Consulting Civil & Structural Engineers



Regents Park Estate, Euston

Project No. SE1238 SuDS DRAINAGE REPORT

Regents Park Estate – Euston

CIVIL & STRUCTURAL ENGINEERING

SuDS DRAINAGE REPORT

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Report Issue

Revision	Date	Notes	Comments
-	27/07/15	Initial Issue	
A	18/09/15	Revision A	Surface Water flow rates amended and green/brown roofs added to the development sites
В	15/10/20	Revision B	Calculations for each plot added to demonstrate that flows have been reduced by 50%. Slight deviations concentrated on limited plots, however the drainage complies with the findings of the approved FRA and meets the overall required standards

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1.0 Introduction

1.1 Commission

Lovell has commissioned lesis Special Structures Ltd to undertake the civil and structural engineering design associated with the redevelopment of the Regents Park Estate in Euston. The redevelopment consists of the demolition of the existing buildings and its replacement with 116 mixed tenure residential units, 336sqm of new/replaced community facilities, 441sqm of commercial space with associated parking and landscaping areas.

1.2 Planning Consent

Planning consent for the development has been approved under application number 2015/3076/P.

1.3 SuDS Related Planning Condition (25)

"Prior to commencement of any development other than site clearance & preparation, relocation of services, utilities and public infrastructure and demolition, full details of the existing and proposed surface water runoff rates for the 1 in 1 and 1 in 30 and 1 in 100 year storm with a 30% provision for climate change and to achieve a 50% reduction in surface water runoff, and a means by which flow rates will be controlled.

The details of the sustainable urban drainage system thus approved and as noted in the approved SuDs drainage report, lesis Special Structures, July 2015 shall be installed and shall thereafter be retained and maintained in accordance with the approved maintenance plan."

1.4 Aims and Objectives

The purpose of this report is to assess the opportunities to utilised SuDS within the scheme proposals and submit details to enable the discharge of the SuDS planning condition.

2.0 Site Details

2.1 Location

Regent Park Estate is located in the Borough of Campden, and is bordered to the east by Hampstead Road and to the west by Albany Street. Granby Terrace forms the north eastern boundary of the Estate with Cumberland Market and Redhill Street forming the north western boundaries of the estate.

Munster Square and William Road form the south western and south eastern boundaries of the estate.

2.2 Grid Reference

The Ordnance Survey National grid reference for the centre of the site is E -529039 N – 182703.

2.3 Ground Conditions

The site investigation report undertaken by Harrison Group Environmental Ltd in 2014 confirms that the whole development is underlain by the impermeable London Clay Formation.

3.0 Proposed Development

The proposed redevelopment works will comprise the demolition of three buildings (Eskdale, Ainsdale, and Silverdale) and the construction of 8 new buildings on 8 different plots within Regents Park Estate. There will also be associated external landscaping works around the proposed buildings.

4.0 Proposed Drainage Design

Please refer to the drainage schemes currently shown on lesis Drawings SE1238 (301 to 309, in Appendix A to H) which reflects the as-built drainage designs for the development sites.

4.1 Existing Site Drainage

The existing sites are currently drained via a series of conventional piped systems all of which appear to discharge into the adjacent Thames Water public systems running throughout the estate.

These existing systems appear to discharge freely with no forms of attenuation provided.

4.2 Cambell Reith FRA Document

As part of the planning submission, a Flood Risk Assessment was undertaken by Cambell Reith (Ref 11774 Dated 17th April 2015) which detailed suggested surface water drainage proposals for the scheme together with an assumption to the impermeable areas and current and permissible discharge rates. The conclusions within this report and the drainage designs proposed, reference back to the permissible discharge rates stipulated within this report with improvements wherever possible to the proposed flow rates.

This document, under Section 3.3.1, details the existing drained areas associated with each site and the surface water flow rates associated with the pre-developed state for the given storm duration. The results of this table have been replicated below;

Plot No	Site Name	Impervious	1 in 2yr	1 in 30yr	1 in 100yr
TIOUNO.		Area (Ha)	Flow (I/s)	Flow (I/s)	Flow (I/s)
1	Robert Street Car Park	0.194	28.2	44.1	57.3
2	Former One Stop Shop	0.049	5.9	11.3	14.5
3	Varndell Street	0	0.5	1.4	1.9
4	Newlands	0.025	3.0	5.7	7.4
5	Dick Collins Hall	0.069	8.2	15.7	20.4
6	Cape of Good Hope	0.067	8.0	15.2	19.7
7	The Victory Pub	0.061	7.3	13.9	18
8	St Bedes Mews	0.033	3.9	7.5	9.7

Table 4.2 - Existing Flow Rates Off Site

The FRA document also considers the proposed acceptable flow rates off the site and stipulates under Section 5.3.1 that a minimum flow rate of 51/s should be applied to each site to limit the potential for blockage.

4.3 Sustainable Drainage Hierarchy

A hierarchical approach has been undertaken in consideration of the application of SuDS in relation to the development. The design philosophy is to ensure that surface water run-off is managed as close to its source as possible and the existing situation is returned as closely as possible to Greenfield run off.

The following drainage hierarchy has been assessed with regard to the implementation of SuDS techniques:

- 1) store rainwater for later use
- 2) use infiltration techniques in permeable strata areas
- 3) attenuate rainwater in ponds or open water features for gradual release
- 4) attenuate rainwater by storing in tanks or sealed water features for gradual release
- 5) discharge rainwater direct to a watercourse
- 6) discharge rainwater to a surface water/drain
- 7) discharge rainwater to the combined sewer.

The sustainable drainage hierarchy shown above is intended to ensure that all practical and reasonable measures are taken to manage surface water higher up the hierarchy (1 being the highest) and that the amount of surface water managed at the bottom of the hierarchy is minimised.

4.4 Assessment of SuD's Hierarchy

4.4.1 Store rainwater for later use

The provision for storing rainwater harvesting for irrigation of landscaping has been carefully considered by the client but has not been incorporated due to the following factors.

- Only 4 of the development sites (plots 1, 2, 3, 4) have landscaping areas.
- These landscaping areas are to designated public spaces and therefore will be separate from the buildings and not regularity maintained or watered.
- The client has expressed concerns regarding the on-going maintenance obligations associated with such systems.

This report still however recommends the inclusion of rainwater butts where feasible to assist with watering of plants associated with the building.

4.4.2 Use infiltration techniques in permeable strata

Given the impermeable underlying ground conditions, the use of infiltration techniques has been discounted, however consideration has been given to falling smaller areas of hardstanding towards soft landscaping to provide natural irrigation, wherever possible.

4.4.3 Attenuate rainwater in ponds for gradual release

Given the consented site layout and the extent of the proposed buildings within the confines of the development site, there is no scope for ponds or open water features and therefore this technique has been discounted.

4.4.4 Attenuate rainwater by storing in tanks for gradual release

The proposed layouts do provide scope for areas where below ground storage tanks can be incorporated to attenuate flows for gradual release into the adjacent piped systems. This method of attenuation has been specifically addressed within the Cambell Reith report and so has been widely adopted for the scheme.

4.4.5 Discharge rainwater direct to a watercourse

There are no watercourses adjacent to the development site and so this technique has been discounted.

4.4.6 Discharge rainwater to a surface water/drain

There are existing Thames Water surface water sewer which run within and adjacent to the development site which have historically taken surface water flows from the development site. As such these systems will be utilised as the main outfalls for the site in conjunction with below ground storage tanks as mentioned within section 4.4.4 above.

4.4.7 Discharge rainwater to the combined sewer.

Not applicable.

Permeable Pavements.

The use of such surfaces with underlying impermeable ground conditions can only offer a degree of water quality improvement through microbial action within the granular sub base **material. It's important to note however that the existing sewerage infrastructure within the** Regents Park Estate is predominantly combined in nature and all of the proposed development sites will discharge both foul and surface water into the adjacent combined systems. As such the use of tanked permeable pavements has been omitted from the

design, as the benefits of improving the quality of the surface water leaving the development sites, will be instantly lost once entering the combined public system.

The designs have therefore focused on reducing surface water flow rates down to reduce the likelihood of flooding of the downstream system.

4.5 Proposed Surface Water Drainage System

The proposed surface water drainage system for the development sites do not comply with all of the desired standards for SuDS drainage outlined within Section 4.4 above mainly due to both the site and proposed layout constraints, but drainage measures have been implemented to ensure the proposed surface water scheme offers a suitable standard to meet the requirements of the London Plan, NPPF and by default any associated SuDS related Planning Condition.

4.5.1 Surface Water Attenuation

To ensure the proposed development meets the requirements of the London Plan, NPPF and North London SFRA, surface water flow rates off the development site have been reduced by 50% (or a minimum 51/s where the 50% flow rate is below this figure).

The calculation for the existing flow rates have been taken from table 3.2 from the Cambell Reith FRA document together with the intended flow rates for the new development site and these have been summarised below;

	Flow Rates off site (I/s)									
Site	Existing 1 in 2yr storm	Proposed 1 in 2 yr storm	% Reduction	Existing 1 in 30yr storm	Proposed 1 in 30yr storm	% Reduction	Existing 1 in 100yr storm	Proposed 1 in 100yr storm	% Reduction	
Robert Street Car Park	28.2	6.7	76%	44.1	13.6	69%	57.3	17	70%	
Former One Stop Shop	5.9	3.5	41%	11.3	3.7	67%	14.5	5	66%	
Varndell Street	0.5	3.5	0%	1.4	3.7	0%	1.9	5	0%	
Newlands	3	3.5	0%	5.7	3.7	35%	7.4	5	32%	
Dick Collins Hall	8.2	6.9	16%	15.7	7.1	55%	20.4	8.5	58%	
Cape of Good Hope	8	0.6	93%	15.2	1.3	91%	19.7	2.1	89%	
Victory Pub	7.3	6.9	5%	13.9	8	42%	18	8	56%	
St Bedes Mews	3.9	0.6	85%	7.5	1.3	83%	9.7	2.1	78%	
Total	65	32.2	50%	114.8	42.4	63%	148.9	52.7	65%	

Table 4.5.1 – Existing and Proposed 1 in 2, 1 in 30 and 1 in 100yr flow rates

The on-site storage provision has be sized for each block to accommodate a 1 in 100yr storm event with 30% allowance for climate change and the above table demonstrates that for each storm event, there is an overall betterment of 50%.

The proposed drainage systems for each site have been summarised below.

Plot 1 - Robert Street Car Park

This development site proposes an area of approximately 1263sqm of new impermeable drained surface associated with both the roof to the new building and the proposed car parking area to the east of the site. This site will incorporate an extensive biodiverse green roof to assist with reducing surface water flow rates off site.

Flows off this parcel are to be reduced from 57.3 l/s to 17 l/s. Some of this reduction is achieved through a reduction in impermeable surfacing and new green roof through implementing the development proposals, however an additional element of flow control and storage is required. As such the scheme details a new 5m x 8m x 0.8m deep cellular storage tank and flow control chamber (set at 17 l/s) prior to discharge into the adjacent Thames Water public combined system running though the scheme.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix A of this report.

Plot 2 - Former One Stop Shop

This development site proposes an area of approximately 571sqm of new impermeable drained surface associated with the roof to the proposed building. The remainder of the site will be soft landscaped. This site will incorporate an extensive biodiverse green roof to assist with reducing surface water flow rates off site.

Flows off this parcel are to be reduced from 14.5l/s to 5 l/s. Some of this reduction is achieved through a natural reduction in impermeable surfacing and new green roof through implementing the development proposals, however an additional element of flow control and storage is required. As such the scheme details a new 3m x 6m x 0.8m deep cellular storage tank and flow control chamber (set at 5 l/s) prior to discharge into the Thames Water public combined system which runs within Robert Street to the south of the development site.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix B of this report.

Plot 3 - Varndell Street

This development site proposes an area of approximately 493sqm of new impermeable drained surface associated with the new roof to the proposed building. This site will incorporate an extensive and semi extensive biodiverse green roof to assist with reducing surface water flow rates off site.

The existing site is predominantly soft landscaping and so surface water flows off the site are only 1.91/s at present. As such flows off this land parcel are to be attenuated at 5 1/s which represents the lowest reliable flow rate achievable through a flow control chamber, without elevating the risk of periodic blockage/system failure.

In order to retain flows associated with the new development an element of flow control and storage is required. As such the scheme details a new 3m x 6m x 0.8m deep cellular storage tank and flow control chamber (set at 51/s) prior to discharge into the Thames Water public combined system which runs within Stanhope Street to the east of the development site.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix C of this report.

<u> Plot 4 - Newlands</u>

This development site proposes an area of approximately 402sqm of new impermeable drained hard standing areas associated with the new roof and external frontage to the proposed building. This site will incorporate an extensive biodiverse brown roof to assist with reducing surface water flow rates off site.

Flows off this parcel are to be reduced from 7.41/s to 51/s. The development proposes an increase to the drainage areas and so flow control and storage is required. As such the scheme details a new 2.5m x 5m x 0.8m deep cellular storage tank and flow control chamber (set at 51/s) prior to discharge into the Thames Water public combined system which runs within Varndell Street to the south of the site.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix D of this report.

Plot 5 - Dick Collins Hall

This development site proposes an area of approximately 570sqm of new impermeable drained hard standing associated with the new roof and external frontage to the proposed building. This site will incorporate an extensive biodiverse brown roof to assist with reducing surface water flow rates off site.

Flows off this parcel are to be reduced from 20.4l/s to 8.5l/s. Some of this reduction is achieved through a natural reduction in impermeable surfacing and new brown roof through implementing the development proposals, however an additional element of flow control and storage is required. As such the scheme details a new 5m x 4m x 0.8m deep cellular storage tank and flow control chamber (set at 8.5 l/s) prior to discharge into the Thames Water public combined system which runs within Varndell Street to the south of the site.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix E of this report.

Plot 6 - Cape of Good Hope

This development site proposes an area of approximately 113sqm of new impermeable drained hard standing associated with the new roof of the proposed building. There are

additional small isolated areas of drained landscaping associated with the basement gardens but these have not been allowed for within the design calculations. The Cambell Reith strategic drainage scheme made an allowance for cellular storage for this development to reduce flows down from 19.7 l/s to 9.9 l/s. The development of the scheme now incorporates **rwp's from the roof area exit**ing the building at basement level and as such the associated storage element cannot be located at ground floor level as shown on the Cambell Reith plan. As such cellular storage has been discounted from the scheme.

The development proposals do however include the provision of a green roof for the new building and a hydraulic assessment of this structure has confirmed that flows leaving the roof and therefore the development site will be lowered down to 2.1 l/s. The reduction in flow will be achieved through the attenuation potential of the green roof structure.

Flows off this site will connect into the Thames Water public combined system which runs due east of the development site and to the side of St Bede's Hall.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix F of this report.

Plot 8 - The Victory Pub

This development site proposes an area of approximately 560sqm of new impermeable drained hard standing associated with the new roof and external area surrounding the proposed building. This site will incorporate an extensive biodiverse brown roof to assist with reducing surface water flow rates off site.

Flows off this parcel are to be reduced from 18 l/s to 8 l/s. Some of this reduction is again achieved through a slight reduction in impermeable surfacing through implementing the development proposals, however an additional element of flow control and storage is still required. As such the scheme details a new 1.5m x 10m x 0.8m deep cellular storage tank and flow control chamber (set at 8 l/s) prior to discharge into the Thames Water public combined system which runs within Nash Street to the east of the site.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix G of this report.

Plot 9 – St Bede's Mews

This development site proposes an area of approximately 113sqm of new impermeable drained area associated with the roof of the proposed building. The Cambell Reith strategic drainage scheme made an allowance for cellular storage for this development to reduce flows down from 9.7 l/s to 5 l/s, however the development proposals include the provision of a green roof for the new building. A hydraulic assessment of this structure alone has confirmed that flows leaving the development site will be lowered down to 2.1 l/s.

Flows off this site will connect into the Thames Water public combined system which runs due south of the development site within St Bede's Mews.

Proposed foul flows will also enter the existing public system via a new connection within the site boundary.

Details of the proposed drainage scheme and associated microdrainage calculations can be found within Appendix H of this report.

5.0 Management and Maintenance

5.1 Adoption of on-site drainage systems

The majority of the proposed on-site drainage systems have been located within communal gardens and cellular plastic storage utilised to enable the necessary volume of storage to be accommodated within the site layout. As such the on-site systems will remain in private ownership and as such the on-going maintenance will be placed with the end users/management company.

5.2 Maintenance of Proposed Surface Water Drainage Systems

Unlike conventional drainage systems, SuDS features are visible, and their function should be easily understood by those responsible for maintenance. When problems occur, they are generally obvious and can be remedied simply, using standard landscaping practice.

During the first year of operation of all types of SuDS, inspections should usually be carried out at least monthly (and after significant storm events) to ensure that the system is functioning as designed and that no damage is evident.

A full SuDS maintenance guidance can be found in Appendix I.

6.0 Thames Water Consents

As part of the development of each site, Thames Water have been consulted to secure their approval for connections into the public drainage systems and the consent have been included within Appendix J.

Capacity within the system is not an issue as all the receiving systems are combined and with the demolition of the old residential blocks and the reduction in flow rates through development of the new sites, capacity within the receiving system will now have increased as a result of the development.

Appendix A – Plot 1, Robert Street Car Park Site



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The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
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Summary of Results for 2 year Return Period

Half Drain Time : 8 minutes.

	Storn Event	n 2	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
15	min	Summer	26.361	0.161	0.0	10.7	10.7	6.1	ОК
30	min	Summer	26.367	0.167	0.0	11.0	11.0	6.3	0 K
60	min	Summer	26.350	0.150	0.0	9.9	9.9	5.7	ΟK
120	min	Summer	26.320	0.120	0.0	7.6	7.6	4.6	ОК
180	min	Summer	26.303	0.103	0.0	6.2	6.2	3.9	ОК
240	min	Summer	26.291	0.091	0.0	5.3	5.3	3.5	ОК
360	min	Summer	26.276	0.076	0.0	4.1	4.1	2.9	ОК
480	min	Summer	26.267	0.067	0.0	3.4	3.4	2.5	ОК
600	min	Summer	26.260	0.060	0.0	2.9	2.9	2.3	ОК
720	min	Summer	26.255	0.055	0.0	2.6	2.6	2.1	ΟK
960	min	Summer	26.248	0.048	0.0	2.1	2.1	1.8	ОК
1440	min	Summer	26.240	0.040	0.0	1.6	1.6	1.5	ΟK
2160	min	Summer	26.233	0.033	0.0	1.2	1.2	1.2	ОК
2880	min	Summer	26.228	0.028	0.0	0.9	0.9	1.1	ΟK
4320	min	Summer	26.223	0.023	0.0	0.7	0.7	0.9	ОК
5760	min	Summer	26.220	0.020	0.0	0.5	0.5	0.8	ΟK
7200	min	Summer	26.218	0.018	0.0	0.5	0.5	0.7	ОК
8640	min	Summer	26.217	0.017	0.0	0.4	0.4	0.6	ОК
10080	min	Summer	26.216	0.016	0.0	0.4	0.4	0.6	ΟK
15	min	Winter	26.376	0.176	0.0	11.6	11.6	6.7	ОК
30	min	Winter	26.373	0.173	0.0	11.4	11.4	6.6	ΟK
60	min	Winter	26.345	0.145	0.0	9.5	9.5	5.5	ОК
120	min	Winter	26.309	0.109	0.0	6.7	6.7	4.1	ΟK
180	min	Winter	26.290	0.090	0.0	5.2	5.2	3.4	ΟK
240	min	Winter	26.278	0.078	0.0	4.3	4.3	3.0	ΟK
360	min	Winter	26.264	0.064	0.0	3.2	3.2	2.4	ОК

Storm Event		Rain (mm/hr)	Flooded Volume	Discharge Volume	Time-Peak (mins)	
				(m ³)	(m ³)	,
15	min	Summer	42.980	0.0	10.1	16
30	min	Summer	27.473	0.0	13.0	24
60	min	Summer	16.881	0.0	15.9	40
120	min	Summer	10.146	0.0	19.2	70
180	min	Summer	7.490	0.0	21.2	102
240	min	Summer	6.029	0.0	22.8	132
360	min	Summer	4.425	0.0	25.1	192
480	min	Summer	3.548	0.0	26.8	252
600	min	Summer	2.988	0.0	28.2	312
720	min	Summer	2.597	0.0	29.4	372
960	min	Summer	2.080	0.0	31.4	494
1440	min	Summer	1.522	0.0	34.5	738
2160	min	Summer	1.113	0.0	37.8	1104
2880	min	Summer	0.892	0.0	40.4	1472
4320	min	Summer	0.652	0.0	44.3	2148
5760	min	Summer	0.522	0.0	47.3	2856
7200	min	Summer	0.439	0.0	49.8	3672
8640	min	Summer	0.382	0.0	51.9	4296
10080	min	Summer	0.339	0.0	53.8	5080
15	min	Winter	42.980	0.0	11.4	17
30	min	Winter	27.473	0.0	14.5	25
60	min	Winter	16.881	0.0	17.8	42
120	min	Winter	10.146	0.0	21.5	72
180	min	Winter	7.490	0.0	23.8	102
240	min	Winter	6.029	0.0	25.5	132
360	min	Winter	4.425	0.0	28.1	194
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Date 15/10/2020 17:08	Designed by Tim.Trotman	
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	Storm Event	Max Level	Max Depth	Max Infiltration	Max Control	Max Σ Outflow	Max Volume	Status
		(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
480	min Winter	26.255	0.055	0.0	2.6	2.6	2.1	ОК
600	min Winter	26.250	0.050	0.0	2.2	2.2	1.9	ОК
720	min Winter	26.245	0.045	0.0	1.9	1.9	1.7	ОК
960	min Winter	26.239	0.039	0.0	1.5	1.5	1.5	ОК
1440	min Winter	26.232	0.032	0.0	1.1	1.1	1.2	ОК
2160	min Winter	26.227	0.027	0.0	0.8	0.8	1.0	ОК
2880	min Winter	26.223	0.023	0.0	0.7	0.7	0.9	ΟK
4320	min Winter	26.219	0.019	0.0	0.5	0.5	0.7	ΟK
5760	min Winter	26.217	0.017	0.0	0.4	0.4	0.6	ОК
7200	min Winter	26.215	0.015	0.0	0.3	0.3	0.6	ОК
8640	min Winter	26.214	0.014	0.0	0.3	0.3	0.5	ОК
10080	min Winter	26.213	0.013	0.0	0.3	0.3	0.5	ОК

	Stori Even	m t	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	3.548	0.0	30.0	254
600	min	Winter	2.988	0.0	31.6	312
720	min	Winter	2.597	0.0	33.0	374
960	min	Winter	2.080	0.0	35.2	496
1440	min	Winter	1.522	0.0	38.6	740
2160	min	Winter	1.113	0.0	42.4	1104
2880	min	Winter	0.892	0.0	45.3	1432
4320	min	Winter	0.652	0.0	49.7	2224
5760	min	Winter	0.522	0.0	53.0	2848
7200	min	Winter	0.439	0.0	55.8	3584
8640	min	Winter	0.382	0.0	58.2	4376
10080	min	Winter	0.339	0.0	60.2	5128

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The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:08	Designed by Tim.Trotman	
File Plot 1 - ROBS - Rev A - 1 in 2y	Checked by	Diamaye
Innovyze	Source Control 2015.1	

<u>Rainfall Details</u>

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.126

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.126

Infrastruct	CS Ltd							P	age 4
The Stables									
High Cogges,	, Witney								Ly
Oxfordshire									Micro
Date 15/10/2	2020 17:08	3		Designed	by Tim.	Trotman			Desinado
File Plot 1	- ROBS -	Rev A -	1 in 2y	Checked b	У				Diamaye
Innovyze				Source Co	ntrol 2	2015.1		i	
				Model Det	ails				
			Storage is	Online Cover	r Level	(m) 28.100			
			<u>Cellu</u>	lar Storag	<u>e Struc</u>	ture			
			_						
		Infiltrati	on Coefficier	vert Level (1 nt Base (m/h	m) 26.2 r) 0.000	00 Safety 00 Po	Factor 2.0 rosity 0.95		
		Infiltrati	on Coefficien	nt Side (m/h	r) 0.000	00	100101 0.00		
Depth (m)	Area (m²)	Inf. Area	(m²) Depth (m	n) Area (m²)	Inf. Are	ea (m²) De	pth (m) Area	a (m²) Inf	. Area (m²)
0.000	40.0		10.0 0.80	40.0		60.2	0.900	0.0	61.5
			Hvdro-	Brake® Out	flow Co	ntrol			
			<u> </u>						
	Desig	gn Head (m)	0.800 Hydro	-Brake® Type	Md5 SW	Only Inver	t Level (m)	26.200	
	Design	Flow (l/s)	17.0 D	lameter (mm)		1/4			
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Oepth (m) Flo	ow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.0	0.800	16.8	2.000	25.8	4.000	36.4	7.000	48.2
0.200	12.9	1.000	18.4	2.200	27.0	4.500	38.7	7.500	49.9
0.300	15.5	1.200	20.0	2.400	28.2	5.000	40.7	8.000	51.5
0.400	15.8	1.400	21.6	2.600	29.4	5.500	42.7	8.500	53.1 54 7
0.500	15.0	1 800	23.1	3 500	34 1	6 500	44.0	9.000	56.2
0.600	15.7	1.800	24.4	3.500	34.1	6.500	46.5	9.500	56.2

Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:09	Designed by Tim.Trotman	
File Plot 1 - ROBS - Rev A - 1 in 30	Checked by	Digitige
Innovyze	Source Control 2015.1	

Summary of Results for 30 year Return Period

Half Drain Time : 10 minutes.

Storm			Max	Max	Max	Max	_	Max	Max	Status
	Event		(m)	Deptn (m)	Infiltration (1/s)	Control (1/e)	Σ	Outriow (1/e)	(m ³)	
			(111)	(111)	(1/3)	(1/3)		(1/3)	(111)	
15	min S	ummer	26.518	0.318	0.0	15.7		15.7	12.1	ОК
30	min S	ummer	26.533	0.333	0.0	15.8		15.8	12.6	ΟK
60	min S	ummer	26.490	0.290	0.0	15.4		15.4	11.0	ОК
120	min S	ummer	26.415	0.215	0.0	13.6		13.6	8.2	ОК
180	min S	ummer	26.373	0.173	0.0	11.5		11.5	6.6	ОК
240	min S	ummer	26.348	0.148	0.0	9.8		9.8	5.6	ОК
360	min S	ummer	26.319	0.119	0.0	7.5		7.5	4.5	ΟK
480	min S	ummer	26.302	0.102	0.0	6.2		6.2	3.9	ОК
600	min S	ummer	26.291	0.091	0.0	5.3		5.3	3.4	ОК
720	min S	ummer	26.282	0.082	0.0	4.6		4.6	3.1	ОК
960	min S	ummer	26.270	0.070	0.0	3.7		3.7	2.7	ΟK
1440	min S	ummer	26.257	0.057	0.0	2.7		2.7	2.2	ΟK
2160	min S	ummer	26.246	0.046	0.0	2.0		2.0	1.7	ΟK
2880	min S	ummer	26.240	0.040	0.0	1.6		1.6	1.5	ΟK
4320	min S	ummer	26.232	0.032	0.0	1.1		1.1	1.2	ΟK
5760	min S	ummer	26.228	0.028	0.0	0.9		0.9	1.0	ΟK
7200	min S	ummer	26.225	0.025	0.0	0.7		0.7	0.9	ΟK
8640	min S	ummer	26.223	0.023	0.0	0.6		0.6	0.9	ΟK
10080	min S	ummer	26.221	0.021	0.0	0.6		0.6	0.8	ΟK
15	min W	linter	26.557	0.357	0.0	15.8		15.8	13.6	ΟK
30	min W	linter	26.559	0.359	0.0	15.9		15.9	13.6	O K
60	min W	linter	26.485	0.285	0.0	15.3		15.3	10.8	ΟK
120	min W	linter	26.388	0.188	0.0	12.3		12.3	7.1	ΟK
180	min W	linter	26.347	0.147	0.0	9.7		9.7	5.6	ΟK
240	min W	linter	26.323	0.123	0.0	7.9		7.9	4.7	ΟK
360	min W	linter	26.298	0.098	0.0	5.8		5.8	3.7	ΟK

Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15	min	Summer	81.719	0.0	19.3	17
30	min	Summer	52.383	0.0	24.7	25
60	min	Summer	32.061	0.0	30.3	42
120	min	Summer	19.041	0.0	36.0	72
180	min	Summer	13.895	0.0	39.4	102
240	min	Summer	11.067	0.0	41.8	132
360	min	Summer	8.018	0.0	45.4	192
480	min	Summer	6.376	0.0	48.2	252
600	min	Summer	5.334	0.0	50.4	312
720	min	Summer	4.609	0.0	52.3	372
960	min	Summer	3.659	0.0	55.3	494
1440	min	Summer	2.640	0.0	59.9	738
2160	min	Summer	1.903	0.0	64.7	1096
2880	min	Summer	1.507	0.0	68.3	1456
4320	min	Summer	1.085	0.0	73.8	2192
5760	min	Summer	0.858	0.0	77.9	2912
7200	min	Summer	0.716	0.0	81.1	3608
8640	min	Summer	0.617	0.0	83.9	4384
10080	min	Summer	0.544	0.0	86.3	5136
15	min	Winter	81.719	0.0	21.6	18
30	min	Winter	52.383	0.0	27.7	27
60	min	Winter	32.061	0.0	33.9	44
120	min	Winter	19.041	0.0	40.3	74
180	min	Winter	13.895	0.0	44.1	102
240	min	Winter	11.067	0.0	46.8	132
360	min	Winter	8.018	0.0	50.9	192
		©198	32-2015	XP Sol	utions	

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The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:09	Designed by Tim.Trotman	
File Plot 1 - ROBS - Rev A - 1 in 30	Checked by	Diginarie
Innovyze	Source Control 2015.1	•

Storm	Max	Max	Max	Max	Max	Max	Status
Event	Level	Depth	Infiltration	Control	Σ Outflow	Volume	
	(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
480 min Winter	26.283	0.083	0.0	4.7	4.7	3.2	O F
600 min Winter	26.274	0.074	0.0	4.0	4.0	2.8	O F
720 min Winter	26.267	0.067	0.0	3.4	3.4	2.5	O I
960 min Winter	26.257	0.057	0.0	2.7	2.7	2.2	0 1
1440 min Winter	26.246	0.046	0.0	2.0	2.0	1.7	O I
2160 min Winter	26.237	0.037	0.0	1.4	1.4	1.4	0 1
2880 min Winter	26.232	0.032	0.0	1.1	1.1	1.2	0 1
4320 min Winter	26.226	0.026	0.0	0.8	0.8	1.0	O I
5760 min Winter	26.223	0.023	0.0	0.6	0.6	0.9	O I
7200 min Winter	26.220	0.020	0.0	0.5	0.5	0.8	O I
8640 min Winter	26.219	0.019	0.0	0.5	0.5	0.7	O F
10080 min Winter	26.217	0.017	0.0	0.4	0.4	0.6	O I

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	6.376	0.0	54.0	252
600	min	Winter	5.334	0.0	56.4	312
720	min	Winter	4.609	0.0	58.5	372
960	min	Winter	3.659	0.0	61.9	494
1440	min	Winter	2.640	0.0	67.0	738
2160	min	Winter	1.903	0.0	72.5	1104
2880	min	Winter	1.507	0.0	76.6	1428
4320	min	Winter	1.085	0.0	82.6	2132
5760	min	Winter	0.858	0.0	87.2	2888
7200	min	Winter	0.716	0.0	90.9	3544
8640	min	Winter	0.617	0.0	94.0	4312
10080	min	Winter	0.544	0.0	96.7	5032

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The Stables		
High Cogges, Witney		
Oxfordshire		Micco
Date 15/10/2020 17:09	Designed by Tim.Trotman	
File Plot 1 - ROBS - Rev A - 1 in 30	Checked by	Diamaye
Innovyze	Source Control 2015.1	

<u>Rainfall Details</u>

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer) ().750
Region	England and Wales	Cv (Winter) (0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins) 1	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.126

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.126

Infrastruct CS Ltd		1					Page 4
The Stables							
High Cogges, Witney							
Oxfordshire							Micro
Date 15/10/2020 17:09		Designed b	y Tim.I	rotman			
File Plot 1 - ROBS - Rev A	- 1 in 30	Checked by					Diamaye
Innovyze		Source Con	trol 20	15.1		ľ	
		<u>Model Deta</u>	<u>115</u>				
	Storage is (Online Cover	Level (m	a) 28.100			
	<u>Cellul</u>	ar Storage	Struct	ure			
- 613	Inv	ert Level (m)	26.200) Safety F	actor 2.0		
Infilt	ration Coefficien	t Base (m/hr) t Side (m/hr)	0.00000) Por)	osity 0.95		
		, ,					
Depth (m) Area (m²) Inf. Ar	ea (m²) Depth (m)) Area (m²) I	nf. Area	(m²) Dep	th (m) Area	a (m²) In	nf. Area (m²)
0.000 40.0	40.0 0.800	40.0		60.2	0.900	0.0	61.5
	<u>Hydro-E</u>	Brake® Outfl	Low Con	<u>trol</u>			
Design Head	(m) 0.800 Hydro-	Brake® Type N	1d5 SW Or	nlv Invert	Level (m)	26.200	
Design Flow (l/s) 17.0 Di	ameter (mm)	-	174			
Depth (m) Flow (1/s) Depth	(m) Flow (l/s) De	epth (m) Flow	(l/s) [Oepth (m)	Flow (l/s)	Depth (m) Flow (l/s)
0.100 6.0 0.	800 16.8	2.000	25.8	4.000	36.4	7.00	48.2
0.200 12.9 1.	000 18.4	2.200	27.0	4.500	38.7	7.50	0 49.9
0.300 15.5 1.	200 20.0	2.400	28.2	5.000	40.7	8.00	0 51.5
0.400 15.8 1.	400 21.6	2.600	29.4	5.500	42.7	8.50	0 53.1
0.500 15.6 1.	600 23.1	3.000	31.6	6.000	44.6	9.00	54.7
0.600 15.7 1.	800 24.4	3.500	34.1	6.500	46.5	9.50	56.2

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Station Point		
Old Station Way		4
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:44	Designed by Tim	
File Plot 1 - ROBS - Rev A.srcx	Checked by	Dialitaye
Micro Drainage	Source Control 2015.1	

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 17 minutes.

