.00	6.01	64.695	0.570	0.0	0.0	0.0	2.43	268.0	77.2
51.000	50.00	4.27	65.575	0.008	0.0	0.0	0.0	1.00	17.7	1.1
51.001	50.00	4.52	65.415	0.008	0.0	0.0	0.0	1.00	17.7	1.1
51.002	50.00	4.73	65.265	0.008	0.0	0.0	0.0	1.43	25.2	1.1
52.000	50.00	4.07	65.205	0.012	0.0	0.0	0.0	1.42	25.1	1.6
53.000	50.00	4.11	65.435	0.010	0.0	0.0	0.0	1.43	25.4	1.4
54.000	50.00	4.11	65.315	0.118	0.0	0.0	0.0	1.29	51.4	16.0
53.001	50.00	4.36	65.160	0.128	0.0	0.0	0.0	1.57	62.3	17.3
51.003	50.00	4.83	64.760	0.148	0.0	0.0	0.0	2.85	201.4	20.0
51.004	50.00	5.20	64.180	0.148	0.0	0.0	0.0	1.64	116.0	20.0
55.000	50.00	4.25	64.850	0.043	0.0	0.0	0.0	1.07	42.7	5.8
56.000	50.00	4.26	65.040	0.000	0.0	0.0	0.0	1.00	17.7	0.0

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
57.000	10.765	0.075	143.5	0.054	4.00	0.0	0.600	o	225	Pipe/Conduit	
56.001	9.603	0.070	137.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
41.004	13.996	0.065	215.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
58.000	11.955	0.120	100.0	0.008	4.00	0.0	0.600	o	150	Pipe/Conduit	
41.005	30.800	0.140	220.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
59.000	21.525	0.350	61.5	0.075	4.00	0.0	0.600	o	225	Pipe/Conduit	
60.000	4.935	0.060	82.3	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit	
61.000	10.240	0.165	62.1	0.028	4.00	0.0	0.600	o	150	Pipe/Conduit	
59.001	3.655	0.025	146.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
59.002	14.476	0.110	131.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
62.000	8.425	0.170	49.6	0.019	4.00	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)
57.000	50.00	4.16	64.885	0.054	0.0	0.0	0.0	1.09	43.3	7.3
56.001	50.00	4.40	64.810	0.054	0.0	0.0	0.0	1.11	44.3	7.3
41.004	50.00	6.18	63.640	0.815	0.0	0.0	0.0	1.38	219.7	110.4
58.000	50.00	4.20	66.200	0.008	0.0	0.0	0.0	1.00	17.8	1.1
41.005	50.00	6.56	63.575	0.823	0.0	0.0	0.0	1.37	217.4	111.4
59.000	50.00	4.21	66.315	0.075	0.0	0.0	0.0	1.67	66.4	10.2
60.000	50.00	4.07	65.365	0.000	0.0	0.0	0.0	1.11	19.6	0.0
61.000	50.00	4.13	65.705	0.028	0.0	0.0	0.0	1.28	22.6	3.8
59.001	50.00	4.27	64.465	0.103	0.0	0.0	0.0	1.08	42.9	13.9
59.002	50.00	4.48	64.340	0.103	0.0	0.0	0.0	1.14	45.3	13.9
62.000	50.00	4.10	64.475	0.019	0.0	0.0	0.0	1.43	25.3	2.6

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
59.003	26.630	0.560	47.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
63.000	9.890	0.200	49.5	0.026	4.00	0.0	0.600	o	150	Pipe/Conduit	
64.000	7.685	0.155	49.6	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit	
63.001	26.840	0.555	48.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
65.000	12.825	0.615	20.9	0.049	4.00	0.0	0.600	o	225	Pipe/Conduit	
41.006	20.195	0.265	76.2	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
66.000	20.600	0.415	49.6	0.035	4.00	0.0	0.600	o	225	Pipe/Conduit	
41.007	14.640	0.185	79.1	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.015	12.220	0.100	122.2	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.016	49.518	0.265	186.9	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.017	80.000	0.000	0.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.018	16.991	0.060	283.2	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.019	48.367	0.160	302.3	0.000	0.00	0.0	0.600	o	750	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)
59.003	50.00	4.72	64.230	0.122	0.0	0.0	0.0	1.90	75.6	16.5
63.000	50.00	4.11	66.000	0.026	0.0	0.0	0.0	1.43	25.3	3.5
64.000	50.00	4.09	65.955	0.000	0.0	0.0	0.0	1.43	25.3	0.0
63.001	50.00	4.42	65.800	0.026	0.0	0.0	0.0	1.45	25.6	3.5
65.000	50.00	4.07	64.285	0.049	0.0	0.0	0.0	2.88	114.4	6.6
41.006	50.00	6.69	63.370	1.020	0.0	0.0	0.0	2.57	555.9	138.1
66.000	50.00	4.18	63.820	0.035	0.0	0.0	0.0	1.86	74.0	4.7
41.007	50.00	6.79	63.105	1.055	0.0	0.0	0.0	2.52	545.4	142.9
1.015	49.27	9.79	62.545	2.955	0.0	0.0	0.0	2.83	1802.6	394.3
1.016	48.33	10.15	62.445	2.955	0.0	0.0	0.0	2.29	1456.1	394.3
1.017	39.55	14.53	62.180	2.955	0.0	0.0	0.0	0.30	193.9«	394.3
1.018	39.28	14.70	61.180	2.955	0.0	0.0	0.0	1.66	732.5	394.3
1.019	38.51	15.20	60.620	2.955	0.0	0.0	0.0	1.60	708.7	394.3

Storage Structures for Storm

Tank or Pond Manhole: S32a, DS/PN: 41.001

Invert Level (m) 65.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	210.0	0.700	210.0	1.400	0.0	2.100	0.0
0.100	210.0	0.800	0.0	1.500	0.0	2.200	0.0
0.200	210.0	0.900	0.0	1.600	0.0	2.300	0.0
0.300	210.0	1.000	0.0	1.700	0.0	2.400	0.0
0.400	210.0	1.100	0.0	1.800	0.0	2.500	0.0
0.500	210.0	1.200	0.0	1.900	0.0		
0.600	210.0	1.300	0.0	2.000	0.0		

Tank or Pond Manhole: S44H, DS/PN: 1.018

Invert Level (m) 62.180

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1000.0	0.700	1000.0	1.400	0.0	2.100	0.0
0.100	1000.0	0.800	1000.0	1.500	0.0	2.200	0.0
0.200	1000.0	0.900	1000.0	1.600	0.0	2.300	0.0
0.300	1000.0	1.000	1000.0	1.700	0.0	2.400	0.0
0.400	1000.0	1.100	0.0	1.800	0.0	2.500	0.0
0.500	1000.0	1.200	0.0	1.900	0.0		
0.600	1000.0	1.300	0.0	2.000	0.0		

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 485000 169050 SU 85000 69050
C (1km)	-0.028
D1 (1km)	0.258
D2 (1km)	0.282
D3 (1km)	0.325
E (1km)	0.301
F (1km)	2.726
Cv (Summer)	1.000
Cv (Winter)	1.000

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)	60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	KO1	60 Summer	2	+0%			2/60 Summer	41	64.742
2.000	KO2	60 Summer	2	+0%	100/60 Summer				64.611
1.001	S1	60 Summer	2	+0%	100/60 Summer				64.524
3.000	KO3	60 Summer	2	+0%	100/60 Summer				64.398
1.002	S2	60 Summer	2	+0%	100/60 Summer				64.215
4.000	KO4	60 Summer	2	+0%	100/60 Summer				64.181
1.003	S3	60 Summer	2	+0%	30/60 Summer				64.015
5.000	RWP	60 Summer	2	+0%	100/60 Summer				66.068
6.000	KO5	60 Summer	2	+0%	100/60 Summer				66.150
5.001	S4	60 Summer	2	+0%	100/60 Summer				65.876
7.000	RWP	60 Summer	2	+0%	30/60 Summer				65.897