	Storn Event	n t	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Σ	Max Outflow (l/s)	Max Volume (m ³)	Status
15	min	Summer	26.805	0.605	0.0	15.9		15.9	23.0	ΟK
30	min	Summer	26.861	0.661	0.0	16.0		16.0	25.1	ΟK
60	min	Summer	26.818	0.618	0.0	15.9		15.9	23.5	ΟK
120	min	Summer	26.663	0.463	0.0	15.9		15.9	17.6	ΟK
180	min	Summer	26.537	0.337	0.0	15.8		15.8	12.8	ΟK
240	min	Summer	26.462	0.262	0.0	14.9		14.9	10.0	ΟK
360	min	Summer	26.390	0.190	0.0	12.4		12.4	7.2	ΟK
480	min	Summer	26.356	0.156	0.0	10.3		10.3	5.9	ΟK
600	min	Summer	26.335	0.135	0.0	8.8		8.8	5.1	ΟK
720	min	Summer	26.321	0.121	0.0	7.7		7.7	4.6	ΟK
960	min	Summer	26.302	0.102	0.0	6.2		6.2	3.9	ΟK
1440	min	Summer	26.281	0.081	0.0	4.5		4.5	3.1	ΟK
2160	min	Summer	26.264	0.064	0.0	3.2		3.2	2.4	ΟK
2880	min	Summer	26.255	0.055	0.0	2.5		2.5	2.1	ΟK
4320	min	Summer	26.244	0.044	0.0	1.8		1.8	1.7	ΟK
5760	min	Summer	26.238	0.038	0.0	1.4		1.4	1.4	ΟK
7200	min	Summer	26.233	0.033	0.0	1.2		1.2	1.3	ΟK
8640	min	Summer	26.230	0.030	0.0	1.0		1.0	1.1	ОК
10080	min	Summer	26.228	0.028	0.0	0.9		0.9	1.1	ОК
15	min	Winter	26.892	0.692	0.0	16.1		16.1	26.3	ОК
30	min	Winter	26.946	0.746	0.0	16.4		16.4	28.4	ОК
60	min	Winter	26.869	0.669	0.0	16.0		16.0	25.4	ОК
120	min	Winter	26.626	0.426	0.0	15.9		15.9	16.2	ОК
180	min	Winter	26.471	0.271	0.0	15.1		15.1	10.3	ОК
240	min	Winter	26.403	0.203	0.0	13.1		13.1	7.7	ОК
360	min	Winter	26.349	0.149	0.0	9.8		9.8	5.7	ΟK

	Stor	m	Rain	Flooded	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	138.220	0.0	32.6	19
30	min	Summer	89.266	0.0	42.2	27
60	min	Summer	54.817	0.0	51.8	44
120	min	Summer	32.511	0.0	61.4	76
180	min	Summer	23.643	0.0	67.0	106
240	min	Summer	18.757	0.0	70.9	134
360	min	Summer	13.517	0.0	76.6	192
480	min	Summer	10.710	0.0	80.9	252
600	min	Summer	8.935	0.0	84.4	312
720	min	Summer	7.702	0.0	87.3	372
960	min	Summer	6.089	0.0	92.0	494
1440	min	Summer	4.367	0.0	99.0	738
2160	min	Summer	3.127	0.0	106.4	1104
2880	min	Summer	2.465	0.0	111.8	1472
4320	min	Summer	1.761	0.0	119.8	2148
5760	min	Summer	1.387	0.0	125.8	2872
7200	min	Summer	1.151	0.0	130.5	3672
8640	min	Summer	0.988	0.0	134.5	4336
10080	min	Summer	0.869	0.0	137.9	5032
15	min	Winter	138.220	0.0	36.6	19
30	min	Winter	89.266	0.0	47.2	29
60	min	Winter	54.817	0.0	58.0	48
120	min	Winter	32.511	0.0	68.8	80
180	min	Winter	23.643	0.0	75.1	108
240	min	Winter	18.757	0.0	79.4	134
360	min	Winter	13.517	0.0	85.8	194
		©198	32-2015	XP Sol	utions	

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Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:44	Designed by Tim	
File Plot 1 - ROBS - Rev A.srcx	Checked by	Dialitaye
Micro Drainage	Source Control 2015.1	•

	Sto	rm	Max	Max	Max	Max	Max S Outflow	Max	Statu
	Eve		(m)	(m)	(1/s)	(1/s)	(1/s)	(m ³)	
48	0 mi	n Winter	26.323	0.123	0.0	7.9	7.9	4.7	0 1
60	0 mii	n Winter	26.307	0.107	0.0	6.6	6.6	4.1	0 1
72	0 mii	n Winter	26.296	0.096	0.0	5.7	5.7	3.6	0 1
96	0 mii	n Winter	26.281	0.081	0.0	4.5	4.5	3.1	0
144	0 mii	n Winter	26.264	0.064	0.0	3.2	3.2	2.4	0
216	0 mii	n Winter	26.252	0.052	0.0	2.3	2.3	2.0	0 1
288	0 mii	n Winter	26.244	0.044	0.0	1.8	1.8	1.7	0 1
432	0 mii	n Winter	26.236	0.036	0.0	1.3	1.3	1.4	0 1
576	0 mii	n Winter	26.231	0.031	0.0	1.0	1.0	1.2	0
720	0 mii	n Winter	26.227	0.027	0.0	0.9	0.9	1.0	0
864	0 mii	n Winter	26.225	0.025	0.0	0.7	0.7	0.9	0 1
1008	0 min	n Winter	26.223	0.023	0.0	0.6	0.6	0.9	0

St Ev	orm ent	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 mi	n Winter	10.710	0.0	90.7	252
600 mi	n Winter	8.935	0.0	94.5	312
720 mi	n Winter	7.702	0.0	97.8	374
960 mi	n Winter	6.089	0.0	103.1	494
1440 mi	n Winter	4.367	0.0	110.9	740
2160 mi	n Winter	3.127	0.0	119.1	1104
2880 mi	n Winter	2.465	0.0	125.2	1452
4320 mi	n Winter	1.761	0.0	134.2	2168
5760 mi	n Winter	1.387	0.0	140.9	2872
7200 mi	n Winter	1.151	0.0	146.2	3736
8640 mi	n Winter	0.988	0.0	150.6	4360
10080 mi	n Winter	0.869	0.0	154.5	4984

INFRASTRUCT CS LTD		Page 3
Station Point		
Old Station Way		4
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:44	Designed by Tim	
File Plot 1 - ROBS - Rev A.srcx	Checked by	Diginarie
Micro Drainage	Source Control 2015.1	

<u>Rainfall Details</u>

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

<u>Time Area Diagram</u>

Total Area (ha) 0.126

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.126

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Station Point			
Old Station Way			
Eynsham Oxon OX29 4TL		N	<i>Aicco</i>
Date 15/09/2015 12:44	Designed by Tim		
File Plot 1 - ROBS - Rev A.srcx	Checked by		Janaye
Micro Drainage	Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 28.100

Cellular Storage Structure

Invert Level (m) 26.200 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²)

0.000 40.0 40.0	0.800	40.0	60.2	0.900	0.0	61.5
-----------------	-------	------	------	-------	-----	------

Hydro-Brake® Outflow Control

Design Head (m) 0.800 Hydro-Brake® Type Md5 SW Only Invert Level (m) 26.200 Design Flow (l/s) 17.0 Diameter (mm) 174

Depth (m)	Flow (l/s)								
0 100	6 0	0 000	16 9	2 000	25 0	1 000	26 4	7 000	10 2
0.100	12 9	1 000	18 4	2.000	27.0	4.000	38 7	7.000	40.2
0.300	15.5	1.200	20.0	2.400	28.2	5.000	40.7	8.000	51.5
0.400	15.8	1.400	21.6	2.600	29.4	5.500	42.7	8.500	53.1
0.500	15.6	1.600	23.1	3.000	31.6	6.000	44.6	9.000	54.7
0.600	15.7	1.800	24.4	3.500	34.1	6.500	46.5	9.500	56.2

Appendix B – Plot 2, Former One Stop Shop



Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:13	Designed by Tim.Trotman	
File Plot 2 - RWOS - Rev A - 1 in 2y	Checked by	Diginarie
Innovyze	Source Control 2015.1	•

Summary of Results for 2 year Return Period

Half Drain Time : 6 minutes.

	Storm Event	1 :	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
15	min :	Summer	22.651	0.151	0.0	3.4	3.4	1.7	ОК
30	min :	Summer	22.651	0.151	0.0	3.4	3.4	1.7	ОК
60	min :	Summer	22.626	0.126	0.0	3.2	3.2	1.4	ОК
120	min :	Summer	22.593	0.093	0.0	2.5	2.5	1.1	ОК
180	min :	Summer	22.577	0.077	0.0	2.1	2.1	0.9	ОК
240	min :	Summer	22.566	0.066	0.0	1.7	1.7	0.8	ОК
360	min :	Summer	22.554	0.054	0.0	1.3	1.3	0.6	ОК
480	min :	Summer	22.547	0.047	0.0	1.1	1.1	0.5	ОК
600	min :	Summer	22.542	0.042	0.0	0.9	0.9	0.5	ОК
720	min :	Summer	22.538	0.038	0.0	0.8	0.8	0.4	ОК
960	min :	Summer	22.533	0.033	0.0	0.7	0.7	0.4	ОК
1440	min :	Summer	22.527	0.027	0.0	0.5	0.5	0.3	ОК
2160	min :	Summer	22.522	0.022	0.0	0.4	0.4	0.3	ОК
2880	min :	Summer	22.519	0.019	0.0	0.3	0.3	0.2	ОК
4320	min :	Summer	22.516	0.016	0.0	0.2	0.2	0.2	ОК
5760	min :	Summer	22.514	0.014	0.0	0.2	0.2	0.2	ОК
7200	min :	Summer	22.512	0.012	0.0	0.1	0.1	0.1	ОК
8640	min :	Summer	22.511	0.011	0.0	0.1	0.1	0.1	ОК
10080	min :	Summer	22.511	0.011	0.0	0.1	0.1	0.1	ОК
15	min N	Winter	22.667	0.167	0.0	3.5	3.5	1.9	ОК
30	min N	Winter	22.656	0.156	0.0	3.5	3.5	1.8	ОК
60	min N	Winter	22.617	0.117	0.0	3.0	3.0	1.3	ОК
120	min N	Winter	22.580	0.080	0.0	2.2	2.2	0.9	ОК
180	min N	Winter	22.564	0.064	0.0	1.7	1.7	0.7	ОК
240	min N	Winter	22.555	0.055	0.0	1.3	1.3	0.6	ОК
360	min N	Winter	22.544	0.044	0.0	1.0	1.0	0.5	ОК

Storm		Rain	Flooded	Discharge	Time-Peak	
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	42.980	0.0	3.1	16
30	min	Summer	27.473	0.0	4.0	24
60	min	Summer	16.881	0.0	4.9	40
120	min	Summer	10.146	0.0	5.9	70
180	min	Summer	7.490	0.0	6.6	100
240	min	Summer	6.029	0.0	7.0	130
360	min	Summer	4.425	0.0	7.8	190
480	min	Summer	3.548	0.0	8.3	250
600	min	Summer	2.988	0.0	8.7	312
720	min	Summer	2.597	0.0	9.1	372
960	min	Summer	2.080	0.0	9.7	494
1440	min	Summer	1.522	0.0	10.7	738
2160	min	Summer	1.113	0.0	11.7	1096
2880	min	Summer	0.892	0.0	12.5	1464
4320	min	Summer	0.652	0.0	13.7	2156
5760	min	Summer	0.522	0.0	14.6	2848
7200	min	Summer	0.439	0.0	15.4	3600
8640	min	Summer	0.382	0.0	16.1	4352
10080	min	Summer	0.339	0.0	16.6	5112
15	min	Winter	42.980	0.0	3.5	17
30	min	Winter	27.473	0.0	4.5	25
60	min	Winter	16.881	0.0	5.5	42
120	min	Winter	10.146	0.0	6.6	72
180	min	Winter	7.490	0.0	7.4	100
240	min	Winter	6.029	0.0	7.9	132
360	min	Winter	4.425	0.0	8.7	190
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:13	Designed by Tim.Trotman	
File Plot 2 - RWOS - Rev A - 1 in 2y	Checked by	Digitigh
Innovyze	Source Control 2015.1	•

	Stor	m	Max	Max	Max	Max	Max	Max	Status
	Even	it	Level	Depth	Infiltration	Control	Σ Outflow	Volume	
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
480	min	Winter	22.538	0.038	0.0	0.8	0.8	0.4	ОК
600	min	Winter	22.534	0.034	0.0	0.7	0.7	0.4	ОК
720	min	Winter	22.531	0.031	0.0	0.6	0.6	0.4	ΟK
960	min	Winter	22.527	0.027	0.0	0.5	0.5	0.3	ΟK
1440	min	Winter	22.522	0.022	0.0	0.3	0.3	0.2	ΟK
2160	min	Winter	22.518	0.018	0.0	0.3	0.3	0.2	ΟK
2880	min	Winter	22.516	0.016	0.0	0.2	0.2	0.2	ΟK
4320	min	Winter	22.513	0.013	0.0	0.2	0.2	0.1	ΟK
5760	min	Winter	22.511	0.011	0.0	0.1	0.1	0.1	ΟK
7200	min	Winter	22.510	0.010	0.0	0.1	0.1	0.1	ОК
8640	min	Winter	22.509	0.009	0.0	0.1	0.1	0.1	ΟK
10080	min	Winter	22.509	0.009	0.0	0.1	0.1	0.1	Οŀ

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	3.548	0.0	9.3	252
600	min	Winter	2.988	0.0	9.8	314
720	min	Winter	2.597	0.0	10.2	374
960	min	Winter	2.080	0.0	10.9	480
1440	min	Winter	1.522	0.0	12.0	740
2160	min	Winter	1.113	0.0	13.1	1108
2880	min	Winter	0.892	0.0	14.0	1472
4320	min	Winter	0.652	0.0	15.4	2124
5760	min	Winter	0.522	0.0	16.4	2936
7200	min	Winter	0.439	0.0	17.3	3544
8640	min	Winter	0.382	0.0	18.0	4296
10080	min	Winter	0.339	0.0	18.6	4864

Infrastruct CS Ltd		Page 3
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:13	Designed by Tim.Trotman	
File Plot 2 - RWOS - Rev A - 1 in 2y	Checked by	Dialitaye
Innovyze	Source Control 2015.1	

<u>Rainfall Details</u>

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.039

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.039

Infrastruct CS Ltd			Page 4
The Stables			
High Cogges, Witney			
Oxfordshire			Micco
Date 15/10/2020 17:13	Designed by Tim	.Trotman	
File Plot 2 - RWOS - Rev A - 1 in 2y	Checked by		Diamaye
Innovyze	Source Control	2015.1	·
	Model Details		
	<u>110401 D004110</u>		
Storage i	s Online Cover Level	(m) 24.150	
Cell	ular Storage Stru	<u>cture</u>	
Infiltration Coefficie	nvert Level (m) 22.5	00 Safety Factor 2.0) =
Infiltration Coefficient	ent Side (m/hr) 0.000)00 POPOSILY 0.93)
Denth (m) Area (m^2) Inf Area (m^2) Denth	(m) Area (m^2) Trf Ar	(m^2) Donth (m) Are	(m^2) Inf Area (m^2)
	(m) Alea (m) Inf. Al	ea (m) bepon (m) Are	a (m) IIII. Alea (m)
0.000 12.0 12.0 0.	300 12.0	23.1 0.900	0.0 23.8
Hydro	-Brake® Outflow Co	<u>ontrol</u>	
Design Head (m) 0.800 Hyd:	co-Brake® Type Md5 SW	Only Invert Level (m)	22.500
Design Flow (l/s) 5.0	Diameter (mm)	96	
Depth (m) Flow (1/s) Depth (m) Flow (1/s)	Depth (m) Flow (1/s)	Depth (m) Flow (1/s)	Depth (m) Flow (1/s)
0.100 2.7 0.800 5.0	2.000 7.8	4.000 11.1	7.000 14.7
0.200 3.6 1.000 5.5	2.200 8.2	4.500 11.8	7.500 15.2
0.300 3.5 1.200 6.1	2.400 8.6	5.000 12.4	8.000 15.7
0.400 3.7 1.400 6.6	2.600 8.9	5.500 13.0	8.500 16.2
0.500 4.0 1.800 7.0	3.000 9.0	6 500 14 1	9 500 17 1
1.5 1.000 7.4	0.1	0.000 14.1	9.000

Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:13	Designed by Tim.Trotman	
File Plot 2 - RWOS - Rev A - 1 in 30	Checked by	Digiliada
Innovyze	Source Control 2015.1	

Summary of Results for 30 year Return Period

Half Drain Time : 12 minutes.

Storm		Max	Max	Max	Max	Max	Max	Status	
	Event	:	Level	Depth	Infiltration	Control	Σ Outflow	Volume	
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
15	min :	Summer	22.839	0.339	0.0	3.6	3.6	3.9	ОК
30	min :	Summer	22.856	0.356	0.0	3.6	3.6	4.1	ОК
60	min :	Summer	22.811	0.311	0.0	3.6	3.6	3.5	ОК
120	min :	Summer	22.709	0.209	0.0	3.6	3.6	2.4	ОК
180	min :	Summer	22.648	0.148	0.0	3.4	3.4	1.7	ОК
240	min :	Summer	22.617	0.117	0.0	3.0	3.0	1.3	ОК
360	min :	Summer	22.588	0.088	0.0	2.4	2.4	1.0	ОК
480	min :	Summer	22.573	0.073	0.0	1.9	1.9	0.8	ОК
600	min :	Summer	22.564	0.064	0.0	1.7	1.7	0.7	ОК
720	min :	Summer	22.558	0.058	0.0	1.4	1.4	0.7	ОК
960	min :	Summer	22.549	0.049	0.0	1.2	1.2	0.6	ОК
1440	min :	Summer	22.539	0.039	0.0	0.8	0.8	0.4	ΟK
2160	min :	Summer	22.531	0.031	0.0	0.6	0.6	0.4	ΟK
2880	min :	Summer	22.527	0.027	0.0	0.5	0.5	0.3	ΟK
4320	min :	Summer	22.522	0.022	0.0	0.3	0.3	0.2	ΟK
5760	min :	Summer	22.519	0.019	0.0	0.3	0.3	0.2	ΟK
7200	min :	Summer	22.517	0.017	0.0	0.2	0.2	0.2	ΟK
8640	min :	Summer	22.515	0.015	0.0	0.2	0.2	0.2	ΟK
10080	min :	Summer	22.514	0.014	0.0	0.2	0.2	0.2	ΟK
15	min N	Winter	22.888	0.388	0.0	3.7	3.7	4.4	ΟK
30	min N	Winter	22.898	0.398	0.0	3.7	3.7	4.5	O K
60	min N	Winter	22.824	0.324	0.0	3.6	3.6	3.7	O K
120	min N	Winter	22.673	0.173	0.0	3.5	3.5	2.0	ΟK
180	min N	Winter	22.614	0.114	0.0	3.0	3.0	1.3	ОК
240	min N	Winter	22.591	0.091	0.0	2.5	2.5	1.0	ΟK
360	min N	Winter	22.569	0.069	0.0	1.8	1.8	0.8	ΟK

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15	min	Summer	81.719	0.0	6.0	18
30	min	Summer	52.383	0.0	7.7	2.6
60	min	Summer	32.061	0.0	9.4	44
120	min	Summer	19.041	0.0	11.1	74
180	min	Summer	13.895	0.0	12.2	102
240	min	Summer	11.067	0.0	12.9	132
360	min	Summer	8.018	0.0	14.1	190
480	min	Summer	6.376	0.0	14.9	250
600	min	Summer	5.334	0.0	15.6	312
720	min	Summer	4.609	0.0	16.2	372
960	min	Summer	3.659	0.0	17.1	494
1440	min	Summer	2.640	0.0	18.5	738
2160	min	Summer	1.903	0.0	20.0	1080
2880	min	Summer	1.507	0.0	21.2	1472
4320	min	Summer	1.085	0.0	22.8	2204
5760	min	Summer	0.858	0.0	24.1	2936
7200	min	Summer	0.716	0.0	25.1	3632
8640	min	Summer	0.617	0.0	26.0	4400
10080	min	Summer	0.544	0.0	26.7	4968
15	min	Winter	81.719	0.0	6.7	19
30	min	Winter	52.383	0.0	8.6	28
60	min	Winter	32.061	0.0	10.5	46
120	min	Winter	19.041	0.0	12.5	76
180	min	Winter	13.895	0.0	13.7	102
240	min	Winter	11.067	0.0	14.5	132
360	min	Winter	8.018	0.0	15.8	190
		©198	32 - 2015	XP Sol	utions	

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The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:13	Designed by Tim.Trotman	
File Plot 2 - RWOS - Rev A - 1 in 30	Checked by	Diginarie
Innovyze	Source Control 2015.1	

	Storm		Max	Max	Max	Max	Max	Max	Status
	Even	t	Level (m)	Depth (m)	(1/s)	(1/s)	E Outflow (1/s)	Volume (m³)	
480	min	Winter	22.558	0.058	0.0	1.5	1.5	0.7	O F
600	min	Winter	22.551	0.051	0.0	1.2	1.2	0.6	O F
720	min	Winter	22.546	0.046	0.0	1.1	1.1	0.5	O F
960	min	Winter	22.539	0.039	0.0	0.8	0.8	0.4	O I
1440	min	Winter	22.531	0.031	0.0	0.6	0.6	0.4	O I
2160	min	Winter	22.525	0.025	0.0	0.4	0.4	0.3	OH
2880	min	Winter	22.522	0.022	0.0	0.3	0.3	0.2	OH
4320	min	Winter	22.518	0.018	0.0	0.3	0.3	0.2	O H
5760	min	Winter	22.515	0.015	0.0	0.2	0.2	0.2	O I
7200	min	Winter	22.514	0.014	0.0	0.2	0.2	0.2	OH
8640	min	Winter	22.513	0.013	0.0	0.2	0.2	0.1	OF
10080	min	Winter	22.512	0.012	0.0	0.1	0.1	0.1	ΟJ

Storm Event			Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	6.376	0.0	16.7	252
600	min	Winter	5.334	0.0	17.5	312
720	min	Winter	4.609	0.0	18.1	372
960	min	Winter	3.659	0.0	19.2	488
1440	min	Winter	2.640	0.0	20.7	738
2160	min	Winter	1.903	0.0	22.4	1080
2880	min	Winter	1.507	0.0	23.7	1428
4320	min	Winter	1.085	0.0	25.6	2184
5760	min	Winter	0.858	0.0	27.0	2864
7200	min	Winter	0.716	0.0	28.1	3720
8640	min	Winter	0.617	0.0	29.1	4304
10080	min	Winter	0.544	0.0	29.9	5168

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The Stables		
High Cogges, Witney		
Oxfordshire		Micco
Date 15/10/2020 17:13	Designed by Tim.Trotman	
File Plot 2 - RWOS - Rev A - 1 in 30	Checked by	Diamacje
Innovyze	Source Control 2015.1	

<u>Rainfall Details</u>

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.039

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.039

Infrastruct C	S Ltd												P	age 4	1			
The Stables																٦		
High Cogges,										4	\sim							
Oxfordshire														Mic		~		
Date 15/10/20	20 17:13	3			Desig	ned b	y Tim.	.Trotm	an						in			
File Plot 2 -	RWOS -	Rev A	- 1 in	30	. Check	ed by	7							Dialinatic				
Innovyze					Sourc	e Con	itrol 2	2015.1										
					Model		ile											
					<u>1100001</u>	Dett	<u>1115</u>											
			Sto	rage i	s Online	Cover	Level	(m) 24.	150									
				<u>Cell</u>	<u>ular St</u>	orage	Struc	ture										
						-												
				I	nvert Lev	vel (m)) 22.5	00 Safe	ety F	actor	2.0							
		Infiltr	ation Co ation Co	peffici	ent Base	(m/hr)) 0.000	00	Por	cosity	0.95							
					0110 0100	(,	,	00										
Depth (m) A	rea (m²)	Inf. Are	ea (m²)	Depth	(m) Area	(m²) 1	Inf. Are	ea (m²)	Dep	th (m) Are	a (m²)	Inf	. Area	(m²)			
0.000	12.0		12.0	0.	800	12.0		23.1		0.90	0	0.0			23.8			
				Hvdro	-Brake®	Outf	low Co	ntrol										
				_														
	Desig	gn Head	(m) 0.80	00 Hydi	o-Brake®	Туре	Md5 SW	Only I	nvert	Leve	1 (m)	22.50	0					
	Design	FIOM (I	/S) J.	. 0	Diameter	(mm)		96										
Depth (m) F	low (l/s)	Depth	(m) Flow	(l/s)	Depth (m) Flov	v (l/s)	Depth	(m)	Flow	(1/s)	Depth	(m)	Flow	(1/s)			
0.100	2.7	0.8	300	5.0	2.00	0	7.8	4.	000		11.1	7	.000		14.7			
0.200	3.6	1.0	000	5.5	2.20	0	8.2	4.	500		11.8	7	.500		15.2			
0.300	3.5	1.2	200	6.1	2.40	0	8.6	5.	000		12.4	8	.000		15.7			
0.400	3.7	1.4	100	6.6	2.60	0	8.9	5.	500		13.0	8	.500		16.2			
0.500	4.0	1.6	500	7.0	3.00	0	9.6	6.	000		13.6	9	.000		16.6			
0.600	4.3	1.8	300	1.4	3.50	0	10.4	6.	500		14.1	9	.500		1/.1			
INFRASTRUCT CS LTD		Page 1																
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Station Point																		
Old Station Way		<u> </u>																
Eynsham Oxon OX29 4TL		Micro																
Date 15/09/2015 12:46	Designed by Tim																	
File Plot 2 - RWOS - Rev A.srcx	Checked by	Dialitatje																
Micro Drainage	Source Control 2015.1	•																

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 18 minutes.

	Storm		Max	Max	Max	Max		Max	Max	Status
	Event	:	Level	Depth	Infiltration	Control	Σ	Outflow	Volume	
			(m)	(m)	(l/s)	(l/s)		(l/s)	(m³)	
15	min	Summer	23.139	0.639	0.0	4.4		4.4	7.3	ОК
30	min	Summer	23.195	0.695	0.0	4.6		4.6	7.9	ОК
60	min	Summer	23.162	0.662	0.0	4.5		4.5	7.5	ΟK
120	min	Summer	23.038	0.538	0.0	4.1		4.1	6.1	ΟK
180	min	Summer	22.920	0.420	0.0	3.7		3.7	4.8	ΟK
240	min	Summer	22.815	0.315	0.0	3.6		3.6	3.6	ΟK
360	min	Summer	22.675	0.175	0.0	3.5		3.5	2.0	ΟK
480	min	Summer	22.625	0.125	0.0	3.2		3.2	1.4	ΟK
600	min	Summer	22.602	0.102	0.0	2.8		2.8	1.2	ΟK
720	min	Summer	22.589	0.089	0.0	2.4		2.4	1.0	ΟK
960	min	Summer	22.573	0.073	0.0	1.9		1.9	0.8	ΟK
1440	min	Summer	22.556	0.056	0.0	1.4		1.4	0.6	ΟK
2160	min	Summer	22.544	0.044	0.0	1.0		1.0	0.5	ΟK
2880	min	Summer	22.537	0.037	0.0	0.8		0.8	0.4	ΟK
4320	min	Summer	22.530	0.030	0.0	0.6		0.6	0.3	ΟK
5760	min	Summer	22.526	0.026	0.0	0.5		0.5	0.3	ΟK
7200	min	Summer	22.523	0.023	0.0	0.4		0.4	0.3	ΟK
8640	min	Summer	22.521	0.021	0.0	0.3		0.3	0.2	ОК
10080	min	Summer	22.519	0.019	0.0	0.3		0.3	0.2	ОК
15	min M	Winter	23.229	0.729	0.0	4.7		4.7	8.3	ОК
30	min 1	Winter	23.290	0.790	0.0	4.9		4.9	9.0	ОК
60	min M	Winter	23.232	0.732	0.0	4.7		4.7	8.3	ОК
120	min 1	Winter	23.043	0.543	0.0	4.1		4.1	6.2	ОК
180	min 1	Winter	22.872	0.372	0.0	3.6		3.6	4.2	ОК
240	min 1	Winter	22.718	0.218	0.0	3.6		3.6	2.5	ОК
360	min 1	Winter	22.616	0.116	0.0	3.0		3.0	1.3	ΟK

	Stor	m	Rain	Floode	d Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	e Volume	(mins)
				(m³)	(m³)	
15	min	Summer	138.220	0.	0 10.1	19
30	min	Summer	89.266	0.	0 13.0	28
60	min	Summer	54.817	0.	0 16.0	44
120	min	Summer	32.511	0.	0 19.0	78
180	min	Summer	23.643	0.	0 20.7	110
240	min	Summer	18.757	0.	0 21.9	142
360	min	Summer	13.517	0.	0 23.7	196
480	min	Summer	10.710	0.	0 25.1	252
600	min	Summer	8.935	0.	0 26.1	312
720	min	Summer	7.702	0.	0 27.0	372
960	min	Summer	6.089	0.	0 28.5	494
1440	min	Summer	4.367	0.	0 30.6	738
2160	min	Summer	3.127	0.	0 32.9	1088
2880	min	Summer	2.465	0.	0 34.6	1440
4320	min	Summer	1.761	Ο.	0 37.1	2196
5760	min	Summer	1.387	0.	0 38.9	2896
7200	min	Summer	1.151	0.	0 40.4	3648
8640	min	Summer	0.988	0.	0 41.6	4288
10080	min	Summer	0.869	0.	0 42.7	4960
15	min	Winter	138.220	0.	0 11.3	19
30	min	Winter	89.266	0.	0 14.6	29
60	min	Winter	54.817	0.	0 18.0	48
120	min	Winter	32.511	0.	0 21.3	84
180	min	Winter	23.643	Ο.	0 23.2	116
240	min	Winter	18.757	Ο.	0 24.6	144
360 min Winter			13.517	0.	0 26.6	194
		©198	82-2015	XP Sc	olutions	

INFRASTRUCT CS LTD		Page 2
Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:46	Designed by Tim	
File Plot 2 - RWOS - Rev A.srcx	Checked by	Digitigh
Micro Drainage	Source Control 2015.1	

	Storm Event		Storm		torm Max Max Max Went Level Depth Infiltrati		Max Infiltration	Max Control	Max Σ Outflow	Max Volume	Status
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m ³)			
480) min	Winter	22.590	0.090	0.0	2.4	2.4	1.0	0 1		
600) min	Winter	22.576	0.076	0.0	2.0	2.0	0.9	0 1		
720) min	Winter	22.568	0.068	0.0	1.8	1.8	0.8	0 1		
960) min	Winter	22.556	0.056	0.0	1.4	1.4	0.6	0 1		
1440) min	Winter	22.544	0.044	0.0	1.0	1.0	0.5	0 1		
2160) min	Winter	22.535	0.035	0.0	0.7	0.7	0.4	0		
2880) min	Winter	22.530	0.030	0.0	0.6	0.6	0.3	0		
4320) min	Winter	22.524	0.024	0.0	0.4	0.4	0.3	0		
5760) min	Winter	22.521	0.021	0.0	0.3	0.3	0.2	0		
7200) min	Winter	22.518	0.018	0.0	0.3	0.3	0.2	0		
8640) min	Winter	22.517	0.017	0.0	0.2	0.2	0.2	0		
10080) min	Winter	22.515	0.015	0.0	0.2	0.2	0.2	0		

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	10.710	0.0	28.1	252
600	min	Winter	8.935	0.0	29.3	312
720	min	Winter	7.702	0.0	30.3	370
960	min	Winter	6.089	0.0	31.9	494
1440	min	Winter	4.367	0.0	34.3	738
2160	min	Winter	3.127	0.0	36.9	1104
2880	min	Winter	2.465	0.0	38.8	1456
4320	min	Winter	1.761	0.0	41.5	2148
5760	min	Winter	1.387	0.0	43.6	2800
7200	min	Winter	1.151	0.0	45.2	3544
8640	min	Winter	0.988	0.0	46.6	4392
10080	min	Winter	0.869	0.0	47.8	5136

INFRASTRUCT CS LTD		Page 3
Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micro
Date 15/09/2015 12:46	Designed by Tim	
File Plot 2 - RWOS - Rev A.srcx	Checked by	Digitigh
Micro Drainage	Source Control 2015.1	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

<u>Time Area Diagram</u>

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.039

INFRASTRUCT CS LTD		Page 4
Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:46	Designed by Tim	
File Plot 2 - RWOS - Rev A.srcx	Checked by	Diginarie
Micro Drainage	Source Control 2015.1	1
	Model Details	
Storage is	Online Cover Level (m) 24.150	
Cellu	lar Storage Structure	
Int	vort Lovol (m) 22 500 Safaty Factor 2 0	

Invert Level (m) 22.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²)

0.000	12.0	12.0	0.800	12.0	23.1	0.900	0.0	23.8
-------	------	------	-------	------	------	-------	-----	------

Hydro-Brake® Outflow Control

Design Head (m) 0.800 Hydro-Brake® Type Md5 SW Only Invert Level (m) 22.500 Design Flow (l/s) 5.0 Diameter (mm) 96

Depth (m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)
0 1 0 0		0 7		000		F 0	2	000		7 0		000		1 1 1	7	000		14 7
0.100		2.1	0	.800		5.0	۷.	.000		/.8	4.	.000		11.1	/ .	000		14./
0.200		3.6	1	.000		5.5	2.	.200		8.2	4.	.500		11.8	7.	500		15.2
0.300		3.5	1	.200		6.1	2.	.400		8.6	5.	.000		12.4	8.	000		15.7
0.400		3.7	1	.400		6.6	2.	.600		8.9	5.	.500		13.0	8.	500		16.2
0.500		4.0	1	.600		7.0	3.	.000		9.6	6.	.000		13.6	9.	000		16.6
0.600		4.3	1	.800		7.4	3.	.500		10.4	6.	.500		14.1	9.	500		17.1

Appendix C – Plot 3, Varndell Street Corner



Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:16	Designed by Tim.Trotman	
File Plot 3 - VARS - 1 in 2yr.srcx	Checked by	Dialitatic
Innovyze	Source Control 2015.1	

Summary of Results for 2 year Return Period

Half Drain Time : 10 minutes.

	Storm	L	Max	Max	Max	Max	Max	Мах	Status
	Event		Level	Depth	Infiltration	Control	Σ Outflow	Volume	
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
15	min S	Summer	25.545	0.145	0.0	3.4	3.4	2.5	ОК
30	min S	Summer	25.552	0.152	0.0	3.4	3.4	2.6	ΟK
60	min S	Summer	25.535	0.135	0.0	3.3	3.3	2.3	ОК
120	min S	Summer	25.505	0.105	0.0	2.8	2.8	1.8	ОК
180	min S	Summer	25.488	0.088	0.0	2.4	2.4	1.5	ОК
240	min S	Summer	25.476	0.076	0.0	2.0	2.0	1.3	ΟK
360	min S	Summer	25.462	0.062	0.0	1.6	1.6	1.1	ΟK
480	min S	Summer	25.454	0.054	0.0	1.3	1.3	0.9	ОК
600	min S	Summer	25.448	0.048	0.0	1.1	1.1	0.8	ΟK
720	min S	Summer	25.444	0.044	0.0	1.0	1.0	0.8	ΟK
960	min S	Summer	25.438	0.038	0.0	0.8	0.8	0.7	ОК
1440	min S	Summer	25.431	0.031	0.0	0.6	0.6	0.5	ОК
2160	min S	Summer	25.426	0.026	0.0	0.5	0.5	0.4	ΟK
2880	min S	Summer	25.422	0.022	0.0	0.4	0.4	0.4	ОК
4320	min S	Summer	25.418	0.018	0.0	0.3	0.3	0.3	ΟK
5760	min S	Summer	25.416	0.016	0.0	0.2	0.2	0.3	ΟK
7200	min S	Summer	25.414	0.014	0.0	0.2	0.2	0.2	ΟK
8640	min S	Summer	25.413	0.013	0.0	0.2	0.2	0.2	ΟK
10080	min S	Summer	25.412	0.012	0.0	0.1	0.1	0.2	ΟK
15	min V	Winter	25.562	0.162	0.0	3.5	3.5	2.8	ΟK
30	min V	Winter	25.563	0.163	0.0	3.5	3.5	2.8	O K
60	min V	Winter	25.533	0.133	0.0	3.3	3.3	2.3	ΟK
120	min V	Winter	25.494	0.094	0.0	2.5	2.5	1.6	ОК
180	min V	Winter	25.475	0.075	0.0	2.0	2.0	1.3	ΟK
240	min V	Winter	25.464	0.064	0.0	1.7	1.7	1.1	ΟK
360	min V	Winter	25.452	0.052	0.0	1.3	1.3	0.9	ΟK

Storm Event			Rain (mm/hr)	Flooded Volume	Discharge Volume	Time-Peak (mins)
				(111)	(111)	
15	min	Summer	42.980	0.0	3.9	17
30	min	Summer	27.473	0.0	5.0	25
60	min	Summer	16.881	0.0	6.2	42
120	min	Summer	10.146	0.0	7.4	72
180	min	Summer	7.490	0.0	8.2	102
240	min	Summer	6.029	0.0	8.9	132
360	min	Summer	4.425	0.0	9.7	192
480	min	Summer	3.548	0.0	10.4	252
600	min	Summer	2.988	0.0	11.0	312
720	min	Summer	2.597	0.0	11.4	372
960	min	Summer	2.080	0.0	12.2	494
1440	min	Summer	1.522	0.0	13.4	738
2160	min	Summer	1.113	0.0	14.7	1100
2880	min	Summer	0.892	0.0	15.7	1460
4320	min	Summer	0.652	0.0	17.2	2156
5760	min	Summer	0.522	0.0	18.4	2936
7200	min	Summer	0.439	0.0	19.4	3664
8640	min	Summer	0.382	0.0	20.2	4392
10080	min	Summer	0.339	0.0	20.9	5040
15	min	Winter	42.980	0.0	4.4	18
30	min	Winter	27.473	0.0	5.6	26
60	min	Winter	16.881	0.0	6.9	42
120	min	Winter	10.146	0.0	8.3	74
180	min	Winter	7.490	0.0	9.2	104
240	min	Winter	6.029	0.0	9.9	134
360	min	Winter	4.425	0.0	10.9	194
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:16	Designed by Tim.Trotman	
File Plot 3 - VARS - 1 in 2yr.srcx	Checked by	Diamaye
Innovyze	Source Control 2015.1	

	Storm	Max	Max	Max	Max	Max	Max	Statu
	Event	Level (m)	Depth (m)	Infiltration (l/s)	Control (1/s)	Σ Outflow (l/s)	Volume (m³)	
480	min Winter	25.444	0.044	0.0	1.0	1.0	0.8	0 1
600	min Winter	25.440	0.040	0.0	0.9	0.9	0.7	0 1
720	min Winter	25.436	0.036	0.0	0.7	0.7	0.6	0 1
960	min Winter	25.431	0.031	0.0	0.6	0.6	0.5	0 1
1440	min Winter	25.425	0.025	0.0	0.4	0.4	0.4	0 1
2160	min Winter	25.421	0.021	0.0	0.3	0.3	0.4	0
2880	min Winter	25.418	0.018	0.0	0.3	0.3	0.3	0
4320	min Winter	25.415	0.015	0.0	0.2	0.2	0.2	0 1
5760	min Winter	25.413	0.013	0.0	0.2	0.2	0.2	0
7200	min Winter	25.412	0.012	0.0	0.1	0.1	0.2	0
8640	min Winter	25.411	0.011	0.0	0.1	0.1	0.2	0
10080	min Winter	25.410	0.010	0.0	0.1	0.1	0.2	0

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	3.548	0.0	11.7	254
600	min	Winter	2.988	0.0	12.3	314
720	min	Winter	2.597	0.0	12.8	378
960	min	Winter	2.080	0.0	13.7	494
1440	min	Winter	1.522	0.0	15.0	738
2160	min	Winter	1.113	0.0	16.5	1072
2880	min	Winter	0.892	0.0	17.6	1500
4320	min	Winter	0.652	0.0	19.3	2160
5760	min	Winter	0.522	0.0	20.6	2936
7200	min	Winter	0.439	0.0	21.7	3624
8640	min	Winter	0.382	0.0	22.6	4336
10080	min	Winter	0.339	0.0	23.4	5144

Infrastruct CS Ltd		Page 3
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:16	Designed by Tim.Trotman	
File Plot 3 - VARS - 1 in 2yr.srcx	Checked by	Digitight
Innovyze	Source Control 2015.1	L.

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.049

Infrastruct CS Ltd	1		Page 4
The Stables			
High Cogges, Witney			
Oxfordshire			Mirro
Date 15/10/2020 17:16	Designed by Tim	.Trotman	Drainago
File Plot 3 - VARS - 1 in 2yr.srcx	Checked by		Drainage
Innovyze	Source Control 2	2015.1	
	<u>Model Details</u>		
Storage is	Online Cover Level	(m) 26 500	
	ourrie cover never	(11) 20.000	
<u>Cellu</u>	<u>lar Storage Struc</u>	<u>cture</u>	
In	vert Level (m) 25.4	00 Safety Factor 2.0	
Infiltration Coefficie	nt Base (m/hr) 0.000 nt Side (m/hr) 0.000	00 Porosity 0.95	
	ne bide (m/ni) 0.000		
Depth (m) Area (m²) Inf. Area (m²) Depth (m	n) Area (m²) Inf. Ar	ea (m²) Depth (m) Area	(m ²) Inf. Area (m ²)
0.000 18.0 18.0 0.80	18.0	31.6 0.900	0.0 32.4
<u>Hydro-</u>	Brake® Outflow Co	ontrol	
Design Head (m) 0.800 Hydro Design Flow (l/s) 5.0 D	-Brake® Type Md5 SW iameter (mm)	Only Invert Level (m) 96	25.400
Depth (m) Flow (l/s) Depth (m) Flow (l/s)	Depth (m) Flow (l/s)	Depth (m) Flow (1/s)	Depth (m) Flow (l/s)
0.100 2.7 0.800 5.0	2.000 7.8	4.000 11.1	7.000 14.7
0.200 3.6 1.000 5.5	2.200 8.2	4.500 11.8	7.500 15.2
0.300 3.5 1.200 6.1	2.400 8.6	5.000 12.4	8.000 15.7
0.400 3.7 1.400 6.6	2.600 8.9	5.500 13.0	8.500 16.2
	3.000 9.6	6.000 13.6	9.000 16.6
0.000 4.5 1.000 7.4	5.500 10.4	0.300 14.1	9.300 17.1

Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:17	Designed by Tim.Trotman	
File Plot 3 - VARS - 1 in 30yr.srcx	Checked by	Dialitatie
Innovyze	Source Control 2015.1	•

Summary of Results for 30 year Return Period

Half Drain Time : 18 minutes.

	Storm	L	Max	Max	Max	Max	Max	Мах	Status
	Event		Level	Depth	Infiltration	Control	Σ Outflow	Volume	
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
15	min S	Summer	25.713	0.313	0.0	3.6	3.6	5.3	ОК
30	min S	Summer	25.740	0.340	0.0	3.6	3.6	5.8	ОК
60	min S	Summer	25.720	0.320	0.0	3.6	3.6	5.5	ΟK
120	min S	Summer	25.643	0.243	0.0	3.6	3.6	4.2	ΟK
180	min S	Summer	25.581	0.181	0.0	3.6	3.6	3.1	ΟK
240	min S	Summer	25.544	0.144	0.0	3.4	3.4	2.5	ΟK
360	min S	Summer	25.505	0.105	0.0	2.8	2.8	1.8	ΟK
480	min S	Summer	25.487	0.087	0.0	2.4	2.4	1.5	ΟK
600	min S	Summer	25.476	0.076	0.0	2.0	2.0	1.3	ΟK
720	min S	Summer	25.468	0.068	0.0	1.8	1.8	1.2	ΟK
960	min S	Summer	25.458	0.058	0.0	1.4	1.4	1.0	ΟK
1440	min S	Summer	25.446	0.046	0.0	1.1	1.1	0.8	ΟK
2160	min S	Summer	25.436	0.036	0.0	0.8	0.8	0.6	ΟK
2880	min S	Summer	25.431	0.031	0.0	0.6	0.6	0.5	ΟK
4320	min S	Summer	25.425	0.025	0.0	0.4	0.4	0.4	ΟK
5760	min S	Summer	25.422	0.022	0.0	0.3	0.3	0.4	ΟK
7200	min S	Summer	25.419	0.019	0.0	0.3	0.3	0.3	ΟK
8640	min S	Summer	25.418	0.018	0.0	0.3	0.3	0.3	ΟK
10080	min S	Summer	25.416	0.016	0.0	0.2	0.2	0.3	ΟK
15	min V	Winter	25.758	0.358	0.0	3.6	3.6	6.1	ΟK
30	min V	Winter	25.785	0.385	0.0	3.7	3.7	6.6	O K
60	min V	Winter	25.746	0.346	0.0	3.6	3.6	5.9	ΟK
120	min V	Winter	25.626	0.226	0.0	3.6	3.6	3.9	ΟK
180	min V	Winter	25.549	0.149	0.0	3.4	3.4	2.5	ΟK
240	min V	Winter	25.513	0.113	0.0	3.0	3.0	1.9	ΟK
360	min V	Winter	25.483	0.083	0.0	2.3	2.3	1.4	ΟK

Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15	min	Summer	81.719	0.0	7.5	19
30	min	Summer	52.383	0.0	9.6	27
60	min	Summer	32.061	0.0	11.8	44
120	min	Summer	19.041	0.0	14.0	76
180	min	Summer	13.895	0.0	15.3	106
240	min	Summer	11.067	0.0	16.3	134
360	min	Summer	8.018	0.0	17.7	192
480	min	Summer	6.376	0.0	18.7	252
600	min	Summer	5.334	0.0	19.6	312
720	min	Summer	4.609	0.0	20.3	372
960	min	Summer	3.659	0.0	21.5	494
1440	min	Summer	2.640	0.0	23.3	738
2160	min	Summer	1.903	0.0	25.2	1104
2880	min	Summer	1.507	0.0	26.6	1456
4320	min	Summer	1.085	0.0	28.7	2200
5760	min	Summer	0.858	0.0	30.3	2896
7200	min	Summer	0.716	0.0	31.6	3600
8640	min	Summer	0.617	0.0	32.6	4376
10080	min	Summer	0.544	0.0	33.6	5032
15	min	Winter	81.719	0.0	8.4	19
30	min	Winter	52.383	0.0	10.8	29
60	min	Winter	32.061	0.0	13.2	48
120	min	Winter	19.041	0.0	15.7	80
180	min	Winter	13.895	0.0	17.1	108
240	min	Winter	11.067	0.0	18.2	136
360	min	Winter	8.018	0.0	19.8	194
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:17	Designed by Tim.Trotman	
File Plot 3 - VARS - 1 in 30yr.srcx	Checked by	Digiligh
Innovyze	Source Control 2015.1	

	Stor	m	Max	Max	Max	Max	Max	Max	Statu
	Even	t	Level	Depth	Infiltration	Control X	Coutflow	Volume	
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
480	min	Winter	25.469	0.069	0.0	1.8	1.8	1.2	0 1
600	min	Winter	25.460	0.060	0.0	1.5	1.5	1.0	0
720	min	Winter	25.454	0.054	0.0	1.3	1.3	0.9	0
960	min	Winter	25.446	0.046	0.0	1.1	1.1	0.8	0
1440	min	Winter	25.437	0.037	0.0	0.8	0.8	0.6	0
2160	min	Winter	25.429	0.029	0.0	0.5	0.5	0.5	0
2880	min	Winter	25.425	0.025	0.0	0.4	0.4	0.4	0
4320	min	Winter	25.420	0.020	0.0	0.3	0.3	0.4	0
5760	min	Winter	25.418	0.018	0.0	0.3	0.3	0.3	0
7200	min	Winter	25.416	0.016	0.0	0.2	0.2	0.3	0
8640	min	Winter	25.414	0.014	0.0	0.2	0.2	0.2	0
10080	min	Winter	25.413	0.013	0.0	0.2	0.2	0.2	0

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	6.376	0.0	21.0	252
600	min	Winter	5.334	0.0	21.9	312
720	min	Winter	4.609	0.0	22.8	376
960	min	Winter	3.659	0.0	24.1	494
1440	min	Winter	2.640	0.0	26.1	738
2160	min	Winter	1.903	0.0	28.2	1104
2880	min	Winter	1.507	0.0	29.8	1432
4320	min	Winter	1.085	0.0	32.1	2208
5760	min	Winter	0.858	0.0	33.9	2864
7200	min	Winter	0.716	0.0	35.3	3656
8640	min	Winter	0.617	0.0	36.5	4312
10080	min	Winter	0.544	0.0	37.6	5096

Infrastruct CS Ltd		Page 3
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:17	Designed by Tim.Trotman	
File Plot 3 - VARS - 1 in 30yr.srcx	Checked by	Digitight
Innovyze	Source Control 2015.1	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.049

								P	age 4
he Stables									
igh Cogges,	Witney								4
xfordshire									Misso
ate 15/10/20	20 17:17	7		Designe	ed by Tim.	.Trotman			
ile Plot 3 -	VARS -	1 in 30y	r.srcx	Checked	d by				Urainage
nnovyze				Source	Control 2	2015.1			
				<u>Model</u>	<u>Details</u>				
			Storago is	online Co	wor Iowol	(m) 26 50(C		
			Storage is	onitine co	over rever	(111) 20.000			
			Cell	ular Stor	age Struc	ture			
		Infiltrati	I On Coeffici	nvert Level ont Base (r	1 (m) 25.4	00 Safety	Factor 2.0		
		Infiltrati	on Coeffici	ent Side (r	n/hr) 0.000	00	0103109 0.93		
		_							
Depth (m) A	rea (m²)	Inf. Area ((m ²) Depth	(m) Area (n	1 ²) Inf. Are	ea (m²) D	epth (m) Are	a (m²) Inf	. Area (m²)
0 000									
0.000	18.0	1	.8.0 0.8	300 18	3.0	31.6	0.900	0.0	32.4
0.000	18.0	1	.8.0 0.8	-Brake® (3.0 Dutflow Co	31.6	0.900	0.0	32.4
0.000	18.0	1	.8.0 0.8 <u>Hydro</u>	-Brake® C	3.0 Dutflow Co	31.6	0.900	0.0	32.4
0.000	18.0 Desig] Jn Head (m)	.8.0 0.8 <u>Hydro</u> 0.800 Hydr	-Brake® C -Brake® T	3.0 Dutflow Co Ype Md5 SW	31.6 ontrol Only Inve	0.900 rt Level (m)	0.0 25.400	32.4
0.000	18.0 Design] Jn Head (m) Flow (l/s)	.8.0 0.8 <u>Hydro</u> 0.800 Hydr 5.0	-Brake® C o-Brake® T Diameter (1	3.0 Dutflow Co ype Md5 SW mm)	31.6 ontrol Only Inve 96	0.900 rt Level (m)	0.0 25.400	32.4
Depth (m) F	18.0 Desig Design low (1/s)	jn Head (m) Flow (l/s) Depth (m)	.8.0 0.8 <u>Hydro</u> 0.800 Hydr 5.0 Flow (1/s)	BOO 18 -Brake® C O-Brake® T Diameter (1) Depth (m)	3.0 Outflow Cc ype Md5 SW nm) Flow (l/s)	31.6 ontrol Only Inve 96	0.900 rt Level (m)) Flow (1/s)	0.0 25.400 Depth (m)	32.4 Flow (1/s)
Depth (m) F	18.0 Desig Design low (1/s) 2.7	gn Head (m) Flow (1/s) Depth (m) 0.800	.8.0 0.8 <u>Hydro</u> 0.800 Hydr 5.0 Flow (1/s) 5.0	BOO 18 <u>-Brake® C</u> o-Brake® T Diameter (1) Depth (m) 2.000	3.0 Dutflow Co ype Md5 SW mm) Flow (1/s) 7.8	31.6 ontrol Only Inve 96 Depth (m) 4.000	0.900 rt Level (m)) Flow (1/s)	0.0 25.400 Depth (m) 7.000	32.4 Flow (1/s) 14.7
Depth (m) F 0.100 0.200	18.0 Design low (1/s) 2.7 3.6	<pre>gn Head (m) Flow (1/s) Depth (m)</pre>	.8.0 0.8 <u>Hydro</u> 0.800 Hydr 5.0 Flow (1/s) 5.0 5.0 5.5	BOO 18 -Brake® C o-Brake® T Diameter (1) Depth (m) 2.000 2.200	3.0 Dutflow Co ype Md5 SW nm) Flow (1/s) 7.8 8.2	31.6 ontrol Only Inve 96 Depth (m) 4.000 4.500	0.900 rt Level (m)) Flow (1/s) 0 11.1 0 11.8	0.0 25.400 Depth (m) 7.000 7.500	32.4 Flow (1/s) 14.7 15.2
Depth (m) F 0.100 0.200 0.300	18.0 Design low (1/s) 2.7 3.6 3.5	gn Head (m) Flow (1/s) Depth (m) 0.800 1.000 1.200	.8.0 0.8 <u>Hydro</u> 0.800 Hydr 5.0 Flow (1/s) 5.0 5.5 6.1	300 18 <u>-Brake® C</u> o-Brake® T Diameter (n) Depth (m) 2.000 2.200 2.400	3.0 Dutflow Co ype Md5 SW mm) Flow (1/s) 7.8 8.2 8.6	31.6 ontrol Only Inve 96 Depth (m) 4.000 4.500 5.000	0.900 rt Level (m)) Flow (1/s) 0 11.1 0 11.8 0 12.4	0.0 25.400 Depth (m) 7.000 7.500 8.000	32.4 Flow (1/s) 14.7 15.2 15.7
Depth (m) F 0.100 0.200 0.300 0.400	18.0 Design low (1/s) 2.7 3.6 3.5 3.7	gn Head (m) Flow (1/s) Depth (m) 0.800 1.000 1.200 1.400	.8.0 0.8 <u>Hydro</u> 0.800 Hydr 5.0 Flow (1/s) 5.0 5.5 6.1 6.6	300 18 -Brake® C C o-Brake® T Diameter (n) Diameter (m) 2.000 2.200 2.200 2.400 2.600	3.0 Outflow Co ype Md5 SW nm) Flow (1/s) 7.8 8.2 8.6 8.9	31.6 ontrol Only Inve 96 Depth (m) 4.000 4.500 5.500	0.900 rt Level (m)) Flow (1/s) 0 11.1 0 11.8 0 12.4 0 13.0	0.0 25.400 Depth (m) 7.000 7.500 8.000 8.500	32.4 Flow (1/s) 14.7 15.2 15.7 16.2
Depth (m) F 0.100 0.200 0.300 0.400 0.500	18.0 Design low (1/s) 2.7 3.6 3.5 3.7 4.0	gn Head (m) Flow (1/s) Depth (m) 0.800 1.000 1.200 1.400 1.600	.8.0 0.8 <u>Hydro</u> 0.800 Hydr 5.0 Flow (1/s) 5.0 5.5 6.1 6.6 7.0	300 18 -Brake® C 0 o-Brake® T 1 Diameter (n) 1 Depth (m) 2.000 2.200 2.400 2.600 3.000	3.0 <u>)utflow Cc</u> ype Md5 SW mm) Flow (1/s) 7.8 8.2 8.6 8.9 9.6	31.6 ontrol Only Inve 96 Depth (m) 4.000 4.500 5.500 6.000	0.900 rt Level (m)) Flow (1/s) 0 11.1 0 11.8 0 12.4 0 13.0 0 13.6	0.0 25.400 Depth (m) 7.000 7.500 8.000 8.500 9.000	32.4 Flow (1/s) 14.7 15.2 15.7 16.2 16.6

INFRASTRUCT CS LTD		Page 1
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 17:31	Designed by Tim	
File Plot 3 - VARS.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 26 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Ma Infiltı (1/	x ration s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Sum	mer 25.980	0.580		0.0	4.2	4.2	9.9	ОК
30 min Sum	mer 26.047	0.647		0.0	4.5	4.5	11.1	ΟK
60 min Sum	mer 26.044	0.644		0.0	4.5	4.5	11.0	ΟK
120 min Sum	mer 25.959	0.559		0.0	4.2	4.2	9.6	ΟK
180 min Sum	mer 25.870	0.470		0.0	3.9	3.9	8.0	ΟK
240 min Sum	mer 25.786	0.386		0.0	3.7	3.7	6.6	ΟK
360 min Sum	mer 25.648	0.248		0.0	3.6	3.6	4.2	ΟK
480 min Sum	mer 25.568	0.168		0.0	3.5	3.5	2.9	ОК
600 min Sum	mer 25.530	0.130		0.0	3.2	3.2	2.2	ОК
720 min Sum	mer 25.510	0.110		0.0	2.9	2.9	1.9	OK
960 min Sum	mer 25.488	0.088		0.0	2.4	2.4	1.5	OK
1440 min Sum	mer 25.46/	0.067		0.0	1 2	1.7	1.1	OK
2160 min Sum	mer 25.452	0.052		0.0	1.0	1.3	0.9	OK
4320 min Sum	mer 25 /35	0.044		0.0	1.0	1.0	0.7	0 K
5760 min Sum	mer 25.430	0.030		0.0	0.7	0.7	0.0	O K
7200 min Sum	mer 25 426	0.030		0.0	0.0	0.0	0.3	0 K
8640 min Sum	mer 25 424	0 024		0.0	0.4	0.4	0.4	0 K
10080 min Sum	mer 25.422	0.022		0.0	0.3	0.3	0.4	0 K
15 min Win	ter 26.059	0.659		0.0	4.5	4.5	11.3	ОК
30 min Win	ter 26.139	0.739		0.0	4.8	4.8	12.6	ОК
60 min Win	ter 26.125	0.725		0.0	4.7	4.7	12.4	ОК
120 min Win	ter 25.995	0.595		0.0	4.3	4.3	10.2	ОК
180 min Win	ter 25.864	0.464		0.0	3.9	3.9	7.9	ОК
240 min Win	ter 25.742	0.342		0.0	3.6	3.6	5.8	ОК
360 min Win	ter 25.567	0.167		0.0	3.5	3.5	2.9	ОК
480 min Win	ter 25.515	0.115		0.0	3.0	3.0	2.0	ΟK
600 min Win	ter 25.494	0.094		0.0	2.5	2.5	1.6	ΟK
		Stor	m	Rain	Time-1	Peak		
		Even	t	(mm/hr) (min	s)		
		15 min	Summer	138.22	0	20		
		30 min	Summer	89.26	6	29		
		60 min	Summer	54.81	7	46		
	1	20 min	Summer	32.51	1	80		
	1	80 min	Summer	23.64	3	114		
	2	40 min	Summer	18.75	7	146		
	3	60 min	Summer	13.51	.7	204		
	4	80 min	Summer	10.71	0	260		
	6	00 min	Summer	8.93	5	316		
	/	20 min	Summer	6.00	2	3/4		
	9 1 A	40 min	Summer	0.00	9 7	494		
	21	40 min	Summer	3 12	, 7 .	1104		
	21	80 min	Summer	2 46	5 -	1464		
	43	20 min	Summer	1.76	1 2	2156		
	57	60 min	Summer	1.38	7 2	2872		
	72	00 min	Summer	1.15	1 ;	3576		
	86	40 min	Summer	0.98	8 4	4392		
	100	80 min	Summer	0.86	9 !	5128		
		15 min	Winter	138.22	0	20		
		30 min	Winter	89.26	6	31		
		60 min	Winter	54.81	7	50		
	1	20 min	Winter	32.51	1	86		
	1	80 min	Winter	23.64	3	122		
	2	40 min	Winter	18.75	7	154		
	3	60 min	Winter	13.51	7	204		
	4	80 min	Winter	10.71	0	258		
	6	00 min	Winter	8.93	5	316		
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INFRASTRUCT CS LTD		Page 2
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 17:31	Designed by Tim	
File Plot 3 - VARS.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

	<u>Summa</u>	ary c	of Resu	ults f	for 100) year	Return	Period	(+30%)	
	Storm Event		Max Level	Max Depth	Ma Infilt	x ration	Max Control Σ	Max Outflow	Max Volume	Status
			(m)	(m)	(1/	s)	(1/s)	(1/s)	(m³)	
720	min Wi	nter	25.482	0.082		0.0	2.2	2.2	1.4	ОК
960	min Wi	nter	25.467	0.067		0.0	1.8	1.8	1.1	ΟK
1440	min Wi	nter	25.452	0.052		0.0	1.3	1.3	0.9	ΟK
2160	min Wi	nter	25.441	0.041		0.0	0.9	0.9	0.7	ΟK
2880	min Wi	nter	25.435	0.035		0.0	0.7	0.7	0.6	ΟK
4320	min Wi	nter	25.428	0.028		0.0	0.5	0.5	0.5	ΟK
5760	min Wi	nter	25.424	0.024		0.0	0.4	0.4	0.4	ΟK
7200	min Wi	nter	25.421	0.021		0.0	0.3	0.3	0.4	ΟK
8640	min Wi	nter	25.419	0.019		0.0	0.3	0.3	0.3	ΟK
10080	min Wi	nter	25.418	0.018		0.0	0.3	0.3	0.3	ΟK
				Stor	m	Rain	Time-Pe	ak		
				Even	t	(mm/hr) (mins)			
			72	20 min	Winter	7.70	2 3	74		
			96	50 min	Winter	6.08	9 4	94		
			144	40 min	Winter	4.36	7 7	2.8		
			216	50 min	Winter	3.12	7 10	84		
			288	30 min	Winter	2.46	5 14	68		
			432	20 min	Winter	1.76	1 21	92		
			576	50 min	Winter	1.38	7 29	36		
			720	00 min	Winter	1.15	1 36	72		
			864	40 min	Winter	0.98	8 43	12		
			1008	30 min	Winter	0.86	9 49	68		

INFRASTRUCT CS LTD	Page 3	
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 17:31	Designed by Tim	
File Plot 3 - VARS.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region 1	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

<u>Time / Area Diagram</u>

Time	Area	Time	Area	
(mins)	(ha)	(mins)	(ha)	
0-4	0.000	4-8	0.049	

INFRASTRUCT CS LTD		Page 4
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 17:31	Designed by Tim	DESTRECT
File Plot 3 - VARS.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Model Details

Storage is Online Cover Level (m) 26.500

Cellular Storage Structure

Invert Level (m) 25.400 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²)

0.000 18.0 18.0	0.800	18.0	31.6	0.900	0.0	32.4
-----------------	-------	------	------	-------	-----	------

Hydro-Brake® Outflow Control

Design Head (m) 0.800 Hydro-Brake® Type Md5 SW Only Invert Level (m) 25.400 Design Flow (l/s) 5.0 Diameter (mm) 96

Depth (m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	Depth	(m)	Flow	(1/s)	Depth	(m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)
0.100		2.7	0.	.800		5.0	2.	000		7.8	4.	.000		11.1	7	.000		14.7
0.200		3.6	1.	.000		5.5	2.	200		8.2	4.	.500		11.8	7	.500		15.2
0.300		3.5	1.	.200		6.1	2.	400		8.6	5.	.000		12.4	8	.000		15.7
0.400		3.7	1.	.400		6.6	2.	600		8.9	5.	.500		13.0	8	.500		16.2
0.500		4.0	1.	.600		7.0	3.	000		9.6	6.	.000		13.6	9	.000		16.6
0.600		4.3	1.	.800		7.4	3.	500		10.4	6.	.500		14.1	9	.500		17.1

Appendix D – Plot 4, Newlands



NL-ISS-XX-00-DR-C-346

Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:19	Designed by Tim.Trotman	
File Plot 4 - NL - 1 in 2yr.srcx	Checked by	Dialitatie
Innovyze	Source Control 2015.1	

Summary of Results for 2 year Return Period

Half Drain Time : 7 minutes.