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	KO1	-0.148	0.000	0.00	4.7	0.1	OK	
2.000	KO2	-0.104	0.000	0.20		3.1	OK	
1.001	S1	-0.106	0.000	0.19		3.2	OK	
3.000	KO3	-0.107	0.000	0.18		2.9	OK	
1.002	S2	-0.165	0.000	0.16		6.0	OK	
4.000	KO4	-0.109	0.000	0.17		2.7	OK	
1.003	S3	-0.150	0.000	0.24		8.6	OK	
5.000	RWP	-0.127	0.000	0.39		17.6	OK	
6.000	KO5	-0.100	0.000	0.24		4.0	OK	
5.001	S4	-0.194	0.000	0.27		21.6	OK	
7.000	RWP	-0.118	0.000	0.46		20.5	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
8.000	KO6	60 Summer	2	+0%	100/60 Summer				65.899
5.002	S5	60 Summer	2	+0%	100/60 Summer				65.627
9.000	RWP	60 Summer	2	+0%	100/60 Summer				65.824
10.000	KO7	60 Summer	2	+0%	100/60 Summer				65.944
5.003	S6	60 Summer	2	+0%	100/60 Summer				65.477
11.000	RWP	60 Summer	2	+0%	100/60 Summer				65.783
12.000	KO8	60 Summer	2	+0%	100/60 Summer				65.775
5.004	S7	60 Summer	2	+0%	100/60 Summer				65.344
13.000	RWP	60 Summer	2	+0%	100/60 Summer				65.628
14.000	KO9	60 Summer	2	+0%	100/60 Summer				65.658
5.005	S8	60 Summer	2	+0%	100/60 Summer				65.255
15.000	KO10	60 Summer	2	+0%	100/60 Summer				65.809
16.000	KO11	60 Summer	2	+0%	100/60 Summer				65.649
1.004	S9	60 Summer	2	+0%	30/60 Summer				63.772
17.000	KO12	60 Summer	2	+0%	100/60 Summer				65.514
1.005	S10	60 Summer	2	+0%	30/60 Summer				63.704
18.000	KO13	60 Summer	2	+0%	100/60 Summer				65.444
1.006	S11	60 Summer	2	+0%	30/60 Summer				63.644
19.000	KO14	60 Summer	2	+0%	100/60 Summer				65.366
1.007	S12	60 Summer	2	+0%	30/60 Summer				63.586
20.000	KO15	60 Summer	2	+0%	100/60 Summer				65.456
1.008	S13	60 Summer	2	+0%	30/60 Summer				63.521
21.000	KO16	60 Summer	2	+0%	100/60 Summer				65.288
1.009	S14	60 Summer	2	+0%	30/60 Summer				63.444
22.000	KO17	60 Summer	2	+0%	100/60 Summer				65.238
1.010	S15	60 Summer	2	+0%	30/60 Summer				63.377
23.000	KO18	60 Summer	2	+0%	100/60 Summer				65.193
24.000	CP5	60 Summer	2	+0%	100/60 Summer				65.267
1.011	S16	60 Summer	2	+0%	30/60 Summer				63.327
25.000	KO19	60 Summer	2	+0%					65.203
1.012	S17	60 Summer	2	+0%	30/60 Summer				63.264
26.000	OB1	60 Summer	2	+0%	100/60 Summer				65.175
26.001	FCS1	60 Summer	2	+0%	100/60 Summer				65.011
1.013	S18	60 Summer	2	+0%	30/60 Summer				63.229
27.000	KO20	60 Summer	2	+0%					65.170
28.000	RWP	60 Summer	2	+0%	100/60 Summer				66.393
28.001	S19	60 Summer	2	+0%	100/60 Summer				66.315
29.000	RWP	60 Summer	2	+0%	30/60 Summer				66.213
28.002	S20	60 Summer	2	+0%	100/60 Summer				66.096
30.000	RWP	60 Summer	2	+0%	30/60 Summer				66.059
28.003	S21	60 Summer	2	+0%	30/60 Summer				65.907
31.000	RWP	60 Summer	2	+0%	100/60 Summer				65.961
28.004	S22	60 Summer	2	+0%	100/60 Summer				65.725
32.000	RWP	60 Summer	2	+0%					65.968
32.001	S23	60 Summer	2	+0%					65.850
33.000	OB2	60 Summer	2	+0%					65.795
34.000 MV	RWP	60 Summer	2	+0%					65.900
28.005	S24	60 Summer	2	+0%					65.536

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
8.000	KO6	-0.156	0.000	0.20		9.7	OK	
5.002	S5	-0.273	0.000	0.32		51.5	OK	
9.000	RWP	-0.146	0.000	0.26		15.6	OK	
10.000	KO7	-0.171	0.000	0.13		8.6	OK	
5.003	S6	-0.318	0.000	0.33		74.6	OK	
11.000	RWP	-0.142	0.000	0.29		18.0	OK	
12.000	KO8	-0.170	0.000	0.14		8.6	OK	
5.004	S7	-0.366	0.000	0.31		99.7	OK	
13.000	RWP	-0.157	0.000	0.20		11.7	OK	
14.000	KO9	-0.172	0.000	0.13		7.9	OK	
5.005	S8	-0.355	0.000	0.35		117.7	OK	
15.000	KO10	-0.181	0.000	0.08		5.7	OK	
16.000	KO11	-0.116	0.000	0.12		2.7	OK	
1.004	S9	-0.303	0.000	0.41		132.5	OK	
17.000	KO12	-0.171	0.000	0.13		8.1	OK	
1.005	S10	-0.271	0.000	0.50		137.4	OK	
18.000	KO13	-0.176	0.000	0.11		6.8	OK	
1.006	S11	-0.266	0.000	0.54		140.3	OK	
19.000	KO14	-0.179	0.000	0.09		5.9	OK	
1.007	S12	-0.269	0.000	0.53		142.6	OK	
20.000	KO15	-0.119	0.000	0.09		2.4	OK	
1.008	S13	-0.274	0.000	0.51		142.9	OK	
21.000	KO16	-0.097	0.000	0.27		6.4	OK	
1.009	S14	-0.276	0.000	0.56		145.4	OK	
22.000	KO17	-0.112	0.000	0.14		3.8	OK	
1.010	S15	-0.294	0.000	0.49		146.8	OK	
23.000	KO18	-0.112	0.000	0.14		3.8	OK	
24.000	CP5	-0.178	0.000	0.35		46.2	OK	
1.011	S16	-0.298	0.000	0.53		171.0	OK	
25.000	KO19	-0.107	0.000	0.18		5.1	OK	
1.012	S17	-0.311	0.000	0.45		173.3	OK	
26.000	OB1	-0.095	0.000	0.29		4.4	OK	
26.001	FCS1	-0.099	0.000	0.25		4.4	OK	
1.013	S18	-0.301	0.000	0.43		175.5	OK	
27.000	KO20	-0.115	0.000	0.12		3.5	OK	
28.000	RWP	-0.132	0.000	0.36		12.8	OK	
28.001	S19	-0.145	0.000	0.27		12.8	OK	
29.000	RWP	-0.107	0.000	0.54		19.4	OK	
28.002	S20	-0.159	0.000	0.45		32.1	OK	
30.000	RWP	-0.111	0.000	0.51		19.6	OK	
28.003	S21	-0.188	0.000	0.49		50.6	OK	
31.000	RWP	-0.144	0.000	0.28		14.1	OK	
28.004	S22	-0.250	0.000	0.41		64.2	OK	
32.000	RWP	-0.177	0.000	0.10		4.9	OK	
32.001	S23	-0.175	0.000	0.11		4.9	OK	
33.000	OB2	-0.170	0.000	0.14		5.5	OK	
34.000	MV RWP	-0.105	0.000	0.19		4.0	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
28.005	S24	-0.349	0.000	0.11		77.8	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.014	S25	60 Summer	2	+0%	30/60 Summer		
35.000	OB3	60 Summer	2	+0%			
35.001	FRI1	60 Summer	2	+0%			
36.000	RWP	60 Summer	2	+0%	100/60 Summer		
37.000	Pumphouse RWP	60 Summer	2	+0%	100/60 Summer		
38.000	OB4	60 Summer	2	+0%	100/60 Summer		
36.001	S26	60 Summer	2	+0%	100/60 Summer		
39.000	Gully	60 Summer	2	+0%			
36.002	S27	60 Summer	2	+0%	100/60 Summer		
35.002	S28	60 Summer	2	+0%			
40.000	KO21	60 Summer	2	+0%			
41.000	Gully	60 Summer	2	+0%	100/60 Summer		
42.000	KO22	60 Summer	2	+0%	100/60 Summer		
41.001	S32a	60 Summer	2	+0%	100/60 Summer		
43.000	KO23	60 Summer	2	+0%	30/60 Summer		
44.000	KO24	60 Summer	2	+0%	30/60 Summer		
45.000	MV RWP	60 Summer	2	+0%	100/60 Summer		
45.001	PPIC1	60 Summer	2	+0%	100/60 Summer		
45.002	S29	60 Summer	2	+0%	100/60 Summer		
46.000	KO25	60 Summer	2	+0%	30/60 Summer		
47.000	MV RWP	60 Summer	2	+0%	100/60 Summer		
45.003	S30	60 Summer	2	+0%	30/60 Summer		
48.000	KO26	60 Summer	2	+0%	30/60 Summer		
45.004	S31	60 Summer	2	+0%	30/60 Summer		
41.002	S32	60 Summer	2	+0%	30/60 Summer		
49.000	KO28	60 Summer	2	+0%	100/60 Summer		
50.000	KO29	60 Summer	2	+0%	100/60 Summer		
41.003	S33	60 Summer	2	+0%	100/60 Summer		
51.000	MV RWP	60 Summer	2	+0%	100/60 Summer		
51.001	PPIC2	60 Summer	2	+0%	100/60 Summer		
51.002	PPIC3	60 Summer	2	+0%	100/60 Summer		
52.000	MVRWP	60 Summer	2	+0%	100/60 Summer		
53.000	MV RWP	60 Summer	2	+0%	100/60 Summer		
54.000	MV Dummy Filter Drain	60 Summer	2	+0%	30/60 Summer		
53.001	CP6	60 Summer	2	+0%	100/60 Summer		
51.003	CP7	60 Summer	2	+0%	100/60 Summer		
51.004	S34	60 Summer	2	+0%	100/60 Summer		
55.000	KO30	60 Summer	2	+0%	100/60 Summer		
56.000	Pumphouse RWP	240 Winter	2	+0%	100/60 Summer		
57.000	KO31	60 Summer	2	+0%	100/60 Summer		
56.001	S35	60 Summer	2	+0%	100/60 Summer		
41.004	S36	60 Summer	2	+0%	30/60 Summer		
58.000	Gatehouse RWP	60 Summer	2	+0%			
41.005	S36a	60 Summer	2	+0%	30/60 Summer		
59.000	KO32	60 Summer	2	+0%	100/60 Summer		
60.000	KO33	240 Winter	2	+0%	100/60 Summer		
61.000	KO34	60 Summer	2	+0%	100/60 Summer		
59.001	S37	60 Summer	2	+0%	30/60 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.014	S25		63.195	-0.285	0.000	0.70		224.8
35.000	OB3		65.237	-0.163	0.000	0.17		6.2
35.001	FRI1		65.059	-0.171	0.000	0.13		6.2
36.000	RWP		65.304	-0.181	0.000	0.08		4.9
37.000	Pumphouse RWP		65.217	-0.173	0.000	0.12		4.8
38.000	OB4		65.289	-0.116	0.000	0.11		2.2
36.001	S26		65.161	-0.149	0.000	0.25		11.9
39.000	Gully		65.136	-0.119	0.000	0.10		2.2
36.002	S27		64.915	-0.120	0.000	0.45		14.1
35.002	S28		64.777	-0.208	0.000	0.21		20.3
40.000	KO21		65.031	-0.179	0.000	0.09		6.8
41.000	Gully		65.430	-0.175	0.000	0.36		36.1
42.000	KO22		65.315	-0.145	0.000	0.28		8.2
41.001	S32a		65.255	-0.170	0.000	0.39		33.6
43.000	KO23		65.153	-0.152	0.000	0.23		8.8
44.000	KO24		65.125	-0.150	0.000	0.20		7.2
45.000	MV RWP		65.835	-0.100	0.000	0.24		3.7
45.001	PPIC1		65.763	-0.102	0.000	0.22		3.7
45.002	S29		65.593	-0.102	0.000	0.22		3.7
46.000	KO25		65.533	-0.077	0.000	0.47		7.3
47.000	MV RWP		65.492	-0.103	0.000	0.22		3.5
45.003	S30		65.399	-0.131	0.000	0.36		14.3
48.000	KO26		65.275	-0.110	0.000	0.16		2.4
45.004	S31		65.208	-0.122	0.000	0.43		16.5
41.002	S32		65.101	-0.084	0.000	0.86		60.5
49.000	KO28		65.256	-0.169	0.000	0.14		9.4
50.000	KO29		65.222	-0.168	0.000	0.15		9.5
41.003	S33		64.841	-0.229	0.000	0.32		76.1
51.000	MV RWP		65.605	-0.120	0.000	0.09		1.5
51.001	PPIC2		65.445	-0.120	0.000	0.09		1.5
51.002	PPIC3		65.289	-0.126	0.000	0.06		1.5
52.000	MVRWP		65.237	-0.118	0.000	0.10		2.2
53.000	MV RWP		65.464	-0.121	0.000	0.08		1.8
54.000	MV Dummy Filter Drain		65.434	-0.106	0.000	0.54		21.6
53.001	CP6		65.261	-0.124	0.000	0.41		23.3
51.003	CP7		64.839	-0.221	0.000	0.16		27.0
51.004	S34		64.282	-0.198	0.000	0.25		27.1
55.000	KO30		64.920	-0.155	0.000	0.21		7.8
56.000	Pumphouse RWP		65.040	-0.150	0.000	0.00		0.0
57.000	KO31		64.965	-0.145	0.000	0.27		9.9
56.001	S35		64.890	-0.145	0.000	0.27		9.9
41.004	S36		63.925	-0.165	0.000	0.72		119.5
58.000	Gatehouse RWP		66.230	-0.120	0.000	0.09		1.5
41.005	S36a		63.838	-0.187	0.000	0.64		120.2
59.000	KO32		66.388	-0.152	0.000	0.23		13.7
60.000	KO33		65.365	-0.150	0.000	0.00		0.0
61.000	KO34		65.756	-0.099	0.000	0.25		5.1

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
59.001	S37		64.599	-0.091	0.000	0.65		18.8

PN	US/MH Name	Status	Level Exceeded
1.014	S25	OK	
35.000	OB3	OK	
35.001	FRI1	OK	
36.000	RWP	OK	
37.000	Pumphouse RWP	OK	
38.000	OB4	OK	
36.001	S26	OK	
39.000	Gully	OK	
36.002	S27	OK	
35.002	S28	OK	
40.000	KO21	OK	
41.000	Gully	OK	
42.000	KO22	OK	
41.001	S32a	OK	
43.000	KO23	OK	
44.000	KO24	OK	
45.000	MV RWP	OK	
45.001	PPIC1	OK	
45.002	S29	OK	
46.000	KO25	OK	
47.000	MV RWP	OK	
45.003	S30	OK	
48.000	KO26	OK	
45.004	S31	OK	
41.002	S32	OK	
49.000	KO28	OK	
50.000	KO29	OK	
41.003	S33	OK	
51.000	MV RWP	OK	
51.001	PPIC2	OK	
51.002	PPIC3	OK	
52.000	MVRWP	OK	
53.000	MV RWP	OK	
54.000	MV Dummy Filter Drain	OK	
53.001	CP6	OK	
51.003	CP7	OK	
51.004	S34	OK	
55.000	KO30	OK	
56.000	Pumphouse RWP	OK	
57.000	KO31	OK	
56.001	S35	OK	

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

PN	US/MH Name	Status	Level Exceeded
41.004	S36	OK	
58.000	Gatehouse RWP	OK	
41.005	S36a	OK	
59.000	KO32	OK	
60.000	KO33	OK	
61.000	KO34	OK	
59.001	S37	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
59.002	BPS1	60 Summer	2	+0%	30/60 Summer				64.450
62.000	KO35	60 Summer	2	+0%	100/60 Summer				64.515
59.003	S38	60 Summer	2	+0%	100/60 Summer				64.317
63.000	KO36	60 Summer	2	+0%					66.047
64.000	KO37	240 Winter	2	+0%					65.955
63.001	S39	60 Summer	2	+0%					65.845
65.000	KO38	60 Summer	2	+0%	100/60 Summer				64.331
41.006	S40	60 Summer	2	+0%	100/60 Summer				63.597
66.000	KO39	60 Summer	2	+0%	100/60 Summer				63.867
41.007	S41	60 Summer	2	+0%	100/60 Summer				63.363
1.015	S42	60 Summer	2	+0%	100/60 Summer				62.945
1.016	S43	60 Summer	2	+0%	30/60 Summer				62.848
1.017	Dummy	60 Summer	2	+0%	30/60 Summer				62.741
1.018	S44H	60 Summer	2	+0%	30/60 Summer				61.853
1.019	S45P	60 Summer	2	+0%					61.061