	Storm Event	1	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15	min S	Summer	21.801	0.151	0.0	3.4	3.4	1.8	ОК
30	min S	Summer	21.802	0.152	0.0	3.4	3.4	1.8	ΟK
60	min S	Summer	21.777	0.127	0.0	3.2	3.2	1.5	ΟK
120	min S	Summer	21.745	0.095	0.0	2.6	2.6	1.1	ΟK
180	min S	Summer	21.728	0.078	0.0	2.1	2.1	0.9	ΟK
240	min S	Summer	21.718	0.068	0.0	1.8	1.8	0.8	ΟK
360	min S	Summer	21.705	0.055	0.0	1.4	1.4	0.7	ΟK
480	min S	Summer	21.698	0.048	0.0	1.1	1.1	0.6	ΟK
600	min S	Summer	21.692	0.042	0.0	0.9	0.9	0.5	ΟK
720	min S	Summer	21.689	0.039	0.0	0.8	0.8	0.5	ΟK
960	min S	Summer	21.684	0.034	0.0	0.7	0.7	0.4	ΟK
1440	min S	Summer	21.677	0.027	0.0	0.5	0.5	0.3	ΟK
2160	min S	Summer	21.672	0.022	0.0	0.4	0.4	0.3	ΟK
2880	min S	Summer	21.670	0.020	0.0	0.3	0.3	0.2	ΟK
4320	min S	Summer	21.666	0.016	0.0	0.2	0.2	0.2	ΟK
5760	min S	Summer	21.664	0.014	0.0	0.2	0.2	0.2	ΟK
7200	min S	Summer	21.663	0.013	0.0	0.2	0.2	0.1	ΟK
8640	min S	Summer	21.662	0.012	0.0	0.1	0.1	0.1	ОК
10080	min S	Summer	21.661	0.011	0.0	0.1	0.1	0.1	ОК
15	min V	Winter	21.817	0.167	0.0	3.5	3.5	2.0	ОК
30	min V	Winter	21.808	0.158	0.0	3.5	3.5	1.9	ОК
60	min V	Winter	21.769	0.119	0.0	3.1	3.1	1.4	ОК
120	min V	Winter	21.732	0.082	0.0	2.2	2.2	1.0	ОК
180	min V	Winter	21.715	0.065	0.0	1.7	1.7	0.8	ОК
240	min V	Winter	21.706	0.056	0.0	1.4	1.4	0.7	ОК
360	min V	Winter	21.695	0.045	0.0	1.0	1.0	0.5	ОК

Storm		Rain	Flooded	Discharge	Time-Peak	
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	42.980	0.0	3.2	16
30	min	Summer	27.473	0.0	4.1	24
60	min	Summer	16.881	0.0	5.1	40
120	min	Summer	10.146	0.0	6.1	70
180	min	Summer	7.490	0.0	6.7	100
240	min	Summer	6.029	0.0	7.2	130
360	min	Summer	4.425	0.0	8.0	190
480	min	Summer	3.548	0.0	8.5	250
600	min	Summer	2.988	0.0	9.0	312
720	min	Summer	2.597	0.0	9.3	372
960	min	Summer	2.080	0.0	10.0	494
1440	min	Summer	1.522	0.0	11.0	738
2160	min	Summer	1.113	0.0	12.0	1104
2880	min	Summer	0.892	0.0	12.8	1460
4320	min	Summer	0.652	0.0	14.1	2172
5760	min	Summer	0.522	0.0	15.0	2936
7200	min	Summer	0.439	0.0	15.8	3632
8640	min	Summer	0.382	0.0	16.5	4336
10080	min	Summer	0.339	0.0	17.1	5096
15	min	Winter	42.980	0.0	3.6	17
30	min	Winter	27.473	0.0	4.6	26
60	min	Winter	16.881	0.0	5.7	42
120	min	Winter	10.146	0.0	6.8	72
180	min	Winter	7.490	0.0	7.5	102
240	min	Winter	6.029	0.0	8.1	132
360	min	Winter	4.425	0.0	8.9	192
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:19	Designed by Tim.Trotman	
File Plot 4 - NL - 1 in 2yr.srcx	Checked by	Diamaye
Innovyze	Source Control 2015.1	

	Stor	m	Max	Max	Max	Max	Max	Max	Status
	Even	t	Level	Depth	Infiltration	Control S	Outflow	Volume	
			(m)	(m)	(1/s)	(l/s)	(l/s)	(m³)	
480	min	Winter	21.689	0.039	0.0	0.8	0.8	0.5	0
600	min	Winter	21.685	0.035	0.0	0.7	0.7	0.4	0
720	min	Winter	21.681	0.031	0.0	0.6	0.6	0.4	0
960	min	Winter	21.677	0.027	0.0	0.5	0.5	0.3	0
1440	min	Winter	21.672	0.022	0.0	0.4	0.4	0.3	0
2160	min	Winter	21.668	0.018	0.0	0.3	0.3	0.2	0
2880	min	Winter	21.666	0.016	0.0	0.2	0.2	0.2	0
4320	min	Winter	21.663	0.013	0.0	0.2	0.2	0.2	0
5760	min	Winter	21.661	0.011	0.0	0.1	0.1	0.1	0
7200	min	Winter	21.660	0.010	0.0	0.1	0.1	0.1	0
8640	min	Winter	21.659	0.009	0.0	0.1	0.1	0.1	0
10080	min	Winter	21.659	0.009	0.0	0.1	0.1	0.1	0

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	3.548	0.0	9.5	250
600	min	Winter	2.988	0.0	10.0	312
720	min	Winter	2.597	0.0	10.5	374
960	min	Winter	2.080	0.0	11.2	494
1440	min	Winter	1.522	0.0	12.3	716
2160	min	Winter	1.113	0.0	13.5	1092
2880	min	Winter	0.892	0.0	14.4	1408
4320	min	Winter	0.652	0.0	15.8	2188
5760	min	Winter	0.522	0.0	16.8	2936
7200	min	Winter	0.439	0.0	17.7	3560
8640	min	Winter	0.382	0.0	18.5	4408
10080	min	Winter	0.339	0.0	19.1	5088

Infrastruct CS Ltd		Page 3
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:19	Designed by Tim.Trotman	
File Plot 4 - NL - 1 in 2yr.srcx	Checked by	Diginarie
Innovyze	Source Control 2015.1	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.040

Infrastruct CS Ltd						F	age 4
The Stables							
High Cogges, Witney							<u>Y</u>
Oxfordshire							Micco
Date 15/10/2020 17:19		Designed k	y Tim.	Trotman			
File Plot 4 - NL - 1 in 2yr.srcx		Checked by	7				Digiliga
Innovyze	1	Source Cor	itrol 2	2015.1			
		<u>Model Deta</u>	<u>ails</u>				
	· ·						
Stor	age is C	nline Cover	Level	(m) 23.850			
	Cellul	ar Storage	Struc	ture			
				<u> </u>			
	Inve	ert Level (m) 21.6	50 Safety	Factor 2.0		
Infiltration Coe	efficient	t Base (m/hr) 0.000	00 Po	rosity 0.95		
Inflitration Coe	erricient	t Side (m/nr) 0.000	00			
Depth (m) Area (m ²) Inf. Area (m ²)	epth (m)	Area (m²)	Inf. Are	ea (m²) Dej	oth (m) Area	a (m²) Inf	. Area (m²)
0.000 12.5 12.5	0.800	12.5		23.8	0.900	0.0	24.5
Ŀ	<u>lydro-B</u>	rake® Outf	low Co	ntrol			
Design Head (m) 0.800) Hydro-1	Brake® Type	Md5 SW	Only Inver	t Level (m)	21.650	
Design Flow (1/S) 5.0) DIG	ameter (mm)		90			
Depth (m) Flow (l/s) Depth (m) Flow	(1/s) De	pth (m) Flow	v (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100 2.7 0.800	5.0	2.000	7.8	4.000	11.1	7.000	14.7
0.200 3.6 1.000	5.5	2.200	8.2	4.500	11.8	7.500	15.2
0.300 3.5 1.200	6.1	2.400	8.6	5.000	12.4	8.000	15.7
0.400 3.7 1.400	6.6	2.600	8.9	5.500	13.0	8.500	16.2
0.500 4.0 1.600	7.0	3.000	9.6	6.000	13.6	9.000	16.6
0.600 4.3 1.800	7.4	3.500	10.4	6.500	14.1	9.500	17.1

Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:20	Designed by Tim.Trotman	
File Plot 4 - NL - 1 in 30yr.srcx	Checked by	Diamaye
Innovyze	Source Control 2015.1	

Summary of Results for 30 year Return Period

Half Drain Time : 13 minutes.

	Storm Event		Max Level	Max Depth	Max Infiltration	Max Control	Max Σ Outflow	Max Volume	Status
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m ³)	
15	min S	Summer	21.988	0.338	0.0	3.6	3.6	4.0	ОК
30	min S	Summer	22.006	0.356	0.0	3.6	3.6	4.2	ОК
60	min S	Summer	21.964	0.314	0.0	3.6	3.6	3.7	ОК
120	min S	Summer	21.864	0.214	0.0	3.6	3.6	2.5	ОК
180	min S	Summer	21.802	0.152	0.0	3.4	3.4	1.8	ОК
240	min S	Summer	21.770	0.120	0.0	3.1	3.1	1.4	ΟK
360	min S	Summer	21.740	0.090	0.0	2.4	2.4	1.1	ΟK
480	min S	Summer	21.725	0.075	0.0	2.0	2.0	0.9	ΟK
600	min S	Summer	21.715	0.065	0.0	1.7	1.7	0.8	ΟK
720	min S	Summer	21.709	0.059	0.0	1.5	1.5	0.7	ΟK
960	min S	Summer	21.700	0.050	0.0	1.2	1.2	0.6	ΟK
1440	min S	Summer	21.690	0.040	0.0	0.9	0.9	0.5	ΟK
2160	min S	Summer	21.682	0.032	0.0	0.6	0.6	0.4	ΟK
2880	min S	Summer	21.677	0.027	0.0	0.5	0.5	0.3	ΟK
4320	min S	Summer	21.672	0.022	0.0	0.4	0.4	0.3	ΟK
5760	min S	Summer	21.669	0.019	0.0	0.3	0.3	0.2	ΟK
7200	min S	Summer	21.667	0.017	0.0	0.2	0.2	0.2	ΟK
8640	min S	Summer	21.666	0.016	0.0	0.2	0.2	0.2	ΟK
10080	min S	Summer	21.664	0.014	0.0	0.2	0.2	0.2	ΟK
15	min W	Vinter	22.036	0.386	0.0	3.7	3.7	4.6	ΟK
30	min W	Vinter	22.049	0.399	0.0	3.7	3.7	4.7	O K
60	min W	Vinter	21.978	0.328	0.0	3.6	3.6	3.9	ΟK
120	min W	Vinter	21.829	0.179	0.0	3.6	3.6	2.1	ΟK
180	min W	Vinter	21.767	0.117	0.0	3.1	3.1	1.4	ΟK
240	min W	Vinter	21.743	0.093	0.0	2.5	2.5	1.1	ΟK
360	min W	Vinter	21.721	0.071	0.0	1.9	1.9	0.8	ΟK

	Stor Even	m .t	Rain (mm/hr)	Flooded Volume	Discharge Volume	Time-Peak (mins)
				()	(
15	min	Summer	81.719	0.0	6.1	18
30	min	Summer	52.383	0.0	7.9	26
60	min	Summer	32.061	0.0	9.6	44
120	min	Summer	19.041	0.0	11.4	74
180	min	Summer	13.895	0.0	12.5	102
240	min	Summer	11.067	0.0	13.3	132
360	min	Summer	8.018	0.0	14.4	190
480	min	Summer	6.376	0.0	15.3	250
600	min	Summer	5.334	0.0	16.0	312
720	min	Summer	4.609	0.0	16.6	372
960	min	Summer	3.659	0.0	17.6	494
1440	min	Summer	2.640	0.0	19.0	736
2160	min	Summer	1.903	0.0	20.5	1104
2880	min	Summer	1.507	0.0	21.7	1436
4320	min	Summer	1.085	0.0	23.4	2180
5760	min	Summer	0.858	0.0	24.7	2936
7200	min	Summer	0.716	0.0	25.8	3624
8640	min	Summer	0.617	0.0	26.6	4376
10080	min	Summer	0.544	0.0	27.4	5096
15	min	Winter	81.719	0.0	6.9	19
30	min	Winter	52.383	0.0	8.8	28
60	min	Winter	32.061	0.0	10.8	46
120	min	Winter	19.041	0.0	12.8	76
180	min	Winter	13.895	0.0	14.0	104
240	min	Winter	11.067	0.0	14.9	132
360	min	Winter	8.018	0.0	16.2	190
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:20	Designed by Tim.Trotman	
File Plot 4 - NL - 1 in 30yr.srcx	Checked by	Digiliada
Innovvze	Source Control 2015.1	

	Storm		Max	Max	Max	Max	Max S Outflow	Max	Status
	Evenc		(m)	(m)	(1/s)	(1/s)	(1/s)	(m ³)	
480	min W	Vinter	21.709	0.059	0.0	1.5	1.5	0.7	Οŀ
600	min W	Vinter	21.702	0.052	0.0	1.3	1.3	0.6	ΟK
720	min W	Vinter	21.697	0.047	0.0	1.1	1.1	0.6	Οŀ
960	min W	Vinter	21.690	0.040	0.0	0.9	0.9	0.5	O F
1440	min W	Vinter	21.682	0.032	0.0	0.6	0.6	0.4	O F
2160	min W	Vinter	21.676	0.026	0.0	0.5	0.5	0.3	O F
2880	min W	Vinter	21.672	0.022	0.0	0.4	0.4	0.3	O F
4320	min W	Vinter	21.668	0.018	0.0	0.3	0.3	0.2	O F
5760	min W	Vinter	21.666	0.016	0.0	0.2	0.2	0.2	O F
7200	min W	Vinter	21.664	0.014	0.0	0.2	0.2	0.2	O F
8640	min W	Vinter	21.663	0.013	0.0	0.2	0.2	0.1	OF
10080	min W	Vinter	21.662	0.012	0.0	0.1	0.1	0.1	ΟF

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	6.376	0.0	17.1	250
600	min	Winter	5.334	0.0	17.9	312
720	min	Winter	4.609	0.0	18.6	370
960	min	Winter	3.659	0.0	19.7	484
1440	min	Winter	2.640	0.0	21.3	740
2160	min	Winter	1.903	0.0	23.0	1080
2880	min	Winter	1.507	0.0	24.3	1456
4320	min	Winter	1.085	0.0	26.2	2200
5760	min	Winter	0.858	0.0	27.7	2912
7200	min	Winter	0.716	0.0	28.9	3648
8640	min	Winter	0.617	0.0	29.8	4256
10080	min	Winter	0.544	0.0	30.7	5040

Infrastruct CS Ltd		Page 3
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:20	Designed by Tim.Trotman	
File Plot 4 - NL - 1 in 30yr.srcx	Checked by	Digitige
Innovyze	Source Control 2015.1	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.040

Infrastruct CS Lt	d						P	age 4
The Stables								
High Cogges, Witr	ney							4
Oxfordshire								Micco
Date 15/10/2020 1	7:20		Designe	d by Tim.	Trotman			
File Plot 4 - NL	- 1 in 30yr	srcx	Checked	by				Drainage
Innovyze	-		Source (Control 2	2015.1			
			<u>Model D</u>	<u>etails</u>				
		Storage is	Online Cov	ver Level	(m) 23.850			
		Cell	ular Stora	ige Struc	<u>ture</u>			
	T. 611+	I: I:	nvert Level	(m) 21.6	50 Safety	Factor 2.0		
	Infiltrat	ion Coeffici	ent Base (m, ent Side (m,	'nr) 0.000 'hr) 0.000	00 PO. 00	rosity 0.95		
			(,	,				
Depth (m) Area	(m²) Inf. Area	(m ²) Depth (m) Area (m²) Inf. Are	ea (m²) Deg	oth (m) Area	a (m²) Inf	. Area (m²)
0.000	.2.5	12.5 0.8	12.	5	23.8	0.900	0.0	24.5
		<u>Hydro</u>	-Brake® Ou	tflow Co	<u>ntrol</u>			
							01 650	
De	Design Head (m sign Flow (l/s) 0.800 Hydr) 5.0	o-Brake® Ty Diameter (m	pe Md5 SW n)	Only Inver 96	t Level (m)	21.650	
Depth (m) Flow	(1/S) Depth (m)	Flow (1/s)	Deptn (m) H	10W (1/S)	Deptn (m)	Flow (1/S)	Deptn (m)	FIOW (I/S)
0.100	2.7 0.800	5.0	2.000	7.8	4.000	11.1	7.000	14.7
0.200	3.6 1.000	5.5	2.200	8.2	4.500	11.8	7.500	15.2
0.300	3.5 1.200	6.1	2.400	8.6	5.000	12.4	8.000	15.7
0.400	3.7 1.400	6.6	2.600	8.9	5.500	13.0	8.500	16.2
0.500	4.0 1.600	7.0	3.000	9.6	6.000	13.6	9.000	16.6
0.600	4.3 1.800	7.4	3.500	10.4	6.500	14.1	9.500	17.1

INFRASTRUCT CS LTD		Page 1
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 16:48	Designed by Tim	
File Plot 4 - NL.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 19 minutes.

	Stor Even	m t	Max Level (m)	Max Depth (m)	Ma Infilt: (1/	x ration s)	Max Control (1/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
				. ,		- •				
15	min	Summer	22.285	0.635		0.0	4.4	4.4	7.5	ОК
30	min	Summer	22.342	0.692		0.0	4.6	4.6	8.2	ΟK
60	min	Summer	22.312	0.662		0.0	4.5	4.5	7.9	ΟK
120	min	Summer	22.193	0.543		0.0	4.1	4.1	6.4	ОК
180	min	Summer	22.078	0.428		0.0	3.8	3.8	5.1	ОК
240	min	Summer	21.976	0.326		0.0	3.6	3.6	3.9	ОК
360	min	Summer	21.832	0.182		0.0	3.6	3.6	2.2	ΟK
480	min	Summer	21.778	0.128		0.0	3.2	3.2	1.5	ОК
600	min	Summer	21.755	0.105		0.0	2.8	2.8	1.2	ОК
720	min	Summer	21.741	0.091		0.0	2.5	2.5	1.1	ОК
960	min	Summer	21.724	0.074		0.0	2.0	2.0	0.9	ОК
1440	min	Summer	21.707	0.057		0.0	1.4	1.4	0.7	ΟK
2160	min	Summer	21.695	0.045		0.0	1.0	1.0	0.5	ОК
2880	min	Summer	21.688	0.038		0.0	0.8	0.8	0.5	ОК
4320	min	Summer	21.680	0.030		0.0	0.6	0.6	0.4	ОК
5760	min	Summer	21.676	0.026		0.0	0.5	0.5	0.3	ОК
7200	min	Summer	21.673	0.023		0.0	0.4	0.4	0.3	ОК
8640	min	Summer	21.671	0.021		0.0	0.3	0.3	0.2	ОК
10080	min	Summer	21.669	0.019		0.0	0.3	0.3	0.2	ОК
15	min	Winter	22.374	0.724		0.0	4.7	4.7	8.6	ОК
30	min	Winter	22.438	0.788		0.0	4.9	4.9	9.4	ОК
60	min	Winter	22.385	0.735		0.0	4.8	4.8	8.7	ОК
120	min	Winter	22,202	0 552		0.0	4 2	4 2	6.6	0 K
180	min	Winter	22.035	0 385		0.0	3 7	3 7	4 6	0 K
240	min	Winter	21 883	0 233		0.0	3.6	3.7	2.8	0 K
360	min	Winter	21 770	0.200		0.0	3.0	3.0	1 4	O K
480	min	Winter	21 7/2	0.120		0.0	2 5	2.5	1 1	O K
400 600	min	Winter	21 728	0.072		0.0	2.5	2.0	1.1	O K
000	11111	WINCEL	21.720	Stor	m	Rain	∠.⊥ Time-1	∠.⊥ Peak	0.9	0 K
				Even	t	(mm/hr) (min	s)		
						(/	, (,		
				15 min	Summer	138.22	0	19		
				30 min	Summer	89.26	6	28		
				60 min	Summer	54.81	7	46		
			1:	20 min	Summer	32.51	1	78		
			1	80 min	Summer	23.64	3	112		
			2	40 min	Summer	18.75	7	142		
			3	60 min	Summer	13.51	7	196		
			4	80 min	Summer	10.71	0	254		
			6	00 min	Summer	8.93	5	312		
			7:	20 min	Summer	7.70	2	372		
			9	60 min	Summer	6.08	9	494		
			14	40 min	Summer	4.36	7	738		
			21	60 min	Summer	3 12	7	1088		
			28	RO min	Summer	2 46	5	1460		
			43	20 min	Summer	1 76	1 1	2160		
			57	50 min	Summer	1 38	7 4	2936		
			72	10 min	Summer	1 15	1	3616		
			96	10 min	Summor	1.10	0	1368		
			100	20 min	Summor	0.90	0 I	5056		
			100	15 min	Wintor	139 22	0	10		
				30 min	Winter	89 26	6	29		
				SO min	Wintor	5/ 01	7	4.8		
			1	20 min	Winter	22 51	1	84		
			1.	20 min	Wintor	22.51	3	118		
			2 1	10 min	Wintor	23.04 18 75	7	111		
			2	10 IIIII 60 min	Winter	12 51	7	194		
			C A	80 m4∽	Winter	10 71	0	1 J T 2 5 2		
			4	00 min	Wintor	TO 02	5	202		
			0	50 IIIII	WINCEL	0.93		510		
			©19	82-20	11 Mic	ro Dra	ainage	Ltd		

INFRASTRUCT CS LTD	Page 2	
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 16:48	Designed by Tim	
File Plot 4 - NL.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

	Stor	m	Max	Max	Ma	x	Max	Max	Max	Status
	Even	t	Level	Depth	Infiltr	ation	Control	Σ Outflo	ow Volume	
			(m)	(m)	(1/:	s)	(l/s)	(1/s)	(m³)	
720	min	Wintor	21 710	0 060		0 0	1 0	1	0 0 0	0 K
720	min	Winter	21.719	0.069		0.0	1.0	1	.0 0.0	0 K
960	min	Winter	21.707	0.057		0.0	1.4	1	.4 0.7	0 K
1440	min	winter	21.695	0.045		0.0	1.0	1	.0 0.5	0 K
2160	min ,	winter	21.686	0.036		0.0	0.7	0.	./ 0.4	0 K
2880	min	Winter	21.681	0.031		0.0	0.6	0.	.6 0.4	0 K
4320	mın	Winter	21.6/5	0.025		0.0	0.4	0.	.4 0.3	ΟK
5760	min	Winter	21.671	0.021		0.0	0.3	0.	.3 0.3	ΟK
7200	min	Winter	21.669	0.019		0.0	0.3	0	.3 0.2	ОК
8640	min	Winter	21.667	0.017		0.0	0.2	0.	.2 0.2	ΟK
10080	min	Winter	21.666	0.016		0.0	.0.2	0	.2 0.2	ΟK
				Stor	m	Rain	Time-1	Peak		
				Even	ıt	(mm/hr	r) (min	s)		
			7:	20 min	Winter	7.70	12	374		
			91	60 min	Winter	6.08	-	494		
			144	40 min	Winter	4.36	57	72.4		
			210	60 min	Winter	3.12	27	1076		
			28	30 min	Winter	2.46	5.5	1436		
			433	20 min	Winter	1.76	51 2	2160		
			57	60 min	Winter	1.38	37 2	2896		
			720	00 min	Winter	1 1 5	1	3592		
			86	40 min	Winter	0 98	18 4	4352		
			100	RO min	Winter	0 86	ig 1	5000		
			± 0 0 0			0.00				

INFRASTRUCT CS LTD		Page 3
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 16:48	Designed by Tim	
File Plot 4 - NL.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

<u> Time / Area Diagram</u>

Time	Area	Time	Area	
(mins)	(ha)	(mins)	(ha)	
0-4	0.000	4-8	0.040	

INFRASTRUCT CS LTD		Page 4
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 16:48	Designed by Tim	DESTRET
File Plot 4 - NL.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Model Details

Storage is Online Cover Level (m) 23.850

Cellular Storage Structure

Invert Level (m) 21.650 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²)

0.000	12.5	12.5	0.800	12.5	23.8	0.900	0.0	24.5

Hydro-Brake® Outflow Control

Design Head (m) 0.800 Hydro-Brake® Type Md5 SW Only Invert Level (m) 21.650 Design Flow (l/s) 5.0 Diameter (mm) 96

Depth (m)	Flow (l/s)								
0 100	2 -	0 800	5 0	2 000	7 8	4 000	11 1	7 000	1/ 7
0.200	3.6	1.000	5.5	2.200	8.2	4.500	11.1	7.500	15.2
0.300	3.5	1.200	6.1	2.400	8.6	5.000	12.4	8.000	15.7
0.400	3.7	1.400	6.6	2.600	8.9	5.500	13.0	8.500	16.2
0.500	4.0	1.600	7.0	3.000	9.6	6.000	13.6	9.000	16.6
0.600	4.3	3 1.800	7.4	3.500	10.4	6.500	14.1	9.500	17.1

Appendix E – Plot 5, Dick Collins Hall

	Dr	ainage Manh	ole Schedule				
MANHOLE REF	INVERT LEVEL	COVER LEVEL	CHAMBER DETAILS	COVER DETAILS	GRADE	PIPEØ	LENGTH
FE	29.312	30.48	Existing	Existing	Lin	(mm)	
F1	29.367	30.65	450 x 600	450 x 600 B125	90.0	150	5.0
F2	29.816	30.65	450 x 600	450 x 600 B125 recessed	21.6	150	10.5
F3	29.850	30.95	450 x 600	450 x 600 B125	80.0	150	2.7
F4	30.237	31.68	750 x 1200	450 x 600 B125	23.2	150	9.0
F5	30.350	31.68	450 x 600	450 x 600 B125	80.0	150	9.0
F6	30.518	31.90	450 x 600	450 x 600 B125	80.0	150	13.5
F7	30.700	31.70	600 x 750	recessed	80.0	150	14.5
	55.755	51.70	000 x 100	400 X 000 B120			
F3	29.850	30.95	450 x 600	450 x 600 B125			
F8	30.000	30.95	600 x 750	450 x 600 B125	80.0	150	12.0
				recessed			
F1	29.367	30.65	450 x 600	450 x 600 B125			
S1	29 500	30.70	Hvdrobrake 1500Ø	600 x 600 B125	52.6	150	8.0
82	30.131	31.66	750 x 1200	450 x 600 B125	60.0	100	10.0
62	20.291	21.70	450 × 600	recessed 450 x 600 B125	60.0	100	9.0
33	30.201	31.70	450 x 600	recessed 450 x 600 B125	80.0	100	15.0
34	30.400	31.82	400 X 600	recessed	80.0	100	18.5
55	30.700	31.20	4802	480Ø B125			
				600 x 600 B125			
S1	29.500	30.70	Hydrobrake 1500Ø	recessed	50.0	100	15.0
S6	29.800	30.90	450 x 600	recessed			

L to be confirmed prior to commencing works on site





AS BUILT DRAWING (THIS DRAWING IS THE FINAL CONSTRUCTION ISSUE AND DOES NOT PURPORT TO BE A SURVEY OF THE WORKS AS CONSTRUCTED)

Infrastruct CS Ltd		Page 1
	I	rage r
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:24	Designed by Tim.Trotman	
File Plot 5 - DCH - Rev A - 1 in 2yr	Checked by	Diamaye
Innovyze	Source Control 2015.1	

Summary of Results for 2 year Return Period

Half Drain Time : 2 minutes.