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
59.002	BPS1	-0.115	0.000	0.48		18.9	OK	
62.000	KO35	-0.110	0.000	0.16		3.5	OK	
59.003	S38	-0.138	0.000	0.32		22.4	OK	
63.000	KO36	-0.103	0.000	0.21		4.8	OK	
64.000	KO37	-0.150	0.000	0.00		0.0	OK	
63.001	S39	-0.105	0.000	0.19		4.8	OK	
65.000	KO38	-0.179	0.000	0.09		9.0	OK	
41.006	S40	-0.298	0.000	0.39		154.1	OK	
66.000	KO39	-0.178	0.000	0.10		6.4	OK	
41.007	S41	-0.267	0.000	0.48		159.2	OK	
1.015	S42	-0.500	0.000	0.41		391.3	OK	
1.016	S43	-0.497	0.000	0.34		390.1	OK	
1.017	Dummy	-0.339	0.000	0.71		386.2	OK	
1.018	S44H	-0.077	0.000	0.78		386.9	OK	
1.019	S45P	-0.309	0.000	0.65		385.2	OK	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 485000 169050 SU 85000 69050
C (1km)	-0.028
D1 (1km)	0.258
D2 (1km)	0.282
D3 (1km)	0.325
E (1km)	0.301
F (1km)	2.726
Cv (Summer)	1.000
Cv (Winter)	1.000

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)	60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	KO1	60 Summer	30	+0%			2/60 Summer	41	64.746
2.000	KO2	60 Summer	30	+0%	100/60 Summer				64.636
1.001	S1	60 Summer	30	+0%	100/60 Summer				64.548
3.000	KO3	60 Summer	30	+0%	100/60 Summer				64.422
1.002	S2	60 Summer	30	+0%	100/60 Summer				64.248
4.000	KO4	60 Summer	30	+0%	100/60 Summer				64.212
1.003	S3	60 Summer	30	+0%	30/60 Summer				64.196
5.000	RWP	60 Summer	30	+0%	100/60 Summer				66.135
6.000	KO5	60 Summer	30	+0%	100/60 Summer				66.179
5.001	S4	60 Summer	30	+0%	100/60 Summer				65.940
7.000	RWP	60 Summer	30	+0%	30/60 Summer				66.015

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	KO1	-0.144	0.000	0.01	10.7	0.1	OK	
2.000	KO2	-0.079	0.000	0.45		7.0	OK	
1.001	S1	-0.082	0.000	0.42		7.1	OK	
3.000	KO3	-0.083	0.000	0.41		6.6	OK	
1.002	S2	-0.132	0.000	0.36		13.5	OK	
4.000	KO4	-0.078	0.000	0.38		6.2	OK	
1.003	S3	0.031	0.000	0.52		18.7	SURCHARGED	
5.000	RWP	-0.060	0.000	0.88		39.5	OK	
6.000	KO5	-0.071	0.000	0.54		9.0	OK	
5.001	S4	-0.130	0.000	0.60		48.4	OK	
7.000	RWP	0.000	0.000	1.01		45.1	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
8.000	KO6	60 Summer	30	+0%	100/60 Summer				65.937
5.002	S5	60 Summer	30	+0%	100/60 Summer				65.735
9.000	RWP	60 Summer	30	+0%	100/60 Summer				65.870
10.000	KO7	60 Summer	30	+0%	100/60 Summer				65.974
5.003	S6	60 Summer	30	+0%	100/60 Summer				65.606
11.000	RWP	60 Summer	30	+0%	100/60 Summer				65.833
12.000	KO8	60 Summer	30	+0%	100/60 Summer				65.806
5.004	S7	60 Summer	30	+0%	100/60 Summer				65.495
13.000	RWP	60 Summer	30	+0%	100/60 Summer				65.666
14.000	KO9	60 Summer	30	+0%	100/60 Summer				65.687
5.005	S8	60 Summer	30	+0%	100/60 Summer				65.411
15.000	KO10	60 Summer	30	+0%	100/60 Summer				65.831
16.000	KO11	60 Summer	30	+0%	100/60 Summer				65.668
1.004	S9	60 Summer	30	+0%	30/60 Summer				64.169
17.000	KO12	60 Summer	30	+0%	100/60 Summer				65.543
1.005	S10	60 Summer	30	+0%	30/60 Summer				64.104
18.000	KO13	60 Summer	30	+0%	100/60 Summer				65.470
1.006	S11	60 Summer	30	+0%	30/60 Summer				64.037
19.000	KO14	60 Summer	30	+0%	100/60 Summer				65.389
1.007	S12	60 Summer	30	+0%	30/60 Summer				63.967
20.000	KO15	60 Summer	30	+0%	100/60 Summer				65.471
1.008	S13	60 Summer	30	+0%	30/60 Summer				63.888
21.000	KO16	60 Summer	30	+0%	100/60 Summer				65.319
1.009	S14	60 Summer	30	+0%	30/60 Summer				63.798
22.000	KO17	60 Summer	30	+0%	100/60 Summer				65.259
1.010	S15	60 Summer	30	+0%	30/60 Summer				63.723
23.000	KO18	60 Summer	30	+0%	100/60 Summer				65.214
24.000	CP5	60 Summer	30	+0%	100/60 Summer				65.346
1.011	S16	60 Summer	30	+0%	30/60 Summer				63.674
25.000	KO19	60 Summer	30	+0%					65.227
1.012	S17	60 Summer	30	+0%	30/60 Summer				63.603
26.000	OB1	60 Summer	30	+0%	100/60 Summer				65.208
26.001	FCS1	60 Summer	30	+0%	100/60 Summer				65.041
1.013	S18	60 Summer	30	+0%	30/60 Summer				63.557
27.000	KO20	60 Summer	30	+0%					65.188
28.000	RWP	60 Summer	30	+0%	100/60 Summer				66.454
28.001	S19	60 Summer	30	+0%	100/60 Summer				66.363
29.000	RWP	60 Summer	30	+0%	30/60 Summer				66.344
28.002	S20	60 Summer	30	+0%	100/60 Summer				66.250
30.000	RWP	60 Summer	30	+0%	30/60 Summer				66.190
28.003	S21	60 Summer	30	+0%	30/60 Summer				66.097
31.000	RWP	60 Summer	30	+0%	100/60 Summer				66.010
28.004	S22	60 Summer	30	+0%	100/60 Summer				65.851
32.000	RWP	60 Summer	30	+0%					65.993
32.001	S23	60 Summer	30	+0%					65.876
33.000	OB2	60 Summer	30	+0%					65.826
34.000	MV RWP	60 Summer	30	+0%					65.924
28.005	S24	60 Summer	30	+0%					65.585

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
8.000	KO6	-0.118	0.000	0.46		21.8	OK	
5.002	S5	-0.165	0.000	0.72		114.6	OK	
9.000	RWP	-0.100	0.000	0.59		35.0	OK	
10.000	KO7	-0.141	0.000	0.30		19.4	OK	
5.003	S6	-0.189	0.000	0.73		166.4	OK	
11.000	RWP	-0.092	0.000	0.65		40.4	OK	
12.000	KO8	-0.139	0.000	0.31		19.4	OK	
5.004	S7	-0.214	0.000	0.68		222.1	OK	
13.000	RWP	-0.119	0.000	0.45		26.4	OK	
14.000	KO9	-0.143	0.000	0.28		17.7	OK	
5.005	S8	-0.199	0.000	0.78		261.6	OK	
15.000	KO10	-0.159	0.000	0.19		12.8	OK	
16.000	KO11	-0.097	0.000	0.27		6.2	OK	
1.004	S9	0.094	0.000	0.89		287.7	SURCHARGED	
17.000	KO12	-0.142	0.000	0.29		18.1	OK	
1.005	S10	0.129	0.000	1.08		297.6	SURCHARGED	
18.000	KO13	-0.150	0.000	0.25		15.3	OK	
1.006	S11	0.127	0.000	1.16		303.9	SURCHARGED	
19.000	KO14	-0.156	0.000	0.20		13.2	OK	
1.007	S12	0.112	0.000	1.16		310.7	SURCHARGED	
20.000	KO15	-0.104	0.000	0.21		5.4	OK	
1.008	S13	0.093	0.000	1.11		310.7	SURCHARGED	
21.000	KO16	-0.066	0.000	0.60		14.4	OK	
1.009	S14	0.078	0.000	1.23		317.9	SURCHARGED	
22.000	KO17	-0.091	0.000	0.33		8.7	OK	
1.010	S15	0.053	0.000	1.08		321.8	SURCHARGED	
23.000	KO18	-0.091	0.000	0.33		8.7	OK	
24.000	CP5	-0.099	0.000	0.78		103.9	OK	
1.011	S16	0.049	0.000	1.18		380.6	SURCHARGED	
25.000	KO19	-0.083	0.000	0.41		11.5	OK	
1.012	S17	0.028	0.000	1.01		388.1	SURCHARGED	
26.000	OB1	-0.062	0.000	0.64		9.9	OK	
26.001	FCS1	-0.069	0.000	0.55		9.8	OK	
1.013	S18	0.027	0.000	0.97		394.1	SURCHARGED	
27.000	KO20	-0.097	0.000	0.27		7.8	OK	
28.000	RWP	-0.071	0.000	0.80		28.8	OK	
28.001	S19	-0.097	0.000	0.61		28.7	OK	
29.000	RWP	0.024	0.000	1.21		43.6	SURCHARGED	
28.002	S20	-0.005	0.000	0.97		69.6	OK	
30.000	RWP	0.020	0.000	1.14		44.0	SURCHARGED	
28.003	S21	0.003	0.000	1.07		110.2	SURCHARGED	
31.000	RWP	-0.095	0.000	0.62		31.7	OK	
28.004	S22	-0.123	0.000	0.87		137.2	OK	
32.000	RWP	-0.152	0.000	0.23		11.1	OK	
32.001	S23	-0.149	0.000	0.24		11.1	OK	
33.000	OB2	-0.139	0.000	0.31		12.4	OK	
34.000	MV RWP	-0.081	0.000	0.43		9.1	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
28.005	S24	-0.300	0.000	0.24		166.7	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.014	S25	60 Summer	30	+0%	30/60 Summer		
35.000	OB3	60 Summer	30	+0%			
35.001	FRI1	60 Summer	30	+0%			
36.000	RWP	60 Summer	30	+0%	100/60 Summer		
37.000	Pumphouse RWP	60 Summer	30	+0%	100/60 Summer		
38.000	OB4	60 Summer	30	+0%	100/60 Summer		
36.001	S26	60 Summer	30	+0%	100/60 Summer		
39.000	Gully	60 Summer	30	+0%			
36.002	S27	60 Summer	30	+0%	100/60 Summer		
35.002	S28	60 Summer	30	+0%			
40.000	KO21	60 Summer	30	+0%			
41.000	Gully	60 Summer	30	+0%	100/60 Summer		
42.000	KO22	60 Summer	30	+0%	100/60 Summer		
41.001	S32a	60 Summer	30	+0%	100/60 Summer		
43.000	KO23	60 Summer	30	+0%	30/60 Summer		
44.000	KO24	60 Summer	30	+0%	30/60 Summer		
45.000	MV RWP	60 Summer	30	+0%	100/60 Summer		
45.001	PPIC1	60 Summer	30	+0%	100/60 Summer		
45.002	S29	60 Summer	30	+0%	100/60 Summer		
46.000	KO25	60 Summer	30	+0%	30/60 Summer		
47.000	MV RWP	60 Summer	30	+0%	100/60 Summer		
45.003	S30	60 Summer	30	+0%	30/60 Summer		
48.000	KO26	60 Summer	30	+0%	30/60 Summer		
45.004	S31	60 Summer	30	+0%	30/60 Summer		
41.002	S32	60 Summer	30	+0%	30/60 Summer		
49.000	KO28	60 Summer	30	+0%	100/60 Summer		
50.000	KO29	60 Summer	30	+0%	100/60 Summer		
41.003	S33	60 Summer	30	+0%	100/60 Summer		
51.000	MV RWP	60 Summer	30	+0%	100/60 Summer		
51.001	PPIC2	60 Summer	30	+0%	100/60 Summer		
51.002	PPIC3	60 Summer	30	+0%	100/60 Summer		
52.000	MVRWP	60 Summer	30	+0%	100/60 Summer		
53.000	MV RWP	60 Summer	30	+0%	100/60 Summer		
54.000	MV Dummy Filter Drain	60 Summer	30	+0%	30/60 Summer		
53.001	CP6	60 Summer	30	+0%	100/60 Summer		
51.003	CP7	60 Summer	30	+0%	100/60 Summer		
51.004	S34	60 Summer	30	+0%	100/60 Summer		
55.000	KO30	60 Summer	30	+0%	100/60 Summer		
56.000	Pumphouse RWP	240 Winter	30	+0%	100/60 Summer		
57.000	KO31	60 Summer	30	+0%	100/60 Summer		
56.001	S35	60 Summer	30	+0%	100/60 Summer		
41.004	S36	60 Summer	30	+0%	30/60 Summer		
58.000	Gatehouse RWP	60 Summer	30	+0%			
41.005	S36a	60 Summer	30	+0%	30/60 Summer		
59.000	KO32	60 Summer	30	+0%	100/60 Summer		
60.000	KO33	240 Winter	30	+0%	100/60 Summer		
61.000	KO34	60 Summer	30	+0%	100/60 Summer		
59.001	S37	60 Summer	30	+0%	30/60 Summer		

Technology Services
Sherwood House, Sherwood Ave.
Newark, Nottinghamshire, NG...

Date 26/02/2021 15:03 | Designed by Steve.Thomson
File NK020305 Bracknell Drai... | Checked by

Innovyze | Network 2019.1

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.014	S25		63.509	0.029	0.000	1.65		528.6
35.000	OB3		65.271	-0.129	0.000	0.38		14.0
35.001	FRI1		65.088	-0.142	0.000	0.29		13.9
36.000	RWP		65.326	-0.159	0.000	0.19		11.1
37.000	Pumphouse RWP		65.244	-0.146	0.000	0.27		10.7
38.000	OB4		65.306	-0.099	0.000	0.26		4.9
36.001	S26		65.206	-0.104	0.000	0.55		26.7
39.000	Gully		65.152	-0.103	0.000	0.22		4.9
36.002	S27		64.991	-0.043	0.000	1.00		31.5
35.002	S28		64.828	-0.157	0.000	0.46		45.4
40.000	KO21		65.055	-0.155	0.000	0.21		15.3
41.000	Gully		65.512	-0.093	0.000	0.81		81.1
42.000	KO22		65.405	-0.055	0.000	0.62		18.5
41.001	S32a		65.398	-0.027	0.000	0.75		64.6
43.000	KO23		65.348	0.043	0.000	0.50		19.1
44.000	KO24		65.339	0.064	0.000	0.43		15.9
45.000	MV RWP		65.865	-0.070	0.000	0.55		8.2
45.001	PPIC1		65.790	-0.075	0.000	0.49		8.2
45.002	S29		65.620	-0.075	0.000	0.50		8.2
46.000	KO25		65.614	0.004	0.000	1.05		16.3
47.000	MV RWP		65.542	-0.053	0.000	0.49		7.8
45.003	S30		65.532	0.002	0.000	0.76		30.3
48.000	KO26		65.435	0.050	0.000	0.32		4.6
45.004	S31		65.425	0.095	0.000	0.87		33.6
41.002	S32		65.315	0.130	0.000	1.50		104.9
49.000	KO28		65.287	-0.138	0.000	0.32		21.0
50.000	KO29		65.254	-0.136	0.000	0.33		21.4
41.003	S33		64.905	-0.165	0.000	0.60		141.5
51.000	MV RWP		65.621	-0.104	0.000	0.20		3.3
51.001	PPIC2		65.461	-0.104	0.000	0.20		3.3
51.002	PPIC3		65.302	-0.113	0.000	0.14		3.3
52.000	MVRWP		65.254	-0.101	0.000	0.24		4.9
53.000	MV RWP		65.478	-0.107	0.000	0.18		4.1
54.000	MV Dummy Filter Drain		65.570	0.030	0.000	1.22		48.5
53.001	CP6		65.331	-0.054	0.000	0.92		52.5
51.003	CP7		64.883	-0.177	0.000	0.35		60.9
51.004	S34		64.396	-0.084	0.000	0.56		59.4
55.000	KO30		64.959	-0.116	0.000	0.47		17.6
56.000	Pumphouse RWP		65.040	-0.150	0.000	0.00		0.0
57.000	KO31		65.013	-0.097	0.000	0.61		22.2
56.001	S35		64.937	-0.098	0.000	0.60		22.2
41.004	S36		64.275	0.185	0.000	1.44		239.1
58.000	Gatehouse RWP		66.246	-0.104	0.000	0.20		3.3
41.005	S36a		64.095	0.070	0.000	1.29		241.0
59.000	KO32		66.429	-0.111	0.000	0.51		30.9
60.000	KO33		65.365	-0.150	0.000	0.00		0.0
61.000	KO34		65.787	-0.068	0.000	0.57		11.5