	Storn Event	n t	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
15	min	Summer	29 647	0 047	0 0	69	6 9	0 9	ОК
30	min	Summer	29 628	0.028	0.0	6.9	6.9	0.5	0 K
60	min	Summer	29 600	0 000	0.0	6.9	6.9	0.0	0 K
120	min	Summer	29 600	0 000	0.0	4 6	4 6	0.0	0 K
180	min	Summer	29.600	0.000	0.0	3.5	3.5	0.0	0 K
240	min	Summer	29.600	0.000	0.0	2.8	2.8	0.0	0 K
360	min	Summer	29.600	0.000	0.0	2.1	2.1	0.0	ОК
480	min	Summer	29,600	0.000	0.0	1.7	1.7	0.0	0 K
600	min	Summer	29,600	0.000	0.0	1.4	1.4	0.0	0 K
720	min	Summer	29.600	0.000	0.0	1.2	1.2	0.0	ОК
960	min	Summer	29.600	0.000	0.0	1.0	1.0	0.0	ОК
1440	min	Summer	29.600	0.000	0.0	0.7	0.7	0.0	ОК
2160	min	Summer	29.600	0.000	0.0	0.5	0.5	0.0	ОК
2880	min	Summer	29.600	0.000	0.0	0.4	0.4	0.0	ОК
4320	min	Summer	29.600	0.000	0.0	0.3	0.3	0.0	ОК
5760	min	Summer	29.600	0.000	0.0	0.2	0.2	0.0	ОК
7200	min	Summer	29.600	0.000	0.0	0.2	0.2	0.0	ОК
8640	min	Summer	29.600	0.000	0.0	0.2	0.2	0.0	ОК
10080	min	Summer	29.600	0.000	0.0	0.2	0.2	0.0	ОК
15	min	Winter	29.652	0.052	0.0	6.9	6.9	1.0	ОК
30	min	Winter	29.619	0.019	0.0	6.9	6.9	0.4	ОК
60	min	Winter	29.600	0.000	0.0	5.6	5.6	0.0	ОК
120	min	Winter	29.600	0.000	0.0	3.4	3.4	0.0	ОК
180	min	Winter	29.600	0.000	0.0	2.5	2.5	0.0	ΟK
240	min	Winter	29.600	0.000	0.0	2.0	2.0	0.0	ΟK
360	min	Winter	29.600	0.000	0.0	1.5	1.5	0.0	ОК

Storm Event		Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)	
1 5		C	42 000	0 0	4 5	1.0
10	m±n	Summer	42.980	0.0	4.5	10
30	min	Summer	27.473	0.0	5.8	23
120	min min	Summer	10.001	0.0	1.2	0
120	min	Summer	10.146	0.0	8.7	0
180	min ,	Summer	7.490	0.0	9.6	0
240	min	Summer	6.029	0.0	10.3	0
360	mın	Summer	4.425	0.0	11.4	0
480	mın	Summer	3.548	0.0	12.1	0
600	mın	Summer	2.988	0.0	12.8	0
/20	mın	Summer	2.597	0.0	13.3	0
960	min	Summer	2.080	0.0	14.2	0
1440	min	Summer	1.522	0.0	15.6	0
2160	min	Summer	1.113	0.0	17.1	0
2880	min	Summer	0.892	0.0	18.3	0
4320	min	Summer	0.652	0.0	20.1	0
5760	min	Summer	0.522	0.0	21.4	0
7200	min	Summer	0.439	0.0	22.5	0
8640	min	Summer	0.382	0.0	23.5	0
10080	min	Summer	0.339	0.0	24.3	0
15	min	Winter	42.980	0.0	5.0	16
30	min	Winter	27.473	0.0	6.7	24
60	min	Winter	16.881	0.0	8.1	0
120	min	Winter	10.146	0.0	9.7	0
180	min	Winter	7.490	0.0	10.8	0
240	min	Winter	6.029	0.0	11.5	0
360	min	Winter	4.425	0.0	12.7	0
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:24	Designed by Tim.Trotman	
File Plot 5 - DCH - Rev A - 1 in 2yr	Checked by	Digitigh
Innovyze	Source Control 2015.1	

	Storm		Max	Max	Max	Max	Max	Max	Status
	Even	t	Level	Depth	Infiltration	Control Σ	Outflow	Volume	
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
480	min	Winter	29.600	0.000	0.0	1.2	1.2	0.0	ΟK
600	min	Winter	29.600	0.000	0.0	1.0	1.0	0.0	ΟK
720	min	Winter	29.600	0.000	0.0	0.9	0.9	0.0	ΟK
960	min	Winter	29.600	0.000	0.0	0.7	0.7	0.0	ΟK
1440	min	Winter	29.600	0.000	0.0	0.5	0.5	0.0	ΟK
2160	min	Winter	29.600	0.000	0.0	0.4	0.4	0.0	ΟK
2880	min	Winter	29.600	0.000	0.0	0.3	0.3	0.0	ΟK
4320	min	Winter	29.600	0.000	0.0	0.2	0.2	0.0	ΟK
5760	min	Winter	29.600	0.000	0.0	0.2	0.2	0.0	ΟK
7200	min	Winter	29.600	0.000	0.0	0.1	0.1	0.0	ΟK
8640	min	Winter	29.600	0.000	0.0	0.1	0.1	0.0	ΟK
10080	min	Winter	29.600	0.000	0.0	0.1	0.1	0.0	OF

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	3.548	0.0	13.6	0
600	min	Winter	2.988	0.0	14.3	0
720	min	Winter	2.597	0.0	14.9	0
960	min	Winter	2.080	0.0	15.9	0
1440	min	Winter	1.522	0.0	17.5	0
2160	min	Winter	1.113	0.0	19.2	0
2880	min	Winter	0.892	0.0	20.5	0
4320	min	Winter	0.652	0.0	22.5	0
5760	min	Winter	0.522	0.0	24.0	0
7200	min	Winter	0.439	0.0	25.2	0
8640	min	Winter	0.382	0.0	26.3	0
10080	min	Winter	0.339	0.0	27.3	0
Infrastruct CS Ltd		Page 3				
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The Stables						
High Cogges, Witney		4				
Oxfordshire		Micco				
Date 15/10/2020 17:24	Designed by Tim.Trotman					
File Plot 5 - DCH - Rev A - 1 in 2yr	Checked by	Digitight				
Innovyze	Source Control 2015.1					

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.057

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.057

Infrastruct	CS Ltd							F	Page 4
The Stables									
High Cogges,	, Witney								L.
Oxfordshire									Micro
Date 15/10/2	2020 17:24	1		Designed	by Tim.	Trotman			
File Plot 5	- DCH - H	Rev A - 1	in 2yr	Checked	by				Dialiacje
Innovyze				Source C	ontrol 2	2015.1			
				<u>Model De</u>	tails				
			Storage is	s Online Cove	er Level ((m) 30.900			
			5						
			<u>Cell</u>	ular Storad	<u>ge Struc</u>	<u>ture</u>			
			Ŧ		(m) 20 6	00 00 foto	Eastan 2.0		
		Infiltrati	⊥ on Coeffici.	nvert Level ent Base (m/1	(m) 29.6 hr) 0.000	00 Sarety 00 Po	rosity 0.95		
		Infiltrati	on Coeffici	ent Side (m/l	hr) 0.000	00			
Depth (m)	$\Delta rea (m^2)$	Inf Area	(m²) Denth	(m) Area (m^2)	Inf Are	a (m²) De	oth (m) Are	a (m²) Trif	$\Delta rea (m^2)$
Depth (m)	mea (m)	Int. Area	(m) Depen	(m) mea (m)	int. hit			, (m) 1111	· mea (m)
0.000	20.0	:	20.0 0.8	300 20.0)	34.3	0.900	0.0	35.2
			<u>Hydro</u>	-Brake® Out	tflow Co	<u>ntrol</u>			
	Desi	on Head (m)	0.800 Hvdr	o-Brake® Tvp	e Md5 SW	Onlv Inver	t Level (m)	29.330	
	Design	Flow (l/s)	8.5	Diameter (mm)	125			
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m) Fl	Low (1/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0 100	4 0	0 800	8 4	2 000	133	4 000	18 8	7 000	24 9
0.200	6.7	1.000	9.4	2.200	13.9	4.500	19.9	7.500	25.8
0.300	6.9	1.200	10.3	2.400	14.6	5.000	21.0	8.000	26.6
0.400	6.8	1.400	11.1	2.600	15.2	5.500	22.1	8.500	27.4
0.500	7.1	1.600	11.9	3.000	16.3	6.000	23.0	9.000	28.2
0.600	7.5	1.800	12.6	3.500	17.6	6.500	24.0	9.500	29.0

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		rage I
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:25	Designed by Tim.Trotman	
File Plot 5 - DCH - Rev A - 1 in 30y	Checked by	Diamaye
Innovyze	Source Control 2015.1	*

Summary of Results for 30 year Return Period

Half Drain Time : 6 minutes.

	Storm Event		Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
15	min S	Summer	29.798	0.198	0.0	7.0	7.0	3.8	ΟK
30	min S	Summer	29.785	0.185	0.0	6.9	6.9	3.5	ΟK
60	min S	Summer	29.723	0.123	0.0	6.9	6.9	2.3	ΟK
120	min S	Summer	29.624	0.024	0.0	6.9	6.9	0.5	ОК
180	min S	Summer	29.600	0.000	0.0	6.4	6.4	0.0	ΟK
240	min S	Summer	29.600	0.000	0.0	5.2	5.2	0.0	ΟK
360	min S	Summer	29.600	0.000	0.0	3.7	3.7	0.0	ΟK
480	min S	Summer	29.600	0.000	0.0	3.0	3.0	0.0	ΟK
600	min S	Summer	29.600	0.000	0.0	2.5	2.5	0.0	ΟK
720	min S	Summer	29.600	0.000	0.0	2.1	2.1	0.0	ΟK
960	min S	Summer	29.600	0.000	0.0	1.7	1.7	0.0	ΟK
1440	min S	Summer	29.600	0.000	0.0	1.2	1.2	0.0	ΟK
2160	min S	Summer	29.600	0.000	0.0	0.9	0.9	0.0	ΟK
2880	min S	Summer	29.600	0.000	0.0	0.7	0.7	0.0	ΟK
4320	min S	Summer	29.600	0.000	0.0	0.5	0.5	0.0	ΟK
5760	min S	Summer	29.600	0.000	0.0	0.4	0.4	0.0	ΟK
7200	min S	Summer	29.600	0.000	0.0	0.3	0.3	0.0	ΟK
8640	min S	Summer	29.600	0.000	0.0	0.3	0.3	0.0	ΟK
10080	min S	Summer	29.600	0.000	0.0	0.3	0.3	0.0	ΟK
15	min W	Vinter	29.834	0.234	0.0	7.1	7.1	4.4	O K
30	min W	Vinter	29.806	0.206	0.0	7.0	7.0	3.9	ΟK
60	min W	Vinter	29.703	0.103	0.0	6.9	6.9	1.9	ΟK
120	min W	Vinter	29.600	0.000	0.0	6.4	6.4	0.0	ОК
180	min W	Vinter	29.600	0.000	0.0	4.7	4.7	0.0	ОК
240	min W	Vinter	29.600	0.000	0.0	3.7	3.7	0.0	ОК
360	min W	Vinter	29.600	0.000	0.0	2.7	2.7	0.0	ОК

Storm		Rain	Flooded	Discharge	Time-Peak	
Event		(mm/hr)	Volume	Volume	(mins)	
				(m³)	(m³)	
15	min	Summer	81.719	0.0	8.7	17
30	min	Summer	52.383	0.0	11.0	25
60	min	Summer	32.061	0.0	13.8	42
120	min	Summer	19.041	0.0	16.2	70
180	min	Summer	13.895	0.0	17.8	0
240	min	Summer	11.067	0.0	18.9	0
360	min	Summer	8.018	0.0	20.6	0
480	min	Summer	6.376	0.0	21.8	0
600	min	Summer	5.334	0.0	22.8	0
720	min	Summer	4.609	0.0	23.6	0
960	min	Summer	3.659	0.0	25.0	0
1440	min	Summer	2.640	0.0	27.1	0
2160	min	Summer	1.903	0.0	29.3	0
2880	min	Summer	1.507	0.0	30.9	0
4320	min	Summer	1.085	0.0	33.4	0
5760	min	Summer	0.858	0.0	35.2	0
7200	min	Summer	0.716	0.0	36.7	0
8640	min	Summer	0.617	0.0	38.0	0
10080	min	Summer	0.544	0.0	39.1	0
15	min	Winter	81.719	0.0	9.7	18
30	min	Winter	52.383	0.0	12.4	27
60	min	Winter	32.061	0.0	15.6	44
120	min	Winter	19.041	0.0	18.2	0
180	min	Winter	13.895	0.0	20.0	0
240	min	Winter	11.067	0.0	21.2	0
360	min	Winter	8.018	0.0	23.0	0
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:25	Designed by Tim.Trotman	
File Plot 5 - DCH - Rev A - 1 in 30y	Checked by	Diginarie
Innovyze	Source Control 2015.1	•

	Storm	Max	Max	Max	Max	Max	Max	Status
	Event	Level (m)	Depth (m)	Infiltration (l/s)	Control : (1/s)	E Outflow (l/s)	Volume (m³)	
480	min Winter	29.600	0.000	0.0	2.1	2.1	0.0	O F
600	min Winter	29.600	0.000	0.0	1.8	1.8	0.0	OH
720	min Winter	29.600	0.000	0.0	1.6	1.6	0.0	O I
960	min Winter	29.600	0.000	0.0	1.2	1.2	0.0	O I
1440	min Winter	29.600	0.000	0.0	0.9	0.9	0.0	O I
2160	min Winter	29.600	0.000	0.0	0.6	0.6	0.0	ΟI
2880	min Winter	29.600	0.000	0.0	0.5	0.5	0.0	OH
4320	min Winter	29.600	0.000	0.0	0.4	0.4	0.0	O F
5760	min Winter	29.600	0.000	0.0	0.3	0.3	0.0	ΟI
7200	min Winter	29.600	0.000	0.0	0.2	0.2	0.0	ΟI
8640	min Winter	29.600	0.000	0.0	0.2	0.2	0.0	O F
10080	min Winter	29.600	0.000	0.0	0.2	0.2	0.0	ΟF

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	6.376	0.0	24.4	0
600	min	Winter	5.334	0.0	25.5	0
720	min	Winter	4.609	0.0	26.5	0
960	min	Winter	3.659	0.0	28.0	0
1440	min	Winter	2.640	0.0	30.3	0
2160	min	Winter	1.903	0.0	32.8	0
2880	min	Winter	1.507	0.0	34.6	0
4320	min	Winter	1.085	0.0	37.4	0
5760	min	Winter	0.858	0.0	39.5	0
7200	min	Winter	0.716	0.0	41.1	0
8640	min	Winter	0.617	0.0	42.5	0
10080	min	Winter	0.544	0.0	43.7	0

Infrastruct CS Ltd		Page 3
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:25	Designed by Tim.Trotman	
File Plot 5 - DCH - Rev A - 1 in 30y	Checked by	Digitigh
Innovyze	Source Control 2015.1	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.057

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.057

Inirastruct									
	CS Lta							F	age 4
The Stables									
High Cogges,	Witney								Mar mar
Oxfordshire									Mirro
Date 15/10/2	020 17:25	5		Designed	by Tim.	.Trotman			Dcainago
File Plot 5	- DCH - H	Rev A - 1	in 30y	Checked b	су				Diamage
Innovyze				Source Co	ontrol 2	2015.1			
				Model De	tails				
				<u>110401 D0</u>	04110				
			Storage is	Online Cove	r Level	(m) 30.900			
			<u>Cellu</u>	lar Storac	<u>e Struc</u>	ture			
			Tn	wort Towal	(m) 29 6	00 Safaty	Factor 20		
		Infiltrati	on Coefficie.	nt Base (m/r	nr) 0.000	00 Salety 00 Pc	rosity 0.95		
		Infiltrati	on Coefficie	nt Side (m/h	nr) 0.000	00	-		
Depth (m)	Area (m²)	Inf. Area	(m²) Depth (r	n) Area (m²)	Inf. Are	ea (m²) De	pth (m) Are	a (m²) Inf	. Area (m²)
0.000	20.0	2	20.0 0.80	20.0		34.3	0.900	0.0	35.2
			<u>Hydro-</u>	Brake® Out	flow Co	ntrol			
			-						
	Desig Design	yn Head (m) Flow (l/s)	0.800 Hydro 8.5 E	-Brake® Type iameter (mm)	e Md5 SW	Only Inver 125	t Level (m)	29.330	
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m) Fl	ow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0	0.800	8.4	2.000	13.3	4.000	18.8	7.000	24.9
0.200	6.7	1.000	9.4	2.200	13.9	4.500	19.9	7.500	25.8
0.300	6.9	1.200	10.3	2.400	14.6	5.000	21.0	8.000	26.6
0.300 0.400	6.9 6.8	1.200 1.400	10.3	2.400 2.600	14.6 15.2	5.000 5.500	21.0 22.1	8.000 8.500	26.6 27.4
0.300 0.400 0.500	6.9 6.8 7.1	1.200 1.400 1.600	10.3 11.1 11.9	2.400 2.600 3.000	14.6 15.2 16.3	5.000 5.500 6.000	21.0 22.1 23.0	8.000 8.500 9.000	26.6 27.4 28.2

INFRASTRUCT CS LTD		Page 1
Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:54	Designed by Tim	
File Plot 5 - DCH - Rev A.srcx	Checked by	Dialitatje
Micro Drainage	Source Control 2015.1	

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 13 minutes.

	Storm Event	1 :	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Σ	Max Outflow (1/s)	Max Volume (m ³)	Status
15	min S	Summer	30.047	0.447	0.0	8.0		8.0	8.5	ΟK
30	min S	Summer	30.060	0.460	0.0	8.1		8.1	8.7	ΟK
60	min S	Summer	30.003	0.403	0.0	7.8		7.8	7.7	ΟK
120	min S	Summer	29.859	0.259	0.0	7.2		7.2	4.9	ΟK
180	min S	Summer	29.735	0.135	0.0	6.9		6.9	2.6	ΟK
240	min S	Summer	29.647	0.047	0.0	6.9		6.9	0.9	ΟK
360	min S	Summer	29.600	0.000	0.0	6.3		6.3	0.0	ΟK
480	min S	Summer	29.600	0.000	0.0	5.0		5.0	0.0	ΟK
600	min S	Summer	29.600	0.000	0.0	4.2		4.2	0.0	ΟK
720	min S	Summer	29.600	0.000	0.0	3.6		3.6	0.0	ΟK
960	min S	Summer	29.600	0.000	0.0	2.8		2.8	0.0	ΟK
1440	min S	Summer	29.600	0.000	0.0	2.0		2.0	0.0	ΟK
2160	min S	Summer	29.600	0.000	0.0	1.5		1.5	0.0	ΟK
2880	min S	Summer	29.600	0.000	0.0	1.1		1.1	0.0	ΟK
4320	min S	Summer	29.600	0.000	0.0	0.8		0.8	0.0	ОК
5760	min S	Summer	29.600	0.000	0.0	0.6		0.6	0.0	ОК
7200	min S	Summer	29.600	0.000	0.0	0.5		0.5	0.0	ОК
8640	min S	Summer	29.600	0.000	0.0	0.5		0.5	0.0	ОК
10080	min S	Summer	29.600	0.000	0.0	0.4		0.4	0.0	ОК
15	min V	Winter	30.127	0.527	0.0	8.4		8.4	10.0	ОК
30	min V	Winter	30.133	0.533	0.0	8.5		8.5	10.1	ОК
60	min V	Winter	30.038	0.438	0.0	8.0		8.0	8.3	ОК
120	min V	Winter	29.819	0.219	0.0	7.0		7.0	4.2	ОК
180	min V	Winter	29.642	0.042	0.0	6.9		6.9	0.8	ОК
240	min V	Winter	29.600	0.000	0.0	6.3		6.3	0.0	ОК
360	min N	Winter	29.600	0.000	0.0	4.5		4.5	0.0	ОК

Storm		Rain	Flooded	Discharge	Time-Peak	
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	138.220	0.0	14.9	18
30	min	Summer	89.266	0.0	19.1	27
60	min	Summer	54.817	0.0	23.0	44
120	min	Summer	32.511	0.0	27.6	76
180	min	Summer	23.643	0.0	30.1	106
240	min	Summer	18.757	0.0	32.1	134
360	min	Summer	13.517	0.0	34.7	0
480	min	Summer	10.710	0.0	36.6	0
600	min	Summer	8.935	0.0	38.2	0
720	min	Summer	7.702	0.0	39.5	0
960	min	Summer	6.089	0.0	41.6	0
1440	min	Summer	4.367	0.0	44.8	0
2160	min	Summer	3.127	0.0	48.1	0
2880	min	Summer	2.465	0.0	50.6	0
4320	min	Summer	1.761	0.0	54.2	0
5760	min	Summer	1.387	0.0	56.9	0
7200	min	Summer	1.151	0.0	59.1	0
8640	min	Summer	0.988	0.0	60.8	0
10080	min	Summer	0.869	0.0	62.4	0
15	min	Winter	138.220	0.0	16.6	19
30	min	Winter	89.266	0.0	21.6	28
60	min	Winter	54.817	0.0	26.1	46
120	min	Winter	32.511	0.0	31.0	80
180	min	Winter	23.643	0.0	33.9	106
240	min	Winter	18.757	0.0	35.9	0
360	min	Winter	13.517	0.0	38.8	0
		©198	82-2015	XP Sol	utions	

INFRASTRUCT CS LTD		Page 2
Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:54	Designed by Tim	
File Plot 5 - DCH - Rev A.srcx	Checked by	Diamarye
Micro Drainage	Source Control 2015.1	

	Stor Even	m t	Max Level	Max Depth	Max Infiltration	Max Control	Max Σ Outflow	Max Volume	Statu
			(m)	(m)	(1/s)	(l/s)	(1/s)	(m³)	
480) min	Winter	29.600	0.000	0.0	3.6	3.6	0.0	0
600) min	Winter	29.600	0.000	0.0	3.0	3.0	0.0	0
720) min	Winter	29.600	0.000	0.0	2.6	2.6	0.0	0
960) min	Winter	29.600	0.000	0.0	2.0	2.0	0.0	0
1440) min	Winter	29.600	0.000	0.0	1.5	1.5	0.0	0
2160) min	Winter	29.600	0.000	0.0	1.1	1.1	0.0	0
2880) min	Winter	29.600	0.000	0.0	0.8	0.8	0.0	0
4320) min	Winter	29.600	0.000	0.0	0.6	0.6	0.0	0
5760) min	Winter	29.600	0.000	0.0	0.5	0.5	0.0	0
7200) min	Winter	29.600	0.000	0.0	0.4	0.4	0.0	0
8640) min	Winter	29.600	0.000	0.0	0.3	0.3	0.0	0
10080) min	Winter	29.600	0.000	0.0	0.3	0.3	0.0	0

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	10.710	0.0	41.0	0
600	min	Winter	8.935	0.0	42.8	0
720	min	Winter	7.702	0.0	44.3	0
960	min	Winter	6.089	0.0	46.6	0
1440	min	Winter	4.367	0.0	50.2	0
2160	min	Winter	3.127	0.0	53.9	0
2880	min	Winter	2.465	0.0	56.7	0
4320	min	Winter	1.761	0.0	60.7	0
5760	min	Winter	1.387	0.0	63.7	0
7200	min	Winter	1.151	0.0	66.1	0
8640	min	Winter	0.988	0.0	68.1	0
10080	min	Winter	0.869	0.0	69.9	0

INFRASTRUCT CS LTD		Page 3
Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:54	Designed by Tim	
File Plot 5 - DCH - Rev A.srcx	Checked by	Digitight
Micro Drainage	Source Control 2015.1	1

Rainfall Model		FSR	Wi	inter	Storms	Yes
Return Period (years)		100		Cv (S	Summer)	0.750
Region	England	and Wales		Cv (W	linter)	0.840
M5-60 (mm)		20.800	Shortest S	Storm	(mins)	15
Ratio R		0.438	Longest S	Storm	(mins)	10080
Summer Storms		Yes	Clima	ate Ch	nange 🖇	+30

<u>Time Area Diagram</u>

Total Area (ha) 0.057

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.057

INFRASTRUCT CS LTD		Page 4
Station Point		
Old Station Way		<u> </u>
Eynsham Oxon OX29 4TL		Micco
Date 15/09/2015 12:54	Designed by Tim	
File Plot 5 - DCH - Rev A.srcx	Checked by	Digiligh
Micro Drainage	Source Control 2015.1	

Model Details

Storage is Online Cover Level (m) 30.900

Cellular Storage Structure

Invert Level (m) 29.600 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²)

	0.000	20.0	20.0	0.800	20.0	34.3	0.900	0.0	35.2
--	-------	------	------	-------	------	------	-------	-----	------

Hydro-Brake® Outflow Control

Design Head (m) 0.800 Hydro-Brake® Type Md5 SW Only Invert Level (m) 29.330 Design Flow (l/s) 8.5 Diameter (mm) 125

Depth (m)	Flow	(l/s)	Depth (m) Flow	(l/s)	Depth ((m) Flo	ow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100		4.0	0.80	0	8.4	2.0	000	13.3	4.000	18.8	7.000	24.9
0.200		6.7	1.00	0	9.4	2.2	200	13.9	4.500	19.9	7.500	25.8
0.300		6.9	1.20	0	10.3	2.4	100	14.6	5.000	21.0	8.000	26.6
0.400		6.8	1.40	0	11.1	2.6	500	15.2	5.500	22.1	8.500	27.4
0.500		7.1	1.60	0	11.9	3.0	000	16.3	6.000	23.0	9.000	28.2
0.600		7.5	1.80	0	12.6	3.5	500	17.6	6.500	24.0	9.500	29.0

Appendix F – Plot 6, Cape of Good Hope



AS BUILT DRAWING (THIS DRAWING IS THE FINAL CONSTRUCTION ISSUE AND DOES NOT PURPORT TO BE A SURVEY OF THE WORKS AS CONSTRUCTED)

OVER TYPE	GRADE	PIPE Ø (mm)	LENGTH
	18.5	150	85
0x600 Class D	10.0	150	0.5
00x450 Class D	80.0	150	21.5
-			
0x600 Class D		150	
Class B Recessed	80.0	150	3.5
80Ø Class B Recessed	80.0	150	9.5
-			
Class B Recessed			
0Ø Class B Recessed	14.4	150	4.5
wn, Double Sealed 80Ø Class B Recessed	80.0	150	11.5
wn, Double Sealed			
	3	150	2.8
0x450 Class C	80	150	14.0
Bolt Down			

NOTES / KEY:	
Drainage Key	
<u>Sewers</u>	
	Surface water drain (private/non adoptable)
	Foul water sewer (Adoptable)
	Surface water sewer (Adoptable) Existing combined water sewer (Adopted)
Chamber Key FW SW	
	PPIC - 475mmØ *
	P.C.C. units/brick *
• •	Depth 1.25 to 1.5m * Depth 1.55 to 3.0m *
* General note (Refer to standard Size may need to pipes/size of inco	d details & long sections for chamber sizes. increase dependant on number of incoming ming pipes)
F1	Manhole reference number
0	Rain water down pipe (roddable access)
*	Soil vent pipe/soil stack Rodding access required in vertical stack
99 8	Yard gully (150m - 200mmØ trapped)
fg	Floor gully (trapped) Cellular storage (refer to drawing for sizes)
	Linear drainage channel
	Surface water rodding eye
XX.XX	Finished Floor Level (FFL)
	Green Roof
	Pile cap impacted by proposed drainage
	Location of Crane Base
03/03/20	NJ TST ASBUILT
03/03/20 MARK DATE	NJ TST AS BUILT BY CHKD, REVISION NOTES
03/03/20 MARK DATE SIGNIFICANT RISA	NU TST AS BUILT BY CHKD. REVISION NOTES C.D.M. KS AND HAZARDS:
03/03/20 MARK DATE SIGNIFICANT RISE	NU TST AS BUILT BY CHKD. REVISION NOTES C.D.M. KS AND HAZARDS:
03/03/20 MARK DATE SIGNIFICANT RISE	N TST AS BUILT BY CHCD REVISION NOTES C.D.M. S AND HAZARDS:
03/03/20 MARK DATE SIGNIFICANT RISE SIGNIFICANT RISE SPECIAL STF PROJECT: PROJECT: PROJECT: PROJECT: PIOL 6 - Regents	NI TST AS BUILT EY CHKD REVISION NOTES C.D.M. KS AND HAZARDS: ESIS SPECIAL STRUCTURES C.D.M. ESIS SPECIAL STRUCTURES ESIS SPECIAL STRUCTURES E
03/03/20 MARK DATE SIGNIFICANT RISH SPECIAL STIF PROJECT: PROJECT: PIOT 6 - Regents DRAWING TIT Propose	N TST AS BUILT BY C.D.M. C.D.M. KS AND HAZARDS: IESIS SPECIAL STRUCTURES LONDON ECZY BEP T: -44 (0)207 002912 www.less.net Cape Of Good Hope S Park Estate Infill LE: cd Drainage Plan
03/03/20 MARK DATE SIGNIFICANT RISE SPECIAL STIP PROJECT: PIOT 6 - Regents DRAWING TIT PROPOSE STATUS:	N TST AS BUILT BY C.D.M. C.D.M. KS AND HAZARDS: IESIS SPECIAL STRUCTURES C.D.M. STORMONGER LANE LOUDON ECCUVERS IESIS SPECIAL STRUCTURES C.D.M. RUCTURES IESIS SPECIAL STRUCTURES C.D.M. SCAND HAZARDS:
03/03/20 MARK DATE SIGNIFICANT RISH SECIAL STF PROJECT: PIOT 6 - Regents DRAWING TIT Propose STATUS: SCALE AT A1: 1:100	N TST AS BUILT BY C.D.M. C.D.M. C.D.M. KS AND HAZARDS: IESIS SPECIAL STRUCTURES LONDON ECZY BEP T: -44 (0)207 602912 WWW. IESIS.Net IESIS SPECIAL STRUCTURES LONDON ECZY BEP T: -44 (0)207 602912 Cape Of Good Hope S Park Estate Infill LE: cd Drainage Plan AS BUILT Dec 2015 NJ
03/03/20 MARK DATE SIGNIFICANT RISH SIGNIFICANT RISH SEPECIAL STIF PROJECT: PROJECT: PROJECT: PIOT 6 - Regents DRAWING TIT PROJECT: SCALE AT AT: 1:100 JOB NUMBER: SE1238	NI TST AS BUILT BY CHKD REVISION NOTES C.D.M. C.D.M. KS AND HAZARDS: STATUS RECEVENDENT LESIS SPECIAL STRUCTURES C.D.M. KS AND HAZARDS: STATUS RECEVENDENT LESIS SPECIAL STRUCTURES C.D.M. C.D.M. SPECIAL STRUCTURES C.D.M. RECEVENDENT LESIS SPECIAL STRUCTURES C.D.M. Cape Of Good Hope is Park Estate Infill LE: cod Drainage Plan AS BUILT Dec 2015 PRAVIE DATE DEWWN: Dec 2015 NJ TST AB

Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micro
Date 15/10/2020 17:29	Designed by Tim.Trotman	
File Plot 6 - COGH - 1 in 2yr.srcx	Checked by	Digiliada
Innovyze	Source Control 2015.1	

Summary of Results for 2 year Return Period

	Stor	m	Max	Max	Max	Max	Status
	Even	t	Level	Depth	Control	Volume	
			(m)	(m)	(1/s)	(m³)	
15	min	Summer	25 719	0 019	0 2	0 0	ОК
30	min	Summer	25 727	0.017	0.2	0.0	0 K
60	min	Summer	25 731	0.027	0.4	0.0	O K
120	min	Summer	25.730	0.030	0.5	0.0	O K
180	min	Summer	25.727	0.027	0.4	0.0	O K
240	min	Summer	25.725	0.025	0.4	0.0	O K
360	min	Summer	25.723	0.023	0.3	0.0	O K
480	min	Summer	25.721	0.021	0.3	0.0	ОК
600	min	Summer	25.719	0.019	0.2	0.0	ОК
720	min	Summer	25.718	0.018	0.2	0.0	ОК
960	min	Summer	25.716	0.016	0.2	0.0	ОК
1440	min	Summer	25.714	0.014	0.1	0.0	ОК
2160	min	Summer	25.712	0.012	0.1	0.0	ОК
2880	min	Summer	25.711	0.011	0.1	0.0	ОК
4320	min	Summer	25.710	0.010	0.1	0.0	ОК
5760	min	Summer	25.709	0.009	0.0	0.0	ОК
7200	min	Summer	25.708	0.008	0.0	0.0	ОК
8640	min	Summer	25.707	0.007	0.0	0.0	ОК
10080	min	Summer	25.707	0.007	0.0	0.0	ОК
15	min	Winter	25.723	0.023	0.3	0.0	ОК
30	min	Winter	25.730	0.030	0.5	0.0	ОК
60	min	Winter	25.732	0.032	0.6	0.0	ОК
120	min	Winter	25.729	0.029	0.5	0.0	ОК
180	min	Winter	25.726	0.026	0.4	0.0	ОК
240	min	Winter	25.724	0.024	0.4	0.0	ОК
360	min	Winter	25.721	0.021	0.3	0.0	ОК
480	min	Winter	25.718	0.018	0.2	0.0	ОК

Storm		Rain	Flooded	Discharge	Time-Peak	
Event			(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	42.980	0.0	0.3	31
30	min	Summer	27.473	0.0	0.6	32
60	min	Summer	16.881	0.0	0.8	44
120	min	Summer	10.146	0.0	1.1	70
180	min	Summer	7.490	0.0	1.3	96
240	min	Summer	6.029	0.0	1.4	136
360	min	Summer	4.425	0.0	1.6	194
480	min	Summer	3.548	0.0	1.7	256
600	min	Summer	2.988	0.0	1.8	320
720	min	Summer	2.597	0.0	1.9	374
960	min	Summer	2.080	0.0	2.0	500
1440	min	Summer	1.522	0.0	2.2	744
2160	min	Summer	1.113	0.0	2.3	1088
2880	min	Summer	0.892	0.0	2.4	1460
4320	min	Summer	0.652	0.0	2.4	2176
5760	min	Summer	0.522	0.0	2.3	2904
7200	min	Summer	0.439	0.0	2.2	3656
8640	min	Summer	0.382	0.0	2.2	4352
10080	min	Summer	0.339	0.0	2.1	5064
15	min	Winter	42.980	0.0	0.4	27
30	min	Winter	27.473	0.0	0.7	30
60	min	Winter	16.881	0.0	1.0	42
120	min	Winter	10.146	0.0	1.3	74
180	min	Winter	7.490	0.0	1.5	96
240	min	Winter	6.029	0.0	1.7	142
360	min	Winter	4.425	0.0	1.9	194
480	min	Winter	3.548	0.0	2.0	254
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:29	Designed by Tim.Trotman	
File Plot 6 - COGH - 1 in 2yr.srcx	Checked by	Digitigh
Innovyze	Source Control 2015.1	

Summary of Results for 2 year Return Period

	Stor Even	m t	Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status
600	min	Winter	25.717	0.017	0.2	0.0	ОК
720	min	Winter	25.715	0.015	0.2	0.0	ОК
960	min	Winter	25.714	0.014	0.1	0.0	ΟK
1440	min	Winter	25.712	0.012	0.1	0.0	ОК
2160	min	Winter	25.711	0.011	0.1	0.0	ОК
2880	min	Winter	25.710	0.010	0.1	0.0	ΟK
4320	min	Winter	25.708	0.008	0.0	0.0	ОК
5760	min	Winter	25.707	0.007	0.0	0.0	ОК
7200	min	Winter	25.706	0.006	0.0	0.0	ОК
8640	min	Winter	25.706	0.006	0.0	0.0	ΟK
10080	min	Winter	25.706	0.006	0.0	0.0	ΟK

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
600	min	Winter	2.988	0.0	2.1	308
720	min	Winter	2.597	0.0	2.2	380
960	min	Winter	2.080	0.0	2.4	476
1440	min	Winter	1.522	0.0	2.6	740
2160	min	Winter	1.113	0.0	2.7	1144
2880	min	Winter	0.892	0.0	2.8	1448
4320	min	Winter	0.652	0.0	2.9	2204
5760	min	Winter	0.522	0.0	2.9	2752
7200	min	Winter	0.439	0.0	2.8	3680
8640	min	Winter	0.382	0.0	2.7	4408
10080	min	Winter	0.339	0.0	2.6	5128

Infrastruct CS Ltd		Page 3					
The Stables							
High Cogges, Witney		<u> </u>					
Oxfordshire		Micro					
Date 15/10/2020 17:29	Designed by Tim.Trotman	Dcainago					
File Plot 6 - COGH - 1 in 2yr.srcx	Checked by	Diamage					
Innovyze	Source Control 2015.1						
Rainfall Details							
Rainfall Model	FSR Winter Storms Yes						
Return Period (years)	2 Cv (Summer) 0.750						
Region Eng	gland and Wales Cv (Winter) 0.840						
M5-60 (mm) Patio P	20.800 Shortest Storm (mins) 15 0.438 Longest Storm (mins) 10080						
Summer Storms	Yes Climate Change % +0						
	-						
	<u>Green Roof</u>						
Area (m³) 113 Evaporation (mm/day) 3 Depression Storage (mm) 5 Decay Coefficient 0.050							
Time (mins) Area Time (mins) Area T	ime (mins) Area Time (mins) Area Time	(mins) Area					
From: To: (ha) From: To: (ha) Fr	om: To: (ha) From: To: (ha) From:	To: (ha)					
0 4 0.002053 24 28 0.000618	48 52 0.000186 72 76 0.000056 96	100 0.000017					
4 8 0.001681 28 32 0.000506	52 56 0.000153 76 80 0.000046 100	104 0.000014					

60 0.000125

64 0.000102

68 0.000084

72 0.000069

80

84

88

92

84 0.000038

88 0.000031

92 0.000025

96 0.000021 116

104

108

112

108 0.000011

112 0.000009

116 0.000008

120 0.000006

12 0.001376

16 0.001127

24 0.000755 44

20 0.000923

32

36

40

8

12

16

20

36 0.000415

40 0.000339

44 0.000278

48 0.000228

56

60

64

68

Infrastruct CS Ltd		Page 4
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:29	Designed by Tim.Trotman	
File Plot 6 - COGH - 1 in 2yr.srcx	Checked by	Digitigh
Innovyze	Source Control 2015.1	

Model Details

Storage is Online Cover Level (m) 26.600

<u>Pipe Structure</u>

Diameter (m) 0.150 Slope (1:X) 80.000 Length (m) 10.000 Invert Level (m) 25.700

Pipe Outflow Control

Diameter (m) 0.150 Roughness k (mm) 0.600 Upstream Invert Level (m) 25.700 Slope (1:X) 60.0 Entry Loss Coefficient 0.500 Length (m) 10.000 Coefficient of Contraction 0.600

Infrastruct CS Ltd		Page 1
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:32	Designed by Tim.Trotman	
File Plot 6 - COGH - 1 in 30yr.srcx	Checked by	Diginarie
Innovyze	Source Control 2015.1	1

Summary of Results for 30 year Return Period

Storm			Max	Max	Max	Max	Status
	rven		(m)	Jepth (m)		vorume (m ³)	
			(111)	(111)	(1/5)	(111-)	
15	min	Summer	25.739	0.039	0.9	0.0	ОК
30	min	Summer	25.744	0.044	1.1	0.1	ОК
60	min	Summer	25.746	0.046	1.2	0.1	ΟK
120	min	Summer	25.740	0.040	1.0	0.0	ΟK
180	min	Summer	25.737	0.037	0.8	0.0	ΟK
240	min	Summer	25.735	0.035	0.7	0.0	ОК
360	min	Summer	25.732	0.032	0.6	0.0	ΟK
480	min	Summer	25.729	0.029	0.5	0.0	ΟK
600	min	Summer	25.727	0.027	0.4	0.0	ΟK
720	min	Summer	25.725	0.025	0.4	0.0	ΟK
960	min	Summer	25.723	0.023	0.3	0.0	ΟK
1440	min	Summer	25.719	0.019	0.2	0.0	ΟK
2160	min	Summer	25.716	0.016	0.2	0.0	ΟK
2880	min	Summer	25.714	0.014	0.1	0.0	ΟK
4320	min	Summer	25.712	0.012	0.1	0.0	ΟK
5760	min	Summer	25.711	0.011	0.1	0.0	ΟK
7200	min	Summer	25.710	0.010	0.1	0.0	ΟK
8640	min	Summer	25.710	0.010	0.1	0.0	ΟK
10080	min	Summer	25.709	0.009	0.1	0.0	ΟK
15	min	Winter	25.742	0.042	1.0	0.0	ΟK
30	min	Winter	25.747	0.047	1.3	0.1	ΟK
60	min	Winter	25.745	0.045	1.1	0.1	ΟK
120	min	Winter	25.740	0.040	0.9	0.0	ΟK
180	min	Winter	25.736	0.036	0.8	0.0	ΟK
240	min	Winter	25.733	0.033	0.7	0.0	ΟK
360	min	Winter	25.729	0.029	0.5	0.0	ΟK
480	min	Winter	25.726	0.026	0.4	0.0	ΟK

Storm			Rain	Flooded	Discharge	Time-Peak
Event			(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	81.719	0.0	1.1	18
30	min	Summer	52.383	0.0	1.6	23
60	min	Summer	32.061	0.0	2.1	36
120	min	Summer	19.041	0.0	2.6	68
180	min	Summer	13.895	0.0	2.9	102
240	min	Summer	11.067	0.0	3.1	134
360	min	Summer	8.018	0.0	3.4	190
480	480 min Summer		6.376	0.0	3.6	254
600	600 min Summer		5.334	0.0	3.8	306
720	720 min Summer		4.609	0.0	3.9	370
960	min	Summer	3.659	0.0	4.2	492
1440	min	Summer	2.640	0.0	4.5	736
2160	min	Summer	1.903	0.0	4.7	1100
2880	min	Summer	1.507	0.0	4.9	1460
4320	min	Summer	1.085	0.0	5.0	2176
5760	min	Summer	0.858	0.0	5.1	2936
7200	min	Summer	0.716	0.0	5.0	3696
8640	min	Summer	0.617	0.0	4.9	4384
10080	080 min Summer		0.544	0.0	4.8	5088
15	min	Winter	81.719	0.0	1.3	17
30	min	Winter	52.383	0.0	1.9	22
60	min	Winter	32.061	0.0	2.4	40
120	min	Winter	19.041	0.0	3.0	72
180	min	Winter	13.895	0.0	3.3	106
240	min	Winter	11.067	0.0	3.6	140
360	min	Winter	8.018	0.0	3.9	196
480	min	Winter	6.376	0.0	4.2	262
		©198	32-2015	XP Sol	utions	

Infrastruct CS Ltd		Page 2
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:32	Designed by Tim.Trotman	
File Plot 6 - COGH - 1 in 30yr.srcx	Checked by	Digitight
Innovyze	Source Control 2015.1	·

Summary of Results for 30 year Return Period

S	torm vent	Max Leve (m)	Max l Depth (m)	Max Control (1/s)	Max Volume (m³)	Status
600 1	min Win	ter 25.72	4 0.024	0.3	0.0	ОК
720 1	min Win	ter 25.72	2 0.022	0.3	0.0	ΟK
960 1	min Win	ter 25.71	9 0.019	0.2	0.0	ΟK
1440 1	min Win	ter 25.71	6 0.016	0.2	0.0	ОК
2160 1	min Win	ter 25.71	3 0.013	0.1	0.0	ОК
2880 1	min Win	ter 25.71	2 0.012	0.1	0.0	ΟK
4320 1	min Win	ter 25.71	0 0.010	0.1	0.0	ОК
5760 1	min Win	ter 25.71	0 0.010	0.1	0.0	ОК
7200 1	min Win	ter 25.70	9 0.009	0.0	0.0	ОК
8640 1	min Win	ter 25.70	8 0.008	0.0	0.0	ΟK
10080 1	min Win	ter 25.70	7 0.007	0.0	0.0	ОК

Sto Eve	orm ent	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
600 mi	n Winter	5.334	0.0	4.3	330
720 mi	n Winter	4.609	0.0	4.5	376
960 mi	n Winter	3.659	0.0	4.8	498
1440 mi	n Winter	2.640	0.0	5.1	742
2160 mi	n Winter	1.903	0.0	5.4	1072
2880 mi	n Winter	1.507	0.0	5.6	1444
4320 mi	n Winter	1.085	0.0	5.8	2180
5760 mi	n Winter	0.858	0.0	5.9	2888
7200 mi	n Winter	0.716	0.0	5.9	3776
8640 mi	n Winter	0.617	0.0	5.9	4304
10080 mi	n Winter	0.544	0.0	5.8	5112

Infras	struct	CS Ltd											Page 3	3
The St	ables													
High (Cogges,	Witney											4	\sim
Oxford	dshire												Mic	
Date 1	L5/10/2	2020 17:	32			Des	signed	by Tim.	Trotma	an				
File H	Plot 6	- COGH ·	- 1 ir	n 30yr	.srcx	Che	ecked b	су					DIC	maye
Innovy	yze					Sou	arce Co	ontrol 2	015.1				1	
	Rainfall Details													
				Rainfa	ll Model			FSR	Win	ter Sto	rms Yes			
			Return	Period	(years)			30	С	v (Summ	er) 0.750			
				245	Region	Englanc	d and Wa	ales	C	v (Wint	er) 0.840			
				CM	-60 (mm)		20.	.800 Short	lest St	orm (mi	ns) 10090			
				Summe	r Storms		0.	Yes	Climat	e Chang	ns) 10000 e % +0			
				0 dilililo	2 0002110			100	01111100	onang	0 0 10			
						G	reen F	Roof						
				Dopros	Ar Ar	rea (m³)) 113 E	vaporatio	n (mm/o	day) iont 0 (3			
				Debress	STOIL SCOTS	ige (iiiii) 5	Decay C	OGITIC	Lenc 0.0	000			
Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.002053	24	28	0.000618	48	52	0.000186	72	76	0.000056	96	100	0.000017
4	8	0.001681	28	32	0.000506	52	56	0.000153	76	80	0.000046	100	104	0.000014
8	12	0.001376	32	36	0.000415	56	60	0.000125	80	84	0.00038	104	108	0.000011
12	16	0.001127	36	40	0.000339	60	64	0.000102	84	88	0.000031	108	112	0.000009
16	20	0.000923	40	44	0.000278	64	68	0.000084	88	92	0.000025	112	116	0.00008
20	24	0.000755	44	48	0.000228	68	72	0.000069	92	96	0.000021	116	120	0.000006

Infrastruct CS Ltd		Page 4
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:32	Designed by Tim.Trotman	
File Plot 6 - COGH - 1 in 30yr.srcx	Checked by	Digiliada
Innovyze	Source Control 2015.1	

<u>Model Details</u>

Storage is Online Cover Level (m) 26.600

<u>Pipe Structure</u>

Diameter (m) 0.150 Slope (1:X) 80.000 Length (m) 10.000 Invert Level (m) 25.700

Pipe Outflow Control

Diameter (m) 0.150 Roughness k (mm) 0.600 Upstream Invert Level (m) 25.700 Slope (1:X) 60.0 Entry Loss Coefficient 0.500 Length (m) 10.000 Coefficient of Contraction 0.600

INFRASTRUCT CS LTD		Page 1
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 19:24	Designed by Tim	
File Plot 6 - COGH.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Summary of Results for 100 year Return Period (+30%)

avel Data (m) .755 0 .755 0 .757 0 .757 0 .757 0 .757 0 .753 0 .749 0 .749 0 .749 0 .746 0 .741 0 .737 0 .733 0 .733 0 .734 0 .712 0 .714 0 .713 0 .712 0 .714 0 .714 0 .712 0 .715 0 .714 0 .716 0 .759 0 .743 0 .743 0 .743 0 .732 0 .729 0 .729 0 .729 0 .729 0	epth (m) .055 .058 .057 .053 .049 .046 .041 .037 .035 .033 .030 .025 .022 .018 .015 .014 .013 .012 .011 .060 .059 .052 .047 .043 .038 .034 .038 .034 .032 .029 Rai (mm/)	Control (1/s) 1.8 1.9 1.6 1.4 1.2 1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	Volume (m ³) 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.0	0 K K K K K K K K K K K K K K K K K K K
(m) .755 0 .758 0 .757 0 .753 0 .749 0 .746 0 .741 0 .737 0 .735 0 .716 0 .759 0 .759 0 .759 0 .759 0 .752 0 .743 0 .743 0 .738 0 .738 0 .738 0 .738 0 .732 0 .735 0	<pre>(m) .055 .058 .057 .053 .049 .046 .041 .037 .035 .030 .025 .022 .018 .015 .014 .013 .012 .011 .060 .059 .052 .047 .034 .032 .034 .032 .034 .032 .034 .032 .034</pre>	(1/5) 1.8 1.9 1.9 1.6 1.4 1.2 1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.1 2.1 2.1 2.1 2.1 0.5 1.6 1.5 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	(m ⁻) 3 0.1 3 0.1 5 0.1 4 0.1 5 0.1 4 0.1 2 0.1 2 0.1 0 0.0 5 0.0 5 0.0 5 0.0 6 0.0 6 0.0 6 0.0 7 0.0 8 0.0 9 0.0 1 0.0 1 0.0 9 0.0 1	0 K 0 K 0 K 0 K 0 C 0 C 0 C 0 C 0 C 0 C 0 C 0 C 0 C 0 C
.755 0 .758 0 .757 0 .757 0 .749 0 .749 0 .746 0 .741 0 .737 0 .735 0 .733 0 .733 0 .733 0 .725 0 .718 0 .715 0 .714 0 .715 0 .711 0 .711 0 .711 0 .711 0 .759 0 .759 0 .759 0 .759 0 .759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .733 0 .732 0 .734 0 .732 0 .734 0 .732 0 .734 0 .732 0 .734 0 .732 0 .732 0 .734 0 .732 0 .732 0 .734 0 .732 0 .7	.055 .058 .057 .053 .049 .046 .041 .037 .035 .033 .030 .025 .022 .018 .015 .014 .013 .012 .011 .060 .061 .059 .052 .047 .043 .038 .034 .038 .034 .029 Rai (mm/)	1.8 1.9 1.6 1.4 1.2 1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	8 0.1 9 0.1 9 0.1 5 0.1 5 0.1 6 0.1 7 0.0 8 0.0 7 0.0 6 0.0 6 0.0 6 0.0 6 0.0 8 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.1 9 0.1 9 0.1 9 0.1 9 0.1 9 0.1 9 0.1 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0 9 0.0	0 K K O K K C O K C O K C O K C O C C C O C C C O C C C C
.758 0 .757 0 .757 0 .753 0 .749 0 .746 0 .741 0 .737 0 .735 0 .735 0 .733 0 .730 0 .725 0 .722 0 .718 0 .715 0 .714 0 .715 0 .714 0 .715 0 .712 0 .716 0 .759 0 .759 0 .747 0 .743 0 .743 0 .743 0 .743 0 .743 0 .743 0 .743 0 .743 0 .745 0 .745 0 .745 0 .759 0 .747 0 .748 0 .749 0 .749 0 .749 0 .759 0 .749 0 .740 0 .740 0 .740 0 .740 0 .740 0 .740 0 .759 0 .740 0 .740 0 .740 0 .740 0 .740 0 .740 0 .740 0 .759 0 .740 0 .7	.058 .057 .053 .049 .046 .041 .037 .035 .033 .030 .025 .022 .018 .015 .014 .013 .014 .013 .012 .011 .060 .059 .052 .047 .043 .034 .034 .034 .032 .029 Rai (mm/)	1.9 1.9 1.6 1.4 1.2 1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.5 0.4 0.5 0.4 0.3 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	0 0 1 0 0 1 0 0 1 0 0 1 2 0 1 2 0 1 2 0 0 3 0 0 4 0 0 5 0 0 6 0 0 6 0 0 6 0 0 7 0 0 8 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 9 0 0 10 0 0 11 <td>0 K K O K O K O C K O C K O C K O C C C C</td>	0 K K O K O K O C K O C K O C K O C C C C
.757 0 .753 0 .749 0 .746 0 .741 0 .737 0 .735 0 .735 0 .733 0 .730 0 .725 0 .722 0 .718 0 .715 0 .714 0 .715 0 .714 0 .713 0 .712 0 .716 0 .759 0 .759 0 .752 0 .747 0 .743 0 .743 0 .743 0 .743 0 .743 0 .747 0 .743 0 .747 0 .749 0 .740 0 .759 0 .747 0 .740 0 .747 0 .747 0 .742 0 .747 0 .742 0 .747 0 .742 0 .747 0 .742 0 .747 0 .742 0 .747 0 .742 0 .742 0 .747 0 .742 0 .744 0 .742 0 .744 0 .7	.057 .053 .049 .046 .041 .037 .035 .033 .030 .025 .022 .018 .015 .014 .013 .012 .011 .060 .059 .052 .047 .043 .034 .034 .032 .029 Rai (mm/)	1.9 1.6 1.4 1.2 1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.2 0.1 0.1 0.1 0.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 0.4 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	0 0 1 5 0 1 2 0 1 2 0 1 2 0 1 3 0 0 4 0 1 5 0 0 5 0 0 6 0 0 6 0 0 7 0 0 8 0 0 9 0 1 10 0 1 11 0 0 12 0 1 13 0 1 14 0 0 15 0 1 16 0 0 17 0 0 18 0 0 19 0 0 10 0 0 11 0 0 12 0 0 13 0 0 14 0 0	0 K K 0 K 0 K K 0 K 0 K K 0
.753 0 .749 0 .746 0 .741 0 .737 0 .735 0 .733 0 .730 0 .725 0 .722 0 .718 0 .715 0 .714 0 .715 0 .714 0 .713 0 .712 0 .711 0 .760 0 .759 0 .759 0 .747 0 .747 0 .743 0 .743 0 .738 0 .738 0 .732 0 .732 0 .732 0 .732 0 .734 0 .732 0 .734 0 .732 0 .734 0 .732 0 .734 0 .732 0 .734 0 .735 0 .734 0 .735 0 .735 0 .735 0 .735 0 .735 0 .735 0 .735 0 .737 0 .738 0 .739 0 .747 0 .739 0 .747 0 .749 0 .7	.053 .049 .046 .041 .037 .035 .033 .030 .025 .022 .018 .015 .014 .013 .012 .011 .060 .059 .052 .047 .043 .038 .034 .032 .032 .029 Rai (mm/)	1.6 1.4 1.2 1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.2 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 0.4 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	5 0.1 4 0.1 2 0.1 2 0.1 3 0.0 4 0.0 5 0.0 5 0.0 5 0.0 5 0.0 6 0.0 6 0.0 7 0.0 8 0.0 9 0.0 10 0.1 10 0.1 11 0.0 12 0.0 13 0.1 14 0.0 15 0.1 16 0.0 17 0.0 18 0.0 19 0.0 10 0.0 10 0.0 11 0.0 12 0.0 13 0.0 14 0.0 15 0.0 16 0.0 17 0.0 18 0.0 19	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.749 0 .746 0 .741 0 .737 0 .735 0 .733 0 .725 0 .722 0 .718 0 .715 0 .714 0 .715 0 .714 0 .713 0 .712 0 .711 0 .760 0 .761 0 .759 0 .759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .729 0	.049 .046 .041 .037 .035 .025 .022 .018 .015 .014 .013 .012 .011 .060 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	1.4 1.2 1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	4 0.1 2 0.1 3 0.0 3 0.0 5 0.0 5 0.0 5 0.0 5 0.0 5 0.0 6 0.0 6 0.0 7 0.0 8 0.0 9 0.0 10 0.1 10 0.1 10 0.1 11 0.0 12 0.0 13 0.1 14 0.0 15 0.1 16 0.0 17 0.0 18 0.0 19 0.0 10 0.0 10 0.0 11 0.0 12 0.0 13 0.0 14 0.0 15 0.0 16 0.0 17 0.0 18 0.0 19	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
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.741 0 .737 0 .735 0 .733 0 .725 0 .722 0 .718 0 .715 0 .714 0 .713 0 .714 0 .713 0 .711 0 .760 0 .761 0 .759 0 .759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .729 0	.041 .037 .035 .033 .025 .022 .018 .015 .014 .013 .012 .011 .060 .061 .059 .052 .047 .043 .034 .034 .034 .032 .029 Rai (mm/)	1.0 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.2 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 11 11 0.8	0 0.0 3 0.0 5 0.0 5 0.0 5 0.0 6 0.0 7 0.0 6 0.0 8 0.0 2 0.0 2 0.0 2 0.0 2 0.0 3 0.0 4 0.0 5 0.1 5 0.1 5 0.1 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
. 737 0 .735 0 .733 0 .725 0 .722 0 .718 0 .715 0 .715 0 .714 0 .713 0 .712 0 .711 0 .760 0 .761 0 .759 0 .759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .729 0	.037 .035 .033 .030 .025 .022 .018 .015 .014 .013 .012 .011 .060 .061 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.2 0.1 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim	3 0.0 5 0.0 5 0.0 5 0.0 6 0.0 7 0.0 8 0.0 9 0.0 2 0.0 2 0.0 2 0.0 2 0.0 2 0.0 3 0.1 5 0.1 5 0.1 5 0.0 7 0.0 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
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.733 0 .730 0 .725 0 .722 0 .718 0 .715 0 .715 0 .714 0 .713 0 .712 0 .711 0 .760 0 .759 0 .759 0 .759 0 .752 0 .747 0 .743 0 .738 0 .734 0 .732 0 .729 0 .729 0	.033 .030 .025 .022 .018 .015 .014 .013 .012 .011 .060 .061 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	0.6 0.5 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim	5 0.0 5 0.0 6 0.0 8 0.0 9 0.0 2 0.0 2 0.0 2 0.0 2 0.0 2 0.0 3 0.0 4 0.0 5 0.1 5 0.1 5 0.0 6 0.0 7 0.0 6 0.0 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0 7 0.0 6 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
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.725 0 .722 0 .718 0 .715 0 .714 0 .713 0 .712 0 .711 0 .760 0 .761 0 .759 0 .752 0 .747 0 .743 0 .738 0 .734 0 .734 0 .732 0 .729 0	.025 .022 .018 .015 .014 .013 .012 .011 .060 .052 .047 .043 .034 .034 .034 .034 .034 .032 .029 Rai (mm/)	0.4 0.3 0.2 0.1 0.1 0.1 0.1 2.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim		0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.722 0 .718 0 .715 0 .714 0 .713 0 .712 0 .711 0 .760 0 .761 0 .759 0 .759 0 .752 0 .747 0 .743 0 .738 0 .734 0 .732 0 .729 0	.022 .018 .015 .014 .013 .012 .011 .060 .059 .052 .047 .043 .034 .034 .034 .032 .029 Rai (mm/)	0.3 0.2 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.0 0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.712 0 .713 0 .714 0 .714 0 .712 0 .711 0 .760 0 .761 0 .759 0 .747 0 .743 0 .743 0 .738 0 .734 0 .732 0 .729 0	.012 .013 .014 .013 .012 .011 .060 .052 .047 .043 .034 .034 .034 .032 .029 Rai (mm/)	0.2 0.2 0.1 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim	2 0.0 2 0.0 2 0.0 2 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.715 0 .715 0 .714 0 .713 0 .712 0 .711 0 .761 0 .759 0 .747 0 .747 0 .743 0 .738 0 .734 0 .734 0 .732 0 .729 0	.015 .014 .013 .012 .011 .060 .061 .059 .052 .047 .043 .034 .034 .034 .032 .029 Rai (mm/)	0.2 0.1 0.1 0.1 0.1 0.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim	2 0.0 2 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.713 0 .714 0 .713 0 .712 0 .711 0 .760 0 .761 0 .759 0 .759 0 .747 0 .743 0 .743 0 .738 0 .738 0 .738 0 .738 0 .732 0 .732 0 .732 0	.013 .014 .013 .012 .011 .059 .052 .047 .043 .034 .034 .032 .032 Rai (mm/2)	0.2 0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim	. 0.0 . 0.0 . 0.0 . 0.0 . 0.1 . 0.1 5 0.1 5 0.1 5 0.1 5 0.1 5 0.1 5 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.714 0 .713 0 .712 0 .711 0 .760 0 .760 0 .759 0 .759 0 .752 0 .747 0 .743 0 .743 0 .738 0 .738 0 .732 0 .732 0	.014 .013 .012 .011 .060 .059 .052 .047 .043 .034 .034 .032 .032 .029 Rai (mm/2)	0.1 0.1 0.1 2.1 2.1 2.0 1.6 1.3 0.7 0.6 0.5 in Tim hr) (n	. 0.0 . 0.0 . 0.0 . 0.1 . 0.1 5 0.1 5 0.1 5 0.1 5 0.1 5 0.1 5 0.0 5 0.0 6 0.0 5 0.0 5 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.713 0 .712 0 .711 0 .760 0 .760 0 .759 0 .759 0 .752 0 .747 0 .743 0 .743 0 .738 0 .738 0 .732 0 .732 0 .729 0	.013 .012 .011 .060 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	0.1 0.1 0.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim 'hr) (n	. 0.0 . 0.0 . 0.1 . 0.1 . 0.1 5 0.1 5 0.1 . 0.0 8 0.0 7 0.0 5 0.0 5 0.0 6 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
. /12 0 .711 0 .760 0 .761 0 .759 0 .752 0 .747 0 .743 0 .743 0 .738 0 .734 0 .732 0 .729 0	.012 .011 .060 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	0.1 0.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim 'hr) (n	. 0.0 . 0.1 . 0.1 . 0.1 . 0.1 . 0.1 . 0.1 . 0.1 . 0.0 . 0.0 . 0.0 . 0.0 . 0.0 . 0.0 . 0.0 . 0.0 . 0.0 . 0.1 . 0.0 . 0.1 . 0.1 . 0.1 . 0.0 . 0.0 . 0.1 . 0.1 . 0.0 . 0.1 . 0.1 . 0.0 . 0.1 . 0.0 . 0.1 . 0.1 . 0.1 . 0.0 . 0.1 . 0.0 . 0.1 . 0.0 . 0.0.	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
./11 0 .760 0 .761 0 .759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .729 0	.011 .060 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	0.1 2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim 'hr) (n	. 0.0 . 0.1 . 0.1 . 0.1 5 0.1 5 0.1 . 0.0 8 0.0 7 0.0 5 0.0 5 0.0 6 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.760 0 .761 0 .759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .729 0	.060 .061 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	2.1 2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim 'hr) (n	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K 0 K
.761 0 .759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .729 0	.061 .059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	2.1 2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim 'hr) (n	0.1 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.0	0 K 0 K 0 K 0 K 0 K 0 K 0 K
.759 0 .752 0 .747 0 .743 0 .738 0 .738 0 .734 0 .732 0 .729 0	.059 .052 .047 .043 .038 .034 .032 .029 Rai (mm/)	2.0 1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim hr) (n	0 0.1 0 0.1 0 0.1 0 0.0 0	0 K 0 K 0 K 0 K 0 K
.752 0 .747 0 .743 0 .738 0 .734 0 .732 0 .729 0	.052 .047 .043 .038 .034 .032 .029 Rai (mm/)	1.6 1.3 1.1 0.8 0.7 0.6 0.5 in Tim hr) (n	5 0.1 3 0.1 4 0.0 5 0.0 6 0.0 5 0.0 6 0.0 6 0.0 6 0.0 6 0.0	0 K 0 K 0 K 0 K 0 K
.747 0 .743 0 .738 0 .734 0 .732 0 .729 0	.047 .043 .038 .034 .032 .029 Rai (mm/)	1.3 1.1 0.8 0.7 0.6 0.5 in Tim hr) (n	3 0.1 4 0.0 5 0.0 6 0.0 6 0.0 6 0.0 6 0.0 6 0.0	0 K 0 K 0 K 0 K 0 K
.743 0 .738 0 .734 0 .732 0 .729 0 Summer	.043 .038 .034 .032 .029 Rai (mm/2	1.1 0.8 0.7 0.6 0.5 in Tim (hr) (n	0.0 0.0 0.0 0.0 0.0 0.0 e-Peak	0 K 0 K 0 K 0 K
.738 0 .734 0 .732 0 .729 0	.038 .034 .032 .029 Rai (mm/2	0.8 0.7 0.6 0.5 in Tim (hr) (n	8 0.0 7 0.0 5 0.0 6 0.0 6 0.0	0 K 0 K 0 K
.734 0 .732 0 .729 0	.034 .032 .029 Rai (mm/	0.7 0.6 0.5 in Tim hr) (n	0.0 0.0 0.0 e-Peak	0 K 0 K 0 K
.732 0 .729 0 	.032 .029 Rai (mm/	0.6 0.5 in Tim hr) (n	0.0 0.0 e-Peak	0 K 0 K
.729 0 Summer	.029 Rai (mm/	0.5 in Tim hr) (n	0.0 e-Peak	ΟK
. Summer	Rai (mm/)	in Tim hr) (n	e-Peak	
: Summer	(mm/)	hr) (n		
Summer			nins)	
Summer				
	138.	220	14	
Summer	89.	266	19	
Summer	54.	817	38	
Summer	32.	511	68	
Summer	23.	643	102	
Summer	18.	757	128	
Summer	13.	517	192	
Summer	10.	710	256	
Summer	8.	935	316	
Summer	7.	702	368	
Summer	6.	089	496	
Summer	4.	367	732	
Summer	3.	127	1112	
Summer	2.	465	1476	
Summer	1.	761	2140	
Summer	1.	387	2928	
Summer	1	151	3584	
Summer	∴ • ∩	988	4384	
Summor	۰ ۱	869	5000	
Wintor	U. 130	220	10	
Winter	100. 00	266	10	
winter	09. 54	∠ UU 0 1 7	ZZ 4.0	
winter	54.	O⊥/ ⊏11	40	
winter	32.	DII CAO	12	
Winter	23.	643	104	
Winter	18.	757	136	
Winter	13.	517	204	
Winter	10.	710	256	
Winter	8.	935	320	
Winter	7.	702	384	
	Summer Summer Summer Summer Summer Summer Summer Summer Summer Ninter Winter Winter Winter Winter Winter Winter	Summer 10. Summer 8. Summer 7. Summer 6. Summer 4. Summer 3. Summer 2. Summer 1. Summer 1. Summer 0. Summer 0. Winter 138. Winter 89. Winter 32. Winter 23. Winter 18. Winter 13. Winter 10. Winter 8. Winter 7.	Summer 10.710 Summer 8.935 Summer 7.702 Summer 6.089 Summer 4.367 Summer 3.127 Summer 2.465 Summer 1.761 Summer 1.387 Summer 1.151 Summer 0.988 Summer 0.869 Winter 138.220 Winter 89.266 Winter 54.817 Winter 32.511 Winter 32.511 Winter 18.757 Winter 13.517 Winter 10.710 Winter 8.935 Winter 7.702	Summer 10.710 256 Summer 8.935 316 Summer 7.702 368 Summer 6.089 496 Summer 4.367 732 Summer 3.127 1112 Summer 2.465 1476 Summer 1.761 2140 Summer 1.387 2928 Summer 0.988 4384 Summer 0.988 4384 Summer 0.869 5080 Winter 138.220 13 Winter 54.817 40 Winter 32.511 72 Winter 32.643 104 Winter 13.517 204 Winter 10.710 256 Winter 8.935 320 Winter 7.702 384