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
59.001	S37		64.746	0.056	0.000	1.46		42.2

PN	US/MH Name	Status	Level Exceeded
1.014	S25	SURCHARGED	
35.000	OB3	OK	
35.001	FRI1	OK	
36.000	RWP	OK	
37.000	Pumphouse RWP	OK	
38.000	OB4	OK	
36.001	S26	OK	
39.000	Gully	OK	
36.002	S27	OK	
35.002	S28	OK	
40.000	KO21	OK	
41.000	Gully	OK	
42.000	KO22	OK	
41.001	S32a	OK	
43.000	KO23	SURCHARGED	
44.000	KO24	SURCHARGED	
45.000	MV RWP	OK	
45.001	PPIC1	OK	
45.002	S29	OK	
46.000	KO25	SURCHARGED	
47.000	MV RWP	OK	
45.003	S30	SURCHARGED	
48.000	KO26	SURCHARGED	
45.004	S31	SURCHARGED	
41.002	S32	SURCHARGED	
49.000	KO28	OK	
50.000	KO29	OK	
41.003	S33	OK	
51.000	MV RWP	OK	
51.001	PPIC2	OK	
51.002	PPIC3	OK	
52.000	MVRWP	OK	
53.000	MV RWP	OK	
54.000	MV Dummy Filter Drain	SURCHARGED	
53.001	CP6	OK	
51.003	CP7	OK	
51.004	S34	OK	
55.000	KO30	OK	
56.000	Pumphouse RWP	OK	
57.000	KO31	OK	
56.001	S35	OK	

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

PN	US/MH Name	Status	Level Exceeded
41.004	S36	SURCHARGED	
58.000	Gatehouse RWP	OK	
41.005	S36a	SURCHARGED	
59.000	KO32	OK	
60.000	KO33	OK	
61.000	KO34	OK	
59.001	S37	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
59.002	BPS1	60 Summer	30	+0%	30/60 Summer				64.573
62.000	KO35	60 Summer	30	+0%	100/60 Summer				64.537
59.003	S38	60 Summer	30	+0%	100/60 Summer				64.372
63.000	KO36	60 Summer	30	+0%					66.073
64.000	KO37	240 Winter	30	+0%					65.955
63.001	S39	60 Summer	30	+0%					65.870
65.000	KO38	60 Summer	30	+0%	100/60 Summer				64.354
41.006	S40	60 Summer	30	+0%	100/60 Summer				63.737
66.000	KO39	60 Summer	30	+0%	100/60 Summer				63.891
41.007	S41	60 Summer	30	+0%	100/60 Summer				63.588
1.015	S42	60 Summer	30	+0%	100/60 Summer				63.439
1.016	S43	60 Summer	30	+0%	30/60 Summer				63.370
1.017	Dummy	60 Summer	30	+0%	30/60 Summer				63.232
1.018	S44H	60 Summer	30	+0%	30/60 Summer				62.299
1.019	S45P	60 Summer	30	+0%					61.201

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
59.002	BPS1	0.008	0.000	1.07		42.5	SURCHARGED	
62.000	KO35	-0.088	0.000	0.35		7.8	OK	
59.003	S38	-0.083	0.000	0.72		50.4	OK	
63.000	KO36	-0.077	0.000	0.48		10.7	OK	
64.000	KO37	-0.150	0.000	0.00		0.0	OK	
63.001	S39	-0.080	0.000	0.44		10.7	OK	
65.000	KO38	-0.156	0.000	0.20		20.2	OK	
41.006	S40	-0.158	0.000	0.81		317.9	OK	
66.000	KO39	-0.154	0.000	0.22		14.4	OK	
41.007	S41	-0.042	0.000	0.99		326.3	OK	
1.015	S42	-0.006	0.000	0.90		857.2	OK	
1.016	S43	0.025	0.000	0.74		856.5	SURCHARGED	
1.017	Dummy	0.152	0.000	1.57		856.3	SURCHARGED	
1.018	S44H	0.369	0.000	1.15		571.0	SURCHARGED	
1.019	S45P	-0.169	0.000	0.96		570.8	OK	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 485000 169050 SU 85000 69050
C (1km)	-0.028
D1 (1km)	0.258
D2 (1km)	0.282
D3 (1km)	0.325
E (1km)	0.301
F (1km)	2.726
Cv (Summer)	1.000
Cv (Winter)	1.000

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)	60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	KO1	60 Summer	100	+40%			2/60 Summer	41	64.766
2.000	KO2	60 Summer	100	+40%	100/60 Summer				65.900
1.001	S1	60 Summer	100	+40%	100/60 Summer				65.873
3.000	KO3	60 Summer	100	+40%	100/60 Summer				66.461
1.002	S2	60 Summer	100	+40%	100/60 Summer				66.429
4.000	KO4	60 Summer	100	+40%	100/60 Summer				66.550
1.003	S3	60 Summer	100	+40%	30/60 Summer				66.521
5.000	RWP	60 Summer	100	+40%	100/60 Summer				67.286
6.000	KO5	60 Summer	100	+40%	100/60 Summer				67.183
5.001	S4	60 Summer	100	+40%	100/60 Summer				67.090
7.000	RWP	60 Summer	100	+40%	30/60 Summer				67.224

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	KO1	-0.124	0.000	0.01	48.6	0.2	OK	
2.000	KO2	1.185	0.000	0.77		11.9	SURCHARGED	
1.001	S1	1.243	0.000	0.69		11.7	SURCHARGED	
3.000	KO3	1.956	0.000	0.61		9.8	SURCHARGED	
1.002	S2	2.049	0.000	0.66		25.1	SURCHARGED	
4.000	KO4	2.260	0.000	0.65		10.5	SURCHARGED	
1.003	S3	2.356	0.000	1.23		43.9	SURCHARGED	
5.000	RWP	1.091	0.000	1.60		71.8	SURCHARGED	
6.000	KO5	0.933	0.000	0.90		15.0	FLOOD RISK	
5.001	S4	1.020	0.000	1.01		80.6	SURCHARGED	
7.000	RWP	1.209	0.000	1.90		85.4	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
8.000	KO6	60 Summer	100	+40%	100/60 Summer				67.038
5.002	S5	60 Summer	100	+40%	100/60 Summer				66.981
9.000	RWP	60 Summer	100	+40%	100/60 Summer				66.989
10.000	KO7	60 Summer	100	+40%	100/60 Summer				66.931
5.003	S6	60 Summer	100	+40%	100/60 Summer				66.882
11.000	RWP	60 Summer	100	+40%	100/60 Summer				66.956
12.000	KO8	60 Summer	100	+40%	100/60 Summer				66.836
5.004	S7	60 Summer	100	+40%	100/60 Summer				66.797
13.000	RWP	60 Summer	100	+40%	100/60 Summer				66.767
14.000	KO9	60 Summer	100	+40%	100/60 Summer				66.740
5.005	S8	60 Summer	100	+40%	100/60 Summer				66.707
15.000	KO10	60 Summer	100	+40%	100/60 Summer				66.599
16.000	KO11	60 Summer	100	+40%	100/60 Summer				66.594
1.004	S9	60 Summer	100	+40%	30/60 Summer				66.561
17.000	KO12	60 Summer	100	+40%	100/60 Summer				66.446
1.005	S10	60 Summer	100	+40%	30/60 Summer				66.414
18.000	KO13	60 Summer	100	+40%	100/60 Summer				66.274
1.006	S11	60 Summer	100	+40%	30/60 Summer				66.248
19.000	KO14	60 Summer	100	+40%	100/60 Summer				66.084
1.007	S12	60 Summer	100	+40%	30/60 Summer				66.066
20.000	KO15	60 Summer	100	+40%	100/60 Summer				65.894
1.008	S13	60 Summer	100	+40%	30/60 Summer				65.871
21.000	KO16	60 Summer	100	+40%	100/60 Summer				65.767
1.009	S14	60 Summer	100	+40%	30/60 Summer				65.672
22.000	KO17	60 Summer	100	+40%	100/60 Summer				65.489
1.010	S15	60 Summer	100	+40%	30/60 Summer				65.461
23.000	KO18	60 Summer	100	+40%	100/60 Summer				65.385
24.000	CP5	60 Summer	100	+40%	100/60 Summer				65.907
1.011	S16	60 Summer	100	+40%	30/60 Summer				65.347
25.000	KO19	60 Summer	100	+40%					65.265
1.012	S17	60 Summer	100	+40%	30/60 Summer				65.116
26.000	OB1	60 Summer	100	+40%	100/60 Summer				65.306
26.001	FCS1	60 Summer	100	+40%	100/60 Summer				65.126
1.013	S18	60 Summer	100	+40%	30/60 Summer				64.994
27.000	KO20	60 Summer	100	+40%					65.215
28.000	RWP	60 Summer	100	+40%	100/60 Summer				67.514
28.001	S19	60 Summer	100	+40%	100/60 Summer				67.379
29.000	RWP	60 Summer	100	+40%	30/60 Summer				67.474
28.002	S20	60 Summer	100	+40%	100/60 Summer				67.135
30.000	RWP	60 Summer	100	+40%	30/60 Summer				66.973
28.003	S21	60 Summer	100	+40%	30/60 Summer				66.612
31.000	RWP	60 Summer	100	+40%	100/60 Summer				66.303
28.004	S22	60 Summer	100	+40%	100/60 Summer				66.110
32.000	RWP	60 Summer	100	+40%					66.027
32.001	S23	60 Summer	100	+40%					65.913
33.000	OB2	60 Summer	100	+40%					65.870
34.000	MV RWP	60 Summer	100	+40%					65.964
28.005	S24	60 Summer	100	+40%					65.654