INFRASTRUCT CS LTD		Page 2
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 19:24	Designed by Tim	
File Plot 6 - COGH.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Summary of Results for 100 year Return Period (+30%)

Storm Event				Max Level (m)	Max Depth (m)	Max Contr (1/s	ol \)	Max Volume (m³)	Stati	ıs	
	960	min	Wint	er	25.726	0.026	0	.4	0.0	0	K
	1440 2160	mın min	Wint	er er	25.722	0.022	0	.3 .2	0.0	0	K K
	2880	min min	Wint	er or	25.715	0.015	0	.2	0.0	0	K
	4320 5760	min	Wint	er	25.712	0.013	0	•1	0.0	0	K
	7200 8640	min min	Wint Wint	er er	25.711	0.011	0	.1 .1	0.0	0	K K
	10080	min	Winter		25.710	0.010	0 in Ti	.1	0.0	0	K
Eve		Eve	nt	(mm/	'hr)	(mir	ns)				
			960	mir	Winte	r 6.	089		496		
			1440	mir	Winte	r 4.	367		736		
			2160 2880	mir mir	n Winte Winte	r 3.	127 465		1144 1488		
			4320	mir	Winte	r 1.	761		2264		
			5760 7200	mir mir	n Winte n Winte	r 1. r 1.	387 151		3000 3392		
			8640	mir	Winte	r 0.	988		4096		
		1	.0080	mir	1 Winte	r 0.	869		5208		

INFRASTRUCT CS LTD	Page 3	
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 19:24	Designed by Tim	
File Plot 6 - COGH.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Yes	er Storms	Winter	FSR		ll Model	Rainfal	
0.750	(Summer)	Cv (100		(years)	Period	Return
0.840	(Winter)	Cv (and Wales	England	Region		
15	rm (mins)	Shortest Storm	20.800		-60 (mm)	M5-	
10080	rm (mins)	Longest Storm	0.438		Ratio R		
+30	Change 🖇	Climate C	Yes		r Storms	Summer	

<u>Green Roof</u>

Roof Area (m²) 113 Evapo-transpiration (mm/day)3Depression Storage (mm)5Decay Coefficient - k 0.050

<u> Time / Area Diagram</u>

Time (mins)	Area (ha)										
0-4	0.002053	20-24	0.000755	40-44	0.000278	60-64	0.000102	80-84	0.000038	100-104	0.000014
4-8	0.001681	24-28	0.000618	44-48	0.000228	64-68	0.000084	84-88	0.000031	104-108	0.000011
8-12	0.001376	28-32	0.000506	48-52	0.000186	68-72	0.000069	88-92	0.000025	108-112	0.000009
12-16	0.001127	32-36	0.000415	52-56	0.000153	72-76	0.000056	92-96	0.000021	112-116	0.000008
16-20	0.000923	36-40	0.000339	56-60	0.000125	76-80	0.000046	96-100	0.000017	116-120	0.000006

INFRASTRUCT CS LTD	Page 4	
Station Point		
Old Station Way		
Eynsham Oxon OX29 4TL		
Date 27/07/2015 19:24	Designed by Tim	
File Plot 6 - COGH.srcx	Checked by	
Micro Drainage	Source Control W.12.6	

Model Details

Storage is Online Cover Level (m) 26.600

<u>Pipe Structure</u>

Diameter (m) 0.150 Slope (1:X) 80.000 Length (m) 10.000 Invert Level (m) 25.700

Pipe Outflow Control

Diameter (m) 0.150 Roughness k (mm) 0.600 Upstream Invert Level (m) 25.700 Slope (1:X) 60.0 Entry Loss Coefficient 0.500 Length (m) 10.000 Coefficient of Contraction 0.600 Appendix G – Plot 8, The Victory Pub

	M	anhole Sched	ule				
MANHOLE REF	INVERT LEVEL	COVER LEVEL	CHAMBER DETAILS	COVER DETAILS	GRADE	IEØ	LENGTH
F0	26.640(500) 26.990(150)	30.55	Existing	Existing	1 in	(mm)	
F1	27.916(OUT) 29.984(IN)	30.65	1200Ø	600 x 600 C250	9.7	150	9.0
F2	30.918	32.05	600 x 450	600 x 450 B125 recessed	15.0	150	14.0
F3	31.200	32.09	600 x 450	600 x 450 B125 recessed	80.0	150	22.5
F1	27.916	30.65	1200Ø	600 x 600 C250	60.0	150	80
F4	28.050	29.17	450 x 900	600 x 450 B125 recessed *	60.0	150	7.6
F5	28.175	29.17	450 x 900	600 x 450 B125 recessed *	60.0	150	7.5
	07.600(460)						-
Spur	27.630(100)	-	-	-	3.2	100	4.5
F6	29.019	30.29	600x450	recessed	60	100	9.0
F7	29.241	30.16	600x450	recessed	60	100	9.5
F8	29.400	30.07	600x450	recessed			<u> </u>
	27.916(OUT)						
F1	28.975(IN)	30.65	1200Ø	600 x 600 C250	60.0	150	1.5
S1	29.000	30.80	1500Ø	600 x 600 C250	200.0	Crates	13.5
S2	30.600	32.00	750 x 1200	recessed	60.0	150	11.0
S3	30.783	32.06	750 x 1200	600 x 450 B125 recessed	60.0	150	13.0
S4	31.000	32.07	600 x 450	600 x 450 B125 recessed			
62	20.702	22.06	750 - 4200	600 x 450 B125			
33	30.783	32.06	750 X 1200	recessed 600 x 450 B125	55.0	150	12.0
55	31.000	32.08	600 x 450	recessed		DIC Invention	
	IL to be confirm	ed prior to com	nencing works on	site	P	PIC INVERT L	eveis
•	Double sealed I	oolt down cover				10	IL.
					(<u> </u>	31.150





Construction Note It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforesee obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

nent is	NOTES / KEY:									
oreseen nage is ortive	Drainage Key Sewers									
onne		Foul water drain	(private/non ad	optable)						
		Surface water dra	ain (private/nor	adoptable)						
		 Foul water sewer Surface water se 	(Adoptable) wer (Adoptable)						
		Combined sewer		,						
	Chamber Key									
	•	Miniaccesschar	nber(mac) - 30	0mmØ *						
		PPIC - 475mmØ *								
		Adoptable dema	arcation manho	le						
		Within 1m of bour	ndary *							
		Depth 1.25 to 1.5 Depth 1.55 to 3.0	m * m *							
	* General note	dotolis 8 long soc	tions for chamb	or sizes						
	Size may need to	increase dependa	int on number o	f incoming						
	F1	Manhole referen	ce number							
	•	Rain water down	pipe (roddable	e access)						
	rg	Floor gully (trapp	ed)							
		Anti back flow va	ilve							
	FFL	i ciriear urainage c								
	XX.XX	Finished Floor Lev	ei (FFL)							
		Brown Roof								
		Foundation Impa	cted by Draina	ge						
		Location of Cran	e Base (TBC)							
		Internal step in FF Backdrop	L							
		sucharop								
		Hydrobrake flow	control valve							
		Sonder tra								
		service trench								
	Note:	cations takes for		MR.E						
	Drawing. Subje	ct to confirmation.	i ingleton Wood	rvlőzt.						
	Surface Water									
	Elow rates redu	ced to those detail	ed within planni	ng approved						
	FRA produced	Flow rates reduced to those detailed within planning approved FRA produced by Campbell Reith with storage to cater for 1:100								
	year +30% climate change in line with planning condition 28.									
	Foul Water									
	foul flows.	es suncient capac	ity with system i	orincreased						
		1 1								
	03/03/20	NJ TST ASBU	LT							
	03/03/20 MARK DATE	NJ TST ASBU BY CHKD. REVIS	ILT SION NOTES							
	03/03/20 MARK DATE	NJ TST AS BU BY CHKD. REVIS C.D.M.	ILT JON NOTES							
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	03/03/20 MARK DATE SIGNIFICANT RIS SPECIAL STI PROJECT:	NJ TST AS BU BY CHKD. REVIS C.D.M. KS AND HAZARDS:	ILT ION NOTES IESIS SPECIA 20 IRONMON LONDON ECZV 8EP T: -44 (0)201 www.kesis.net	L STRUCTURES SER LANE 2 6002912						
	03/03/20 MARK DATE SIGNIFICANT RIS SPECIAL STI PROJECT: PIOT 8 -	NJ TST AS BU BY CHKD. REVIS C.D.M. KS AND HAZARDS:	ILT IESIS SPECIA 20 IRONMON EDIDO ECZV 8EP T: +44 (0)202 WWW.kess.net	L STRUCTURES SER LANE 26002912						
	03/03/20 MARK DATE SIGNIFICANT RIS SPECIAL STI PROJECT: PIOT 8 - Regents	NJ TST AS BU BY CHKD. REVIS C.D.M. KS AND HAZARDS: RUCTURES The Victo S Park Est	ILT IESIS SPECIA 20 IROMMON EC2V 8EP T: +44 (0)202 WWW.lesis.net Dry Pub ate Infil	L STRUCTURES SER LANE 2 6002912						
	03/03/20 MARK DATE SIGNIFICANT RIS SPECIAL STI PROJECT: PIOT 8 - Regents DRAWING TIT	NJ TST AS BU BY CHKD REVIS C.D.M. KS AND HAZARDS: RUCTURES The Victors Park Est LE:	ILT IESIS SPECIA 20 IRONMON EC2V 8EP T: +44 (0)20 www.lesis.net Dory Pub ate Infil	L STRUCTURES SER LANE 7 6002912						
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	DARK DATE SIGNIFICANT RIS SPECIAL STI PROJECT: PIOT 8 - Regents DRAWING TIT Propose STATUS: SCALE AT A1:	NU TST ASBU BY CHKD. REVIS C.D.M. SAND HAZARDS:	IESIS SPECIA IESIS SPECIA 20 IRONMON LONDON EC2V 8EP T: +44 (0)202 WWW.lesis.net Pry Pub ate Infil ge Plan ILLT DERWIK:	L STRUCTURES SER LANE 7 6002912						
	DAWING TIT PROJECT: PIOT 8 - Regents DRAWING TIT Propose STATUS: SCALE AT A1: 1:100	NU TST ASBU BY CHKD. REVIS C.D.M. KS AND HAZARDS:	IESIS SPECIA IESIS SPECIA 20 IRONMON LONDON EC2V 8EP T: +44 (0)202 WWW.lesis.net Dry Pub ate Infil ge Plan ILLT DEWWR: NJ	L STRUCTURES SER LANE 7 6002912] CHECKED: TST						
	DARK DATE SIGNIFICANT RIS SPECIAL STI PROJECT: PIOT 8 - Regents DRAWING TIT Propose STATUS: SCALE AT A1: 1:100 JOB NUMBER:	NU TST ASBU BY CHKD. REVIS C.D.M. SAND HAZARDS:	IESIS SPECIA IESIS SPECIA 20 IRONMON LONDON EC2V 8EP T: +44 (0)202 WWW.lesis.net Dry Pub ate Infil ge Plan ILLT DRWW. NJ STATUS:	L STRUCTURES SER LANE 7 6002912 1 CHECKED: TST REVISION:						
7	DAWING THE PROJECT: PIOL 8 - Regents DRAWING THE Propose STATUS: SCALE AT A1: 1:100 JOB MUMBER: SE1238	NJ TST AS BU BY CHKD REVIS C.D.M. KS AND HAZARDS:	ILT IESIS SPECIA 20 IRONMON LONDON EC2V 8EP T: +44 (0)202 WWW.lesis.net Orty Pub ate Infil ge Plan ILLT DRAWNE NJ STATUS: AB	L STRUCTURES SER LANE 7 6002912 1 CHECKED: TST REVISION:						

AS BUILT DRAWING (THIS DRAWING IS THE FINAL CONSTRUCTION ISSUE AND DOES NOT PURPORT TO BE A SURVEY OF THE WORKS AS CONSTRUCTED) TVP-ISS-XX-00-DR-C-361

Infractruct CS Itd		Dago 1
		rage I
The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:35	Designed by Tim.Trotman	
File Plot 8 - TVP - Rev A - 1 in 2yr	Checked by	Diamaye
Innovyze	Source Control 2015.1	*

Summary of Results for 2 year Return Period

Half Drain Time : 6 minutes.

	Storn Event	n C	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
1 5		Q	20 556	0 1 5 6	0.0	C F		2 2	0 77
10	min	Summer	29.556	0.156	0.0	6.5	6.5	2.2	OK
30	min	Summer	29.552	0.152	0.0	6.4	6.4	2.2	OK
100	m±n	Summer	29.526	0.120	0.0	5.2	5.2	1.0	0 K
120	min	Summer	29.498	0.098	0.0	3.8	3.8	1.4	OK
180	min	Summer	29.482	0.082	0.0	3.0	3.0	1.2	OK
240	min	Summer	29.4/3	0.073	0.0	2.5	2.5	1.0	OK
360	mın	Summer	29.460	0.060	0.0	1.9	1.9	0.9	ΟK
480	min	Summer	29.453	0.053	0.0	1.6	1.6	0.8	ОК
600	min	Summer	29.448	0.048	0.0	1.3	1.3	0.7	ΟK
720	min	Summer	29.444	0.044	0.0	1.2	1.2	0.6	ОК
960	min	Summer	29.438	0.038	0.0	0.9	0.9	0.5	ОК
1440	min	Summer	29.432	0.032	0.0	0.7	0.7	0.5	ОК
2160	min	Summer	29.426	0.026	0.0	0.5	0.5	0.4	ΟK
2880	min	Summer	29.423	0.023	0.0	0.4	0.4	0.3	ΟK
4320	min	Summer	29.419	0.019	0.0	0.3	0.3	0.3	ΟK
5760	min	Summer	29.417	0.017	0.0	0.2	0.2	0.2	ОК
7200	min	Summer	29.415	0.015	0.0	0.2	0.2	0.2	ОК
8640	min	Summer	29.414	0.014	0.0	0.2	0.2	0.2	ΟK
10080	min	Summer	29.413	0.013	0.0	0.2	0.2	0.2	ΟK
15	min	Winter	29.567	0.167	0.0	6.9	6.9	2.4	O K
30	min	Winter	29.551	0.151	0.0	6.3	6.3	2.2	ΟK
60	min	Winter	29.517	0.117	0.0	4.8	4.8	1.7	ОК
120	min	Winter	29.485	0.085	0.0	3.2	3.2	1.2	ОК
180	min	Winter	29.470	0.070	0.0	2.4	2.4	1.0	ΟK
240	min	Winter	29.461	0.061	0.0	2.0	2.0	0.9	ΟK
360	min	Winter	29.450	0.050	0.0	1.4	1.4	0.7	ΟK

Storm Event		Rain (mm/hr)	Flooded Volume	Discharge Volume	Time-Peak (mins)	
				()	(
15	min	Summer	42.980	0.0	4.5	16
30	min	Summer	27.473	0.0	5.8	24
60	min	Summer	16.881	0.0	7.1	40
120	min	Summer	10.146	0.0	8.5	70
180	min	Summer	7.490	0.0	9.4	100
240	min	Summer	6.029	0.0	10.1	130
360	min	Summer	4.425	0.0	11.1	190
480	min	Summer	3.548	0.0	11.9	250
600	min	Summer	2.988	0.0	12.5	310
720	min	Summer	2.597	0.0	13.1	372
960	min	Summer	2.080	0.0	14.0	494
1440	min	Summer	1.522	0.0	15.3	738
2160	min	Summer	1.113	0.0	16.8	1104
2880	min	Summer	0.892	0.0	18.0	1472
4320	min	Summer	0.652	0.0	19.7	2204
5760	min	Summer	0.522	0.0	21.0	2936
7200	min	Summer	0.439	0.0	22.1	3592
8640	min	Summer	0.382	0.0	23.1	4352
10080	min	Summer	0.339	0.0	23.9	5096
15	min	Winter	42.980	0.0	5.0	16
30	min	Winter	27.473	0.0	6.5	24
60	min	Winter	16.881	0.0	7.9	40
120	min	Winter	10.146	0.0	9.5	70
180	min	Winter	7.490	0.0	10.6	100
240	min	Winter	6.029	0.0	11.3	130
360	min	Winter	4.425	0.0	12.5	190
		©198	32-2015	XP Sol	utions	

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The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:35	Designed by Tim.Trotman	
File Plot 8 - TVP - Rev A - 1 in 2yr	Checked by	Digitige
Innovyze	Source Control 2015.1	

	Stor	m	Max	Max	Max	Max	Max	Max	Status
	Even	nt	Level	Depth	Infiltration	Control X	E Outflow	Volume	
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
480	min	Winter	29.444	0.044	0.0	1.2	1.2	0.6	ΟF
600	min	Winter	29.439	0.039	0.0	1.0	1.0	0.6	ΟK
720	min	Winter	29.436	0.036	0.0	0.9	0.9	0.5	O F
960	min	Winter	29.432	0.032	0.0	0.7	0.7	0.4	O I
1440	min	Winter	29.426	0.026	0.0	0.5	0.5	0.4	OH
2160	min	Winter	29.422	0.022	0.0	0.4	0.4	0.3	OH
2880	min	Winter	29.419	0.019	0.0	0.3	0.3	0.3	OH
4320	min	Winter	29.416	0.016	0.0	0.2	0.2	0.2	OH
5760	min	Winter	29.414	0.014	0.0	0.2	0.2	0.2	OH
7200	min	Winter	29.413	0.013	0.0	0.1	0.1	0.2	O F
8640	min	Winter	29.412	0.012	0.0	0.1	0.1	0.2	O F
10080	min	Winter	29.411	0.011	0.0	0.1	0.1	0.2	O I

	Stor Even	m t	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min	Winter	3.548	0.0	13.3	250
600	min	Winter	2.988	0.0	14.0	312
720	min	Winter	2.597	0.0	14.6	372
960	min	Winter	2.080	0.0	15.6	492
1440	min	Winter	1.522	0.0	17.2	738
2160	min	Winter	1.113	0.0	18.8	1076
2880	min	Winter	0.892	0.0	20.1	1452
4320	min	Winter	0.652	0.0	22.1	2200
5760	min	Winter	0.522	0.0	23.6	2880
7200	min	Winter	0.439	0.0	24.8	3664
8640	min	Winter	0.382	0.0	25.8	4320
10080	min	Winter	0.339	0.0	26.8	5144

Infrastruct CS Ltd		Page 3
The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:35	Designed by Tim.Trotman	
File Plot 8 - TVP - Rev A - 1 in 2yr	Checked by	Diamatje
Innovyze	Source Control 2015.1	

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.056

Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.000	4	8	0.056

Infrastruct CS									
	S Ltd							E	Page 4
The Stables									
High Cogges, W	∛itney								
Oxfordshire									Micco
Date 15/10/202	20 17:35			Designed	by Tim.	.Trotman			
File Plot 8 -	TVP - R	ev A - 1	in 2yr	Checked	by				Dialinatic
Innovyze				Source C	ontrol 2	2015.1			
				<u>Model De</u>	tails				
			Storage is	Online Cove	er Level	(m) 30.800			
			Cellu	lar Stora	<u>ge Struc</u>	ture			
			_						
		Infiltrati	In In Coefficie	vert Level	(m) 29.4 hr) 0.000	00 Safety 00 Pc	Factor 2.0 prosity 0.95		
		Infiltrati	on Coefficie	nt Side (m/l	hr) 0.000	00	100109 0.90		
Depth (m) Ar	ea (m²) I	inf. Area	(m ²) Depth (1	m) Area (m²)	Inf. Ar	ea (m²) De	epth (m) Are	a (m²) Inf	. Area (m²)
0.000	15.0		15.0 0.8	00 15.0)	27.4	0.900	0.0	28.2
			<u>Hydro-</u>	Brake® Out	tflow Cc	<u>ntrol</u>			
	Desig	n Head (m)	0.800 Hydro)-Brake® Typ	e Md6 SW	Only Inve	rt Level (m)	29.400	
	Design	Flow (l/s)	8.0 I)iameter (mm)	123			
Depth (m) Fl	ow (l/s)	Depth (m)	Flow (1/s)	Depth (m) Fl	Low (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0	0.800	7.9	2.000	12.2	4.000	17.3	7.000	22.8
0.200	7.6	1.000	8.7	2.200	12.8	4.500	18.3	7.500	23.6
0.300	8.0	1.200	9.5	2.400	13.4	5.000	19.3	8.000	24.4
0 400	7.6	1.400	10.2	2.600	13.9	5.500	20.2	8.500	25.2
0.400	/ / /	1 600	10.9	3.000	15.0	6.000	21.1	9.000	25.9
0.500	7.4	1 000	11 6	2 500	16 1	6 500	22 0	0 500	26 6

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High Cogges, Witney		4
Oxfordshire		Micco
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Innovyze	Source Control 2015.1	•

Summary of Results for 30 year Return Period

Half Drain Time : 7 minutes.

	Storm Event	1 :	Max Level	Max Depth	Max Infiltration	Max Control	Max Σ Outflow	Max Volume	Status
			(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
15	min S	Summer	29.730	0.330	0.0	8.0	8.0	4.7	ОК
30	min S	Summer	29.729	0.329	0.0	8.0	8.0	4.7	ΟK
60	min S	Summer	29.656	0.256	0.0	8.0	8.0	3.6	ΟK
120	min S	Summer	29.570	0.170	0.0	7.0	7.0	2.4	ΟK
180	min S	Summer	29.534	0.134	0.0	5.6	5.6	1.9	ОК
240	min S	Summer	29.514	0.114	0.0	4.7	4.7	1.6	ΟK
360	min S	Summer	29.492	0.092	0.0	3.5	3.5	1.3	ΟK
480	min S	Summer	29.479	0.079	0.0	2.8	2.8	1.1	ОК
600	min S	Summer	29.470	0.070	0.0	2.4	2.4	1.0	ОК
720	min S	Summer	29.464	0.064	0.0	2.1	2.1	0.9	ΟK
960	min S	Summer	29.455	0.055	0.0	1.7	1.7	0.8	ΟK
1440	min S	Summer	29.445	0.045	0.0	1.2	1.2	0.6	ΟK
2160	min S	Summer	29.437	0.037	0.0	0.9	0.9	0.5	ΟK
2880	min S	Summer	29.432	0.032	0.0	0.7	0.7	0.5	ΟK
4320	min S	Summer	29.426	0.026	0.0	0.5	0.5	0.4	ΟK
5760	min S	Summer	29.423	0.023	0.0	0.4	0.4	0.3	ΟK
7200	min S	Summer	29.420	0.020	0.0	0.3	0.3	0.3	ΟK
8640	min S	Summer	29.419	0.019	0.0	0.3	0.3	0.3	ΟK
10080	min S	Summer	29.417	0.017	0.0	0.2	0.2	0.2	ΟK
15	min V	Winter	29.772	0.372	0.0	8.0	8.0	5.3	O K
30	min V	Winter	29.749	0.349	0.0	8.0	8.0	5.0	ΟK
60	min V	Winter	29.632	0.232	0.0	7.9	7.9	3.3	ΟK
120	min V	Winter	29.541	0.141	0.0	5.9	5.9	2.0	ΟK
180	min V	Winter	29.510	0.110	0.0	4.5	4.5	1.6	ΟK
240	min V	Winter	29.493	0.093	0.0	3.6	3.6	1.3	ΟK
360	min V	Winter	29.474	0.074	0.0	2.6	2.6	1.1	ОК

Storm Event		Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)	
15	min	Summer	81.719	0.0	8.6	17
30	min	Summer	52.383	0.0	11.0	25
60	min	Summer	32.061	0.0	13.5	40
120	min	Summer	19.041	0.0	16.0	70
180	min	Summer	13.895	0.0	17.5	100
240	min	Summer	11.067	0.0	18.6	130
360	min	Summer	8.018	0.0	20.2	190
480	min	Summer	6.376	0.0	21.4	250
600	min	Summer	5.334	0.0	22.4	310
720	min	Summer	4.609	0.0	23.2	372
960	min	Summer	3.659	0.0	24.6	492
1440	min	Summer	2.640	0.0	26.6	724
2160	min	Summer	1.903	0.0	28.8	1084
2880	min	Summer	1.507	0.0	30.4	1452
4320	min	Summer	1.085	0.0	32.8	2192
5760	min	Summer	0.858	0.0	34.6	2848
7200	min	Summer	0.716	0.0	36.1	3552
8640	min	Summer	0.617	0.0	37.3	4376
10080	min	Summer	0.544	0.0	38.4	5024
15	min	Winter	81.719	0.0	9.6	18
30	min	Winter	52.383	0.0	12.3	26
60	min	Winter	32.061	0.0	15.1	42
120	min	Winter	19.041	0.0	17.9	70
180	min	Winter	13.895	0.0	19.6	100
240	min	Winter	11.067	0.0	20.8	130
360	min	Winter	8.018	0.0	22.6	190
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Innovyze	Source Control 2015.1	

St	orm	Max	Max	Max	Max	Max	Max	Status
Ev	rent	Level	Depth	Infiltration	Control X	Outflow	Volume	
		(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
480 m	in Winter	29.464	0.064	0.0	2.1	2.1	0.9	ΟK
600 m	in Winter	29.457	0.057	0.0	1.8	1.8	0.8	ΟK
720 m	in Winter	29.452	0.052	0.0	1.5	1.5	0.7	Οŀ
960 m	in Winter	29.445	0.045	0.0	1.2	1.2	0.6	Οŀ
1440 m	in Winter	29.437	0.037	0.0	0.9	0.9	0.5	Οŀ
2160 m	in Winter	29.430	0.030	0.0	0.6	0.6	0.4	O F
2880 m	in Winter	29.426	0.026	0.0	0.5	0.5	0.4	Οŀ
4320 m	in Winter	29.422	0.022	0.0	0.4	0.4	0.3	Οŀ
5760 m	in Winter	29.419	0.019	0.0	0.3	0.3	0.3	ΟK
7200 m	in Winter	29.417	0.017	0.0	0.2	0.2	0.2	Οŀ
8640 m	in Winter	29.416	0.016	0.0	0.2	0.2	0.2	ΟK
10080 m	in Winter	29.414	0.014	0.0	0.2	0.2	0.2	ΟF