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
8.000	KO6	0.983	0.000	0.81		38.5	FLOOD RISK	
5.002	S5	1.081	0.000	1.21		192.5	SURCHARGED	
9.000	RWP	1.019	0.000	1.11		65.4	SURCHARGED	
10.000	KO7	0.816	0.000	0.57		37.3	SURCHARGED	
5.003	S6	1.087	0.000	1.22		277.8	SURCHARGED	
11.000	RWP	1.031	0.000	1.23		76.6	SURCHARGED	
12.000	KO8	0.891	0.000	0.59		37.2	SURCHARGED	
5.004	S7	1.087	0.000	1.12		365.2	SURCHARGED	
13.000	RWP	0.982	0.000	0.84		49.6	SURCHARGED	
14.000	KO9	0.910	0.000	0.55		34.2	SURCHARGED	
5.005	S8	1.098	0.000	1.25		419.9	SURCHARGED	
15.000	KO10	0.609	0.000	0.38		25.8	SURCHARGED	
16.000	KO11	0.829	0.000	0.54		12.4	SURCHARGED	
1.004	S9	2.486	0.000	1.22		391.7	SURCHARGED	
17.000	KO12	0.761	0.000	0.59		36.6	SURCHARGED	
1.005	S10	2.439	0.000	1.49		410.6	SURCHARGED	
18.000	KO13	0.654	0.000	0.50		30.8	SURCHARGED	
1.006	S11	2.338	0.000	1.63		427.5	SURCHARGED	
19.000	KO14	0.539	0.000	0.41		26.7	SURCHARGED	
1.007	S12	2.211	0.000	1.65		442.3	SURCHARGED	
20.000	KO15	0.319	0.000	0.42		10.8	SURCHARGED	
1.008	S13	2.075	0.000	1.61		450.8	SURCHARGED	
21.000	KO16	0.382	0.000	1.20		28.8	SURCHARGED	
1.009	S14	1.951	0.000	1.83		471.7	SURCHARGED	
22.000	KO17	0.139	0.000	0.66		17.5	SURCHARGED	
1.010	S15	1.791	0.000	1.63		484.8	SURCHARGED	
23.000	KO18	0.080	0.000	0.66		17.5	SURCHARGED	
24.000	CP5	0.462	0.000	1.56		208.2	SURCHARGED	
1.011	S16	1.722	0.000	1.89		607.4	SURCHARGED	
25.000	KO19	-0.045	0.000	0.83		23.3	OK	
1.012	S17	1.541	0.000	1.63		623.5	SURCHARGED	
26.000	OB1	0.036	0.000	1.30		19.9	SURCHARGED	
26.001	FCS1	0.016	0.000	1.13		20.0	SURCHARGED	
1.013	S18	1.464	0.000	1.56		637.0	SURCHARGED	
27.000	KO20	-0.070	0.000	0.55		15.8	OK	
28.000	RWP	0.989	0.000	1.43		51.4	FLOOD RISK	
28.001	S19	0.920	0.000	1.10		51.7	FLOOD RISK	
29.000	RWP	1.154	0.000	2.26		81.1	FLOOD RISK	
28.002	S20	0.880	0.000	1.80		129.7	SURCHARGED	
30.000	RWP	0.803	0.000	2.20		84.7	SURCHARGED	
28.003	S21	0.517	0.000	2.02		208.7	SURCHARGED	
31.000	RWP	0.198	0.000	1.23		62.4	SURCHARGED	
28.004	S22	0.136	0.000	1.68		265.8	SURCHARGED	
32.000	RWP	-0.118	0.000	0.46		22.5	OK	
32.001	S23	-0.112	0.000	0.49		22.3	OK	
33.000	OB2	-0.095	0.000	0.63		25.0	OK	
34.000	MV RWP	-0.041	0.000	0.87		18.3	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
28.005	S24	-0.231	0.000	0.48		325.9	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.014	S25	60 Summer	100	+40%	30/60 Summer		
35.000	OB3	60 Summer	100	+40%			
35.001	FRI1	60 Summer	100	+40%			
36.000	RWP	60 Summer	100	+40%	100/60 Summer		
37.000	Pumphouse RWP	60 Summer	100	+40%	100/60 Summer		
38.000	OB4	60 Summer	100	+40%	100/60 Summer		
36.001	S26	60 Summer	100	+40%	100/60 Summer		
39.000	Gully	60 Summer	100	+40%			
36.002	S27	60 Summer	100	+40%	100/60 Summer		
35.002	S28	60 Summer	100	+40%			
40.000	KO21	60 Summer	100	+40%			
41.000	Gully	60 Summer	100	+40%	100/60 Summer		
42.000	KO22	60 Summer	100	+40%	100/60 Summer		
41.001	S32a	60 Summer	100	+40%	100/60 Summer		
43.000	KO23	60 Summer	100	+40%	30/60 Summer		
44.000	KO24	60 Summer	100	+40%	30/60 Summer		
45.000	MV RWP	60 Summer	100	+40%	100/60 Summer		
45.001	PPIC1	60 Summer	100	+40%	100/60 Summer		
45.002	S29	60 Summer	100	+40%	100/60 Summer		
46.000	KO25	60 Summer	100	+40%	30/60 Summer		
47.000	MV RWP	60 Summer	100	+40%	100/60 Summer		
45.003	S30	60 Summer	100	+40%	30/60 Summer		
48.000	KO26	60 Summer	100	+40%	30/60 Summer		
45.004	S31	60 Summer	100	+40%	30/60 Summer		
41.002	S32	60 Summer	100	+40%	30/60 Summer		
49.000	KO28	60 Summer	100	+40%	100/60 Summer		
50.000	KO29	60 Summer	100	+40%	100/60 Summer		
41.003	S33	60 Summer	100	+40%	100/60 Summer		
51.000	MV RWP	60 Summer	100	+40%	100/60 Summer		
51.001	PPIC2	60 Summer	100	+40%	100/60 Summer		
51.002	PPIC3	60 Summer	100	+40%	100/60 Summer		
52.000	MVRWP	60 Summer	100	+40%	100/60 Summer		
53.000	MV RWP	60 Summer	100	+40%	100/60 Summer		
54.000	MV Dummy Filter Drain	60 Summer	100	+40%	30/60 Summer		
53.001	CP6	60 Summer	100	+40%	100/60 Summer		
51.003	CP7	60 Summer	100	+40%	100/60 Summer		
51.004	S34	60 Summer	100	+40%	100/60 Summer		
55.000	KO30	60 Summer	100	+40%	100/60 Summer		
56.000	Pumphouse RWP	60 Summer	100	+40%	100/60 Summer		
57.000	KO31	60 Summer	100	+40%	100/60 Summer		
56.001	S35	60 Summer	100	+40%	100/60 Summer		
41.004	S36	60 Summer	100	+40%	30/60 Summer		
58.000	Gatehouse RWP	60 Summer	100	+40%			
41.005	S36a	60 Summer	100	+40%	30/60 Summer		
59.000	KO32	60 Summer	100	+40%	100/60 Summer		
60.000	KO33	60 Summer	100	+40%	100/60 Summer		
61.000	KO34	60 Summer	100	+40%	100/60 Summer		
59.001	S37	60 Summer	100	+40%	30/60 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.014	S25		64.837	1.357	0.000	2.95		945.0
35.000	OB3		65.323	-0.077	0.000	0.76		28.3
35.001	FRI1		65.130	-0.100	0.000	0.59		28.1
36.000	RWP		65.489	0.004	0.000	0.36		21.4
37.000	Pumphouse RWP		65.476	0.086	0.000	0.52		20.6
38.000	OB4		65.483	0.078	0.000	0.48		9.3
36.001	S26		65.463	0.153	0.000	1.05		50.5
39.000	Gully		65.193	-0.062	0.000	0.44		9.9
36.002	S27		65.154	0.119	0.000	1.90		59.8
35.002	S28		64.904	-0.081	0.000	0.88		86.9
40.000	KO21		65.087	-0.123	0.000	0.43		30.8
41.000	Gully		66.085	0.480	0.000	1.57		156.7
42.000	KO22		65.977	0.517	0.000	1.17		35.0
41.001	S32a		65.969	0.544	0.000	1.21		104.6
43.000	KO23		65.946	0.641	0.000	0.95		36.3
44.000	KO24		65.919	0.644	0.000	0.81		29.8
45.000	MV RWP		66.596	0.661	0.000	0.87		13.2
45.001	PPIC1		66.556	0.691	0.000	0.68		11.3
45.002	S29		66.480	0.785	0.000	0.74		12.2
46.000	KO25		66.630	1.020	0.000	1.85		28.7
47.000	MV RWP		66.451	0.856	0.000	0.76		12.2
45.003	S30		66.418	0.888	0.000	1.16		46.1
48.000	KO26		66.165	0.780	0.000	0.53		7.8
45.004	S31		66.150	0.820	0.000	1.37		53.0
41.002	S32		65.884	0.699	0.000	2.11		147.4
49.000	KO28		65.851	0.426	0.000	0.60		39.9
50.000	KO29		65.847	0.457	0.000	0.61		40.1
41.003	S33		65.764	0.694	0.000	0.77		182.1
51.000	MV RWP		66.069	0.344	0.000	0.40		6.6
51.001	PPIC2		66.049	0.484	0.000	0.57		9.2
51.002	PPIC3		66.029	0.614	0.000	0.53		12.5
52.000	MVRWP		66.034	0.679	0.000	0.45		9.4
53.000	MV RWP		66.703	1.118	0.000	0.36		8.0
54.000	MV Dummy Filter Drain		67.011	1.471	0.000	2.16		86.1
53.001	CP6		66.680	1.295	0.000	1.49		85.0
51.003	CP7		66.018	0.958	0.000	0.52		89.2
51.004	S34		65.866	1.386	0.000	0.84		90.2
55.000	KO30		65.660	0.585	0.000	0.88		33.4
56.000	Pumphouse RWP		65.660	0.470	0.000	0.15		2.4
57.000	KO31		65.726	0.616	0.000	1.15		42.0
56.001	S35		65.662	0.627	0.000	1.04		38.2
41.004	S36		65.605	1.515	0.000	1.73		287.1
58.000	Gatehouse RWP		66.267	-0.083	0.000	0.41		6.7
41.005	S36a		65.366	1.341	0.000	1.54		289.1
59.000	KO32		66.553	0.013	0.000	1.02		61.6
60.000	KO33		66.181	0.666	0.000	0.30		4.5
61.000	KO34		66.305	0.450	0.000	1.11		22.5

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
59.001	S37		66.183	1.493	0.000	2.45		70.6

PN	US/MH Name	Status	Level Exceeded
1.014	S25	SURCHARGED	
35.000	OB3	OK	
35.001	FRI1	OK	
36.000	RWP	SURCHARGED	
37.000	Pumphouse RWP	SURCHARGED	
38.000	OB4	SURCHARGED	
36.001	S26	SURCHARGED	
39.000	Gully	OK	
36.002	S27	SURCHARGED	
35.002	S28	OK	
40.000	KO21	OK	
41.000	Gully	SURCHARGED	
42.000	KO22	SURCHARGED	
41.001	S32a	SURCHARGED	
43.000	KO23	SURCHARGED	
44.000	KO24	SURCHARGED	
45.000	MV RWP	SURCHARGED	
45.001	PPIC1	SURCHARGED	
45.002	S29	SURCHARGED	
46.000	KO25	SURCHARGED	
47.000	MV RWP	SURCHARGED	
45.003	S30	SURCHARGED	
48.000	KO26	SURCHARGED	
45.004	S31	SURCHARGED	
41.002	S32	SURCHARGED	
49.000	KO28	SURCHARGED	
50.000	KO29	SURCHARGED	
41.003	S33	SURCHARGED	
51.000	MV RWP	SURCHARGED	
51.001	PPIC2	SURCHARGED	
51.002	PPIC3	SURCHARGED	
52.000	MVRWP	SURCHARGED	
53.000	MV RWP	SURCHARGED	
54.000	MV Dummy Filter Drain	SURCHARGED	
53.001	CP6	SURCHARGED	
51.003	CP7	SURCHARGED	
51.004	S34	SURCHARGED	
55.000	KO30	SURCHARGED	
56.000	Pumphouse RWP	SURCHARGED	
57.000	KO31	SURCHARGED	
56.001	S35	SURCHARGED	

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

PN	US/MH Name	Status	Level Exceeded
41.004	S36	SURCHARGED	
58.000	Gatehouse RWP	OK	
41.005	S36a	SURCHARGED	
59.000	KO32	SURCHARGED	
60.000	KO33	SURCHARGED	
61.000	KO34	SURCHARGED	
59.001	S37	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
59.002	BPS1	60 Summer	100	+40%	30/60 Summer				65.978
62.000	KO35	60 Summer	100	+40%	100/60 Summer				65.745
59.003	S38	60 Summer	100	+40%	100/60 Summer				65.697
63.000	KO36	60 Summer	100	+40%					66.117
64.000	KO37	240 Winter	100	+40%					65.955
63.001	S39	60 Summer	100	+40%					65.910
65.000	KO38	60 Summer	100	+40%	100/60 Summer				65.115
41.006	S40	60 Summer	100	+40%	100/60 Summer				65.054
66.000	KO39	60 Summer	100	+40%	100/60 Summer				64.826
41.007	S41	60 Summer	100	+40%	100/60 Summer				64.779
1.015	S42	60 Summer	100	+40%	100/60 Summer				64.474
1.016	S43	60 Summer	100	+40%	30/60 Summer				64.047
1.017	Dummy	60 Summer	100	+40%	30/60 Summer				63.619
1.018	S44H	60 Summer	100	+40%	30/60 Summer				62.965
1.019	S45P	60 Winter	100	+40%					61.370

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
59.002	BPS1	1.413	0.000	1.65		65.2	SURCHARGED	
62.000	KO35	1.120	0.000	0.56		12.4	SURCHARGED	
59.003	S38	1.242	0.000	1.07		75.2	SURCHARGED	
63.000	KO36	-0.033	0.000	0.96		21.6	OK	
64.000	KO37	-0.150	0.000	0.00		0.0	OK	
63.001	S39	-0.040	0.000	0.88		21.6	OK	
65.000	KO38	0.605	0.000	0.37		36.6	SURCHARGED	
41.006	S40	1.159	0.000	1.03		405.0	SURCHARGED	
66.000	KO39	0.781	0.000	0.36		24.4	SURCHARGED	
41.007	S41	1.149	0.000	1.29		424.7	SURCHARGED	
1.015	S42	1.029	0.000	1.54		1475.7	SURCHARGED	
1.016	S43	0.702	0.000	1.27		1471.3	SURCHARGED	
1.017	Dummy	0.539	0.000	2.65		1444.6	SURCHARGED	
1.018	S44H	1.035	0.000	1.25		620.9	SURCHARGED	
1.019	S45P	0.000	0.000	1.04		619.6	OK	