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	6.376	0.0	24.0	252
600 min Winter	5.334	0.0	25.1	312
720 min Winter	4.609	0.0	26.0	372
960 min Winter	3.659	0.0	27.5	494
1440 min Winter	2.640	0.0	29.8	732
2160 min Winter	1.903	0.0	32.2	1080
2880 min Winter	1.507	0.0	34.0	1472
4320 min Winter	1.085	0.0	36.7	2176
5760 min Winter	0.858	0.0	38.8	2840
7200 min Winter	0.716	0.0	40.4	3640
8640 min Winter	0.617	0.0	41.8	4296
10080 min Winter	0.544	0.0	43.0	5040

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High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:36	Designed by Tim.Trotman	
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Innovyze	Source Control 2015.1	·

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer) ().750
Region	England and Wales	Cv (Winter) (0.840
M5-60 (mm)	20.800	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins) 1	10080
Summer Storms	Yes	Climate Change %	+0

<u>Time Area Diagram</u>

Total Area (ha) 0.056

Time	(mins)	Area	Time	(mins)	Area	
From:	To:	(ha)	From:	To:	(ha)	
0	4	0.000	4	8	0.056	

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The Stables									,
High Cogges,	, Witney								
Oxfordshire									Mirro
Date 15/10/2	2020 17:30	5		Designe	ed by Tim.	Trotman			Drainago
File Plot 8	- TVP - H	Rev A - 1	in 30y	Checked	d by				Dialitage
Innovyze				Source	Control 2	2015.1			
				<u>Model I</u>	<u>Details</u>				
			Storage is	Online Co	wer Level	(m) 30 800			
			btorage 15	UNITING CC	JUCI DEVEL	(111) 50.000			
			Cellu	<u>ılar Stor</u>	age Struc	ture			
			Ir	vert Level	L (m) 29.4	00 Safety	Factor 2.0		
		Infiltratio	on Coefficie on Coefficie	ent Base (n ent Side (n	n/hr) 0.000 n/hr) 0.000	00 Po 00	rosity 0.95		
		111111010001	0		.,,,,				
Depth (m)	Area (m²)	Inf. Area (m ²) Depth (m) Area (m	1 ²) Inf. Are	ea (m²) Deg	pth (m) Are	a (m²) Inf	. Area (m²)
0.000	15.0	1	5.0 0.8	00 15	.0	27.4	0.900	0.0	28.2
			I			I			
			<u>Hydro-</u>	-Brake® O	utflow Co	ntrol			
						_			
	Design	gn Head (m) Flow (l/s)	0.800 Hydro)-Brake® T <u>y</u> Diameter (r	ype Md6 SW	Only Inver	t Level (m)	29.400	
	Debign	1100 (1/0)	0.0	Jianecci (i		120			
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0	0.800	7.9	2.000	12.2	4.000	17.3	7.000	22.8
0.200	7.6	1.000	8.7	2.200	12.8	4.500	18.3	7.500	23.6
0.300	8.0	1.200	9.5	2.400	13.4	5.000	19.3	8.000	24.4
0.400	7.6	1.400	10.2	2.600	13.9	5.500	20.2	8.500	25.2
0.500	7.4	1.600	10.9	3.000	15.0	6.000	21.1	9.000	25.9
0.000	7.4	1.000	11.0	5.500	10.1	0.000	22.0	9.300	20.0

Appendix H – Plot 9, St Bed's Mews



Drain	Drainage Key							
<u>26M6</u>	<u>85</u>	5-						
		- FOI	Foul water drain (private/non adoptable)					
		Fo	ul water	sewer (Adoptable)				
	_	Su	Surface water sewer (Adoptable)					
		Exi	Existing combined water sewer (Adopted)					
\sim	\sim	🗸 Re	Redundant sewer					
Char	mber Kev							
FW	SW							
		_						
×		PP	PPIC - 475mmØ *					
		P.C	C.C. unit	s/brick *				
		De	nnoie pth 1.25	to 1.5m *				
		De	pth 1.55	i to 3.0m *				
* Gene (Refer f	eral note lo standar	d det	aik & lo	na sections for chamber sizes				
Size ma	ay need to	o incr	ease de	pendant on number of incoming				
pipes/s	ize of inco	oming	pipes)					
	*	Re	cessed i	cover required				
	0	Ra	in water	down pipe (roddable access)				
		So	l vent p	ipe/soil stack				
	0	Ro	dding a	ccess required in vertical stack				
3	/9=	Ya	rd gully	(150m - 200mmØ trapped)				
	98	Flo	or gully	(trapped)				
		Ce	ellular sto	prage (refer to drawing for sizes)				
		E Lin	ear drai	nage channel				
_	○ ≋	Su	face w	ater rodding eye				
F	FL	Fin	ished Flo	oor Level (FFL)				
\mathbf{X}	K.XX	1						
		Int	ernal ste	ep in FFL				
		Gr	een Roo	of				
		Pile	e cap in	pacted by proposed drainage				
AC1	03/05/18	ER	TST	As-Constructed Issue				
FC1	23/06/17	NJ	TST	FINAL CONSTRUCTION ISSUE				
C4	15/07/16	NJ	TST	Updated M&E, Drainage amended				
C2	27/05/16	NI	TST	Undated M&F. Drainage amended				
03	21/00/16	INJ	131	opuateu wac, brainage amended				
C2	14/03/16	NJ	TST	Updated Layout, Drainage amended				
C1	05/02/16	SNN	TST	Updated Layout, Drainage amended				
P2	21/12/15	тят	DJ	RWP's updated				
P1	30/11/15	тят	DJ	Initial issue				
MARK	DATE	BY	CHKD	REVISION NOTES				
MARK DATE BY CH			CHIND.					
	C.D.M.							

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Plot 9 - St Bede's Mews Regents Park Estate Infill

Proposed Drainage Plan

AS-CONSTRUCTED						
SCALE AT A1:	DATE:	DRAWN:	CHECKED:			
1:100	Dec 2015	T.Trotman	DJ			
JOB NUMBER:	DRAWING NUMBER:		REVISION:			
SE1238	366		AC1			
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Oxfordshire		Micco				
Date 15/10/2020 17:38	Designed by Tim.Trotman					
File Plot 9 - SBM - 1 in 2yr.srcx	Checked by	Digitigh				
Innovyze	Source Control 2015.1					

Summary of Results for 2 year Return Period

	Stor	m +	Max	Max	Max	Max	Status
	Lven		(m)	(m)	(1/s)	(m ³)	
			(,	(,	(_/ -/	, ,	
15	min	Summer	28.839	0.019	0.2	0.0	ОК
30	min	Summer	28.847	0.027	0.4	0.0	ΟK
60	min	Summer	28.851	0.031	0.6	0.0	ΟK
120	min	Summer	28.850	0.030	0.5	0.0	ΟK
180	min	Summer	28.847	0.027	0.4	0.0	ΟK
240	min	Summer	28.845	0.025	0.4	0.0	ΟK
360	min	Summer	28.843	0.023	0.3	0.0	ΟK
480	min	Summer	28.841	0.021	0.3	0.0	ΟK
600	min	Summer	28.839	0.019	0.2	0.0	ΟK
720	min	Summer	28.838	0.018	0.2	0.0	ОК
960	min	Summer	28.836	0.016	0.2	0.0	ΟK
1440	min	Summer	28.834	0.014	0.1	0.0	ΟK
2160	min	Summer	28.832	0.012	0.1	0.0	ΟK
2880	min	Summer	28.831	0.011	0.1	0.0	ΟK
4320	min	Summer	28.830	0.010	0.1	0.0	ΟK
5760	min	Summer	28.829	0.009	0.0	0.0	ΟK
7200	min	Summer	28.828	0.008	0.0	0.0	ΟK
8640	min	Summer	28.827	0.007	0.0	0.0	ΟK
10080	min	Summer	28.827	0.007	0.0	0.0	ΟK
15	min	Winter	28.843	0.023	0.3	0.0	ΟK
30	min	Winter	28.850	0.030	0.5	0.0	ΟK
60	min	Winter	28.852	0.032	0.6	0.0	ОК
120	min	Winter	28.849	0.029	0.5	0.0	ΟK
180	min	Winter	28.846	0.026	0.4	0.0	ΟK
240	min	Winter	28.844	0.024	0.4	0.0	ΟK
360	min	Winter	28.841	0.021	0.3	0.0	ΟK
480	min	Winter	28.838	0.018	0.2	0.0	ΟK

	Stor	m	Rain	Flooded	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	42.980	0.0	0.3	31
30	min	Summer	27.473	0.0	0.6	32
60	min	Summer	16.881	0.0	0.8	44
120	min	Summer	10.146	0.0	1.1	70
180	min	Summer	7.490	0.0	1.3	96
240	min	Summer	6.029	0.0	1.4	132
360	min	Summer	4.425	0.0	1.6	192
480	min	Summer	3.548	0.0	1.7	250
600	min	Summer	2.988	0.0	1.8	312
720	min	Summer	2.597	0.0	1.9	374
960	min	Summer	2.080	0.0	2.0	502
1440	min	Summer	1.522	0.0	2.2	736
2160	min	Summer	1.113	0.0	2.3	1088
2880	min	Summer	0.892	0.0	2.4	1460
4320	min	Summer	0.652	0.0	2.4	2176
5760	min	Summer	0.522	0.0	2.3	2904
7200	min	Summer	0.439	0.0	2.2	3656
8640	min	Summer	0.382	0.0	2.2	4352
10080	min	Summer	0.339	0.0	2.1	5064
15	min	Winter	42.980	0.0	0.4	27
30	min	Winter	27.473	0.0	0.7	30
60	min	Winter	16.881	0.0	1.0	44
120	min	Winter	10.146	0.0	1.3	68
180	min	Winter	7.490	0.0	1.5	108
240	min	Winter	6.029	0.0	1.7	140
360	min	Winter	4.425	0.0	1.9	202
480	min	Winter	3.548	0.0	2.0	256
		©198	32-2015	XP Sol	utions	

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Oxfordshire		Micro
Date 15/10/2020 17:38	Designed by Tim.Trotman	
File Plot 9 - SBM - 1 in 2yr.srcx	Checked by	Digiliga
Innovyze	Source Control 2015.1	

Summary of Results for 2 year Return Period

	Stor Even	m t	Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status
600	min	Winter	28.837	0.017	0.2	0.0	ОК
720	min	Winter	28.835	0.015	0.2	0.0	ОК
960	min	Winter	28.834	0.014	0.1	0.0	ΟK
1440	min	Winter	28.832	0.012	0.1	0.0	ОК
2160	min	Winter	28.831	0.011	0.1	0.0	ОК
2880	min	Winter	28.830	0.010	0.1	0.0	ОК
4320	min	Winter	28.828	0.008	0.0	0.0	ОК
5760	min	Winter	28.827	0.007	0.0	0.0	ОК
7200	min	Winter	28.826	0.006	0.0	0.0	ОК
8640	min	Winter	28.826	0.006	0.0	0.0	ΟK
10080	min	Winter	28.826	0.006	0.0	0.0	ΟK

	Storm Event	1	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m³)	Time-Peak (mins)
600	min N	Winter	2.988	0.0	2.1	306
720	min N	Winter	2.597	0.0	2.2	384
960	min N	Winter	2.080	0.0	2.4	482
1440	min N	Winter	1.522	0.0	2.6	754
2160	min N	Winter	1.113	0.0	2.7	1108
2880	min N	Winter	0.892	0.0	2.8	1448
4320	min N	Winter	0.652	0.0	2.9	2228
5760	min N	Winter	0.522	0.0	2.9	2752
7200	min N	Winter	0.439	0.0	2.8	3680
8640	min N	Winter	0.382	0.0	2.7	4408
10080	min N	Winter	0.339	0.0	2.6	4824

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High Cogges, Witney							
Oxfordshire				Micco			
Date 15/10/2020 17:38	Designed by)esigned by Tim.Trotman					
File Plot 9 - SBM - 1 in 2yr.srcx	Checked by			Digiliarie			
Innovyze	Source Contr	ol 2015.1		.1			
Rainfall Model Return Period (years) Region Eng M5-60 (mm) Ratio R Summer Storms	FSR 2 gland and Wales 20.800 0.438 Yes <u>Green Roof</u>	Winter Storms Cv (Summer) Cv (Winter) Shortest Storm (mins) Longest Storm (mins) Climate Change %	Yes 0.750 0.840 15 10080 +0				
Area Depression Storage	(m ³) 113 Evapo: (mm) 5 Dec	ration (mm/day) 3 cay Coefficient 0.050					
Time (mins) Area Time (mins) Area T:	ime (mins) Ar	ea Time (mins)	Area Time	(mins) Area			

(mins)	Area	TTIME	(mins)	Area	TTWE	(mins)	ALEa	TTILE	(mitins)	ALEa	TTIME	(minis)	Alea
To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
4	0.002053	24	28	0.000618	48	52	0.000186	72	76	0.000056	96	100	0.000017
8	0.001681	28	32	0.000506	52	56	0.000153	76	80	0.000046	100	104	0.000014
12	0.001376	32	36	0.000415	56	60	0.000125	80	84	0.000038	104	108	0.000011
16	0.001127	36	40	0.000339	60	64	0.000102	84	88	0.000031	108	112	0.000009
20	0.000923	40	44	0.000278	64	68	0.000084	88	92	0.000025	112	116	0.000008
24	0.000755	44	48	0.000228	68	72	0.000069	92	96	0.000021	116	120	0.000006
	To: 4 8 12 16 20 24	To: (ha) 4 0.002053 8 0.001681 12 0.001376 16 0.001127 20 0.000923 24 0.000755	Area From: To: (ha) From: 4 0.002053 24 8 0.001681 28 12 0.001376 32 16 0.00127 36 20 0.000923 40 24 0.000755 44	To: (ha) From: To: 4 0.002053 24 28 8 0.001681 28 32 12 0.001376 32 36 16 0.00127 36 40 20 0.000923 40 44 24 0.000755 44 48	To: (ha) From: To: (ha) 4 0.002053 24 28 0.000618 8 0.001681 28 32 0.000506 12 0.001376 32 36 0.000415 16 0.000923 40 44 0.000278 24 0.000755 44 48 0.000228	(IIIIIS) Afea From: The (IIIIS) Afea Fine To: (ha) From: To: (ha) From: 4 0.002053 24 28 0.000618 48 8 0.001681 28 32 0.000506 52 12 0.001376 32 36 0.000415 56 16 0.001127 36 40 0.000339 60 20 0.000923 40 44 0.00278 64 24 0.000755 44 48 0.00228 68	Ministry Afea fine (minist) Afea fine (minist) To: (ha) From: To: (ha) From: To: 4 0.002053 24 28 0.000618 48 52 8 0.001681 28 32 0.000506 52 56 12 0.001376 32 36 0.000415 56 60 16 0.001127 36 40 0.000339 60 64 20 0.000923 40 44 0.000278 64 68 24 0.000755 44 48 0.000228 68 72	Millisy Alea Hime Millsy Alea Hime Millsy Alea To: (ha) From: To: (ha) From: To: (ha) 4 0.002053 24 28 0.000618 48 52 0.000186 8 0.001681 28 32 0.000506 52 56 0.000125 12 0.001376 32 36 0.000339 60 64 0.000125 16 0.00127 36 40 0.000278 64 68 0.00084 24 0.000755 44 48 0.000228 68 72 0.000069	(mins) Afea fine (mins) Afea fine (mins) Afea fine To: (ha) From: To: (ha) From: To: (ha) From: 4 0.002053 24 28 0.000618 48 52 0.000186 72 8 0.001681 28 32 0.000506 52 56 0.000153 76 12 0.001376 32 36 0.000415 56 60 0.000125 80 16 0.001127 36 40 0.000278 64 68 0.00084 88 24 0.000755 44 48 0.00228 68 72 0.000069 92	Minisy Afea Hine Minisy Minisy <th< td=""><td>Millisy Afea fine (millisy) Afea fine (millisy) Afea To: (ha) From: To: (ha) From: To: (ha) From: To: (ha) From: To: (ha) 4 0.002053 24 28 0.000618 48 52 0.000186 72 76 0.000056 8 0.001681 28 32 0.000506 52 56 0.000153 76 80 0.000046 12 0.001376 32 36 0.000339 60 64 0.000102 84 88 0.000331 16 0.000923 40 44 0.000278 64 68 0.000084 88 92 0.000025 24 0.000755 44 48 0.000228 68 72 0.000069 92 96 0.000021</td><td>Millisy Afea finde (millisy) finde</td><td>Millisy Afea fille Millisy Millisy</td></th<>	Millisy Afea fine (millisy) Afea fine (millisy) Afea To: (ha) From: To: (ha) From: To: (ha) From: To: (ha) From: To: (ha) 4 0.002053 24 28 0.000618 48 52 0.000186 72 76 0.000056 8 0.001681 28 32 0.000506 52 56 0.000153 76 80 0.000046 12 0.001376 32 36 0.000339 60 64 0.000102 84 88 0.000331 16 0.000923 40 44 0.000278 64 68 0.000084 88 92 0.000025 24 0.000755 44 48 0.000228 68 72 0.000069 92 96 0.000021	Millisy Afea finde (millisy) finde	Millisy Afea fille Millisy Millisy

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The Stables		
High Cogges, Witney		
Oxfordshire		Micco
Date 15/10/2020 17:38	Designed by Tim.Trotman	
File Plot 9 - SBM - 1 in 2yr.srcx	Checked by	Digilight
Innovyze	Source Control 2015.1	L.

<u>Model Details</u>

Storage is Online Cover Level (m) 29.600

<u>Pipe Structure</u>

Diameter (m) 0.150 Slope (1:X) 60.000 Length (m) 5.000 Invert Level (m) 28.820

Pipe Outflow Control

Diameter (m) 0.150 Roughness k (mm) 0.600 Upstream Invert Level (m) 28.820 Slope (1:X) 60.0 Entry Loss Coefficient 0.500 Length (m) 5.000 Coefficient of Contraction 0.600

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The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:38	Designed by Tim.Trotman	
File Plot 9 - SBM - 1 in 30yr.srcx	Checked by	Digiliga
Innovyze	Source Control 2015.1	•

Summary of Results for 30 year Return Period

	Stor	m	Max	Max	Max	Max	Status
	Even	t	Level	Depth	Control	Volume	
			(m)	(m)	(1/s)	(m³)	
15	min	Summer	28.859	0.039	0.9	0.0	ΟK
30	min	Summer	28.864	0.044	1.1	0.0	ΟK
60	min	Summer	28.866	0.046	1.2	0.1	ОК
120	min	Summer	28.860	0.040	0.9	0.0	ΟK
180	min	Summer	28.857	0.037	0.8	0.0	ОК
240	min	Summer	28.855	0.035	0.7	0.0	ΟK
360	min	Summer	28.851	0.031	0.6	0.0	ΟK
480	min	Summer	28.849	0.029	0.5	0.0	ΟK
600	min	Summer	28.847	0.027	0.4	0.0	ΟK
720	min	Summer	28.845	0.025	0.4	0.0	ОК
960	min	Summer	28.843	0.023	0.3	0.0	ОК
1440	min	Summer	28.839	0.019	0.2	0.0	ОК
2160	min	Summer	28.836	0.016	0.2	0.0	ОК
2880	min	Summer	28.834	0.014	0.1	0.0	ОК
4320	min	Summer	28.832	0.012	0.1	0.0	ОК
5760	min	Summer	28.831	0.011	0.1	0.0	ОК
7200	min	Summer	28.830	0.010	0.1	0.0	ОК
8640	min	Summer	28.830	0.010	0.1	0.0	ОК
10080	min	Summer	28.829	0.009	0.1	0.0	ОК
15	min	Winter	28.862	0.042	1.0	0.0	ОК
30	min	Winter	28.867	0.047	1.3	0.1	ОК
60	min	Winter	28.865	0.045	1.2	0.0	ОК
120	min	Winter	28.860	0.040	0.9	0.0	ОК
180	min	Winter	28.856	0.036	0.8	0.0	ОК
240	min	Winter	28.853	0.033	0.7	0.0	ОК
360	min	Winter	28.849	0.029	0.5	0.0	ОК
480	min	Winter	28.846	0.026	0.4	0.0	ОК

	Stor	m	Rain	Flooded	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	81.719	0.0	1.1	18
30	min	Summer	52.383	0.0	1.6	23
60	min	Summer	32.061	0.0	2.1	36
120	min	Summer	19.041	0.0	2.6	72
180	min	Summer	13.895	0.0	2.9	102
240	min	Summer	11.067	0.0	3.1	130
360	min	Summer	8.018	0.0	3.4	196
480	min	Summer	6.376	0.0	3.6	252
600	min	Summer	5.334	0.0	3.8	314
720	min	Summer	4.609	0.0	3.9	374
960	min	Summer	3.659	0.0	4.2	498
1440	min	Summer	2.640	0.0	4.5	740
2160	min	Summer	1.903	0.0	4.7	1100
2880	min	Summer	1.507	0.0	4.9	1432
4320	min	Summer	1.085	0.0	5.0	2188
5760	min	Summer	0.858	0.0	5.1	2936
7200	min	Summer	0.716	0.0	5.0	3696
8640	min	Summer	0.617	0.0	4.9	4384
10080	min	Summer	0.544	0.0	4.8	5088
15	min	Winter	81.719	0.0	1.3	17
30	min	Winter	52.383	0.0	1.9	22
60	min	Winter	32.061	0.0	2.4	40
120	min	Winter	19.041	0.0	3.0	72
180	min	Winter	13.895	0.0	3.3	106
240	min	Winter	11.067	0.0	3.6	136
360	min	Winter	8.018	0.0	3.9	206
480	min	Winter	6.376	0.0	4.2	264
		©198	82-2015	XP Sol	utions	

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The Stables		
High Cogges, Witney		4
Oxfordshire		Micco
Date 15/10/2020 17:38	Designed by Tim.Trotman	
File Plot 9 - SBM - 1 in 30yr.srcx	Checked by	Dialinatic
Innovyze	Source Control 2015.1	1

Summary of Results for 30 year Return Period

	Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Statu	IS
600	min	Winter	28.844	0.024	0.3	0.0	0	K
720	min	Winter	28.842	0.022	0.3	0.0	0	K
960	min	Winter	28.839	0.019	0.2	0.0	0	Κ
1440	min	Winter	28.836	0.016	0.2	0.0	0	Κ
2160	min	Winter	28.833	0.013	0.1	0.0	0	K
2880	min	Winter	28.832	0.012	0.1	0.0	0	Κ
4320	min	Winter	28.830	0.010	0.1	0.0	0	K
5760	min	Winter	28.830	0.010	0.1	0.0	0	K
7200	min	Winter	28.829	0.009	0.0	0.0	0	K
8640	min	Winter	28.828	0.008	0.0	0.0	0	Κ
10080	min	Winter	28.827	0.007	0.0	0.0	0	Κ

	Stor	m	Rain Flooded Discha		Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
600	min	Winter	5.334	0.0	4.3	308
720	min	Winter	4.609	0.0	4.5	380
960	min	Winter	3.659	0.0	4.8	494
1440	min	Winter	2.640	0.0	5.1	732
2160	min	Winter	1.903	0.0	5.4	1116
2880	min	Winter	1.507	0.0	5.6	1472
4320	min	Winter	1.085	0.0	5.8	2180
5760	min	Winter	0.858	0.0	5.9	2888
7200	min	Winter	0.716	0.0	5.9	3440
8640	min	Winter	0.617	0.0	5.9	4296
10080	min	Winter	0.544	0.0	5.8	5112

Infras	struct	CS Ltd											Page	3
The St	cables													
High C	Cogges,	Witney								~				
Oxford	dshire												Mic	
Date 1	L5/10/2	2020 17:	38			Des	signed	by Tim.	Trotma	an				
File B	Plot 9	- SBM -	1 in	30yr.s	srcx	Che	ecked b	су					Uld	IIIaye
Innovy	yze					Sou	arce Co	ontrol 2	015.1					
			Return	Rainfa Period M5 Summe	ll Model (years) Region -60 (mm) Ratio R r Storms	<u>Rain</u> England	d and Wa 20. 0.	Petails FSR 30 ales .800 Short .438 Long Yes	Win C Cest St gest St Climat	ter Sto v (Summ v (Wint orm (mi orm (mi e Chang	rms Yes er) 0.750 er) 0.840 ns) 15 ns) 10080 e % +0			
						<u>.</u>	Green F	Roof						
				Depress	Ar sion Stora	rea (m³ ige (mm) 113 E) 5	vaporatio Decay C	n (mm/o oeffic:	day) Lent 0.0	3 050			
Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.002053	24	28	0.000618	48	52	0.000186	72	76	0.000056	96	100	0.000017
4	8	0.001681	28	32	0.000506	52	56	0.000153	76	80	0.000046	100	104	0.000014
8	12	0.001376	32	36	0.000415	56	60	0.000125	80	84	0.000038	104	108	0.000011

0	4	0.002053	24	28	0.000618	48	52 (0.000186	72	76	0.000056	96	100	0.000017
4	8	0.001681	28	32	0.000506	52	56 (0.000153	76	80	0.000046	100	104	0.000014
8	12	0.001376	32	36	0.000415	56	60 (0.000125	80	84	0.000038	104	108	0.000011
12	16	0.001127	36	40	0.000339	60	64 (0.000102	84	88	0.000031	108	112	0.000009
16	20	0.000923	40	44	0.000278	64	68 (0.000084	88	92	0.000025	112	116	0.000008
20	24	0.000755	44	48	0.000228	68	72 (0.000069	92	96	0.000021	116	120	0.000006
			1					1			1			

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The Stables		
High Cogges, Witney		<u> </u>
Oxfordshire		Micco
Date 15/10/2020 17:38	Designed by Tim.Trotman	
File Plot 9 - SBM - 1 in 30yr.srcx	Checked by	Digitigh
Innovyze	Source Control 2015.1	•

<u>Model Details</u>

Storage is Online Cover Level (m) 29.600

<u>Pipe Structure</u>

Diameter (m) 0.150 Slope (1:X) 60.000 Length (m) 5.000 Invert Level (m) 28.820

Pipe Outflow Control

Diameter (m) 0.150 Roughness k (mm) 0.600 Upstream Invert Level (m) 28.820 Slope (1:X) 60.0 Entry Loss Coefficient 0.500 Length (m) 5.000 Coefficient of Contraction 0.600

INFRASTRUCT CS LTD	Page 1			
Station Point				
Old Station Way				
Eynsham Oxon OX29 4TL				
Date 27/07/2015 18:07	Designed by Tim			
File Plot 9 - SBM.srcx	Checked by			
Micro Drainage	Source Control W.12.6	· – –		

Summary of Results for 100 year Return Period (+30%)

	Storm	Max	Max	Max	Max	Status
	Event	Level (m)	Depth (m)	(1/s)	(m ³)	
		(/	()	(_/-/	,	
15	min Summer	28.876	0.056	1.8	0.1	O K
30	min Summer	28.879	0.059	2.0	0.1	ΟK
60	min Summer	28.878	0.058	1.9	0.1	ΟK
120	min Summer	28.873	0.053	1.6	0.1	ΟK
180	min Summer	28.869	0.049	1.4	0.1	ΟK
240	min Summer	28.866	0.046	1.2	0.1	ΟK
360	min Summer	28.861	0.041	1.0	0.0	ΟK
480	min Summer	28.857	0.037	0.8	0.0	ΟK
600	min Summer	28.855	0.035	0.7	0.0	ΟK
720	min Summer	28.853	0.033	0.6	0.0	ΟK
960	min Summer	28.850	0.030	0.5	0.0	ОК
1440	min Summer	28.845	0.025	0.4	0.0	ОК
2160	min Summer	28.842	0.022	0.3	0.0	ΟK
2880	min Summer	28.838	0.018	0.2	0.0	ОК
4320	min Summer	- 28.835	0.015	0.2	0.0	ОК
5760	min Summer	28.833	0.013	0 1	0 0	0 K
7200	min Summer	- 28 833	0.013	0 1	0.0	0 K
2610	min Summer	- 28 832	0 012	0.1	0.0	0 K
10040	min Summer	- 20.002 - 20.002	0.012	0.1	0.0	0 K
10000	min Winter	- 20.001	0.011	0.1	0.0	
15	min Winter	. 20.001	100.001	2.1	0.1	O K
30	min Winter	28.881	0.061	2.1	0.1	OK
60	min Winter	28.879	0.059	2.0	0.1	O K
120	min Winter	28.8/2	0.052	1.6	0.1	ΟK
180	min Winter	28.868	0.048	1.3	0.1	ΟK
240	min Winter	28.863	0.043	1.1	0.0	ΟK
360	min Winter	28.857	0.037	0.8	0.0	ΟK
480	min Winter	28.854	0.034	0.7	0.0	ΟK
600	min Winter	28.851	0.031	0.6	0.0	ΟK
720	min Winter	28.849	0.029	0.5	0.0	ΟK
	St	torm	Rai	n Time	-Peak	
				-		
	E	vent	(mm/1	hr) (mi	ins)	
	Ev 15 m	vent in Summe	(mm/)	hr) (m i	i ns) 14	
	E1 5 m 30 m	vent in Summe in Summe	(mm/) r 138.2 r 89.2	hr) (mi 220 266	14 19	
	15 m 30 m 60 m	in Summe in Summe in Summe	(mm/l r 138.2 r 89.2 r 54.8	hr) (mi 220 266 817	14 19 38	
	15 m 30 m 60 m 120 m	in Summe in Summe in Summe in Summe	(mm/) r 138.2 r 89.2 r 54.8 r 32 5	hr) (m: 220 266 817 511	14 19 38 68	
	15 m 30 m 60 m 120 m	in Summe in Summe in Summe in Summe in Summe	(mm/) r 138.2 r 89.2 r 54.8 r 32.5 r 23.6	hr) (mi 220 266 817 511 643	14 19 38 68	
	15 m 30 m 60 m 120 m 180 m 240 m	in Summe in Summe in Summe in Summe in Summe	(mm/) r 138.2 r 89.2 r 54.8 r 32.5 r 23.6 r 18	hr) (mi 220 266 817 511 643 757	14 19 38 68 102 132	
	15 m 30 m 60 m 120 m 180 m 240 m	in Summe in Summe in Summe in Summe in Summe in Summe	(mm/) r 138.2 r 54.8 r 54.8 r 32.5 r 23.6 r 18.7 r 13.6	hr) (m: 220 266 817 511 643 757 517	14 19 38 68 102 132	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m	vent in Summe in Summe in Summe in Summe in Summe in Summe	(mm/l r 138.2 r 89.2 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5	hr) (m: 220 266 817 511 643 757 517 710	ins) 14 19 38 68 102 132 196 252	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m	vent in Summe in Summe in Summe in Summe in Summe in Summe in Summe	(mm/l r 138.2 r 89.2 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5 r 10.7	hr) (m: 220 266 817 511 643 757 517 710 925	ins) 14 19 38 68 102 132 196 252 212	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m	vent in Summe in Summe in Summe in Summe in Summe in Summe in Summe	(mm/l r 138.2 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5 r 10.7 r 8.9	hr) (m: 220 266 817 511 643 757 517 710 935 702	ins) 14 19 38 68 102 132 196 252 312 201	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 720 m	vent in Summe in Summe in Summe in Summe in Summe in Summe in Summe	(mm/l r 138.2 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5 r 10.7 r 8.9 r 7.7	hr) (m: 220 266 817 511 643 757 517 710 935 702 200	ins) 14 19 38 68 102 132 196 252 312 384 50	
	En 15 m 30 m 120 m 120 m 120 m 240 m 360 m 480 m 720 m 960 m	vent in Summe in Summe in Summe in Summe in Summe in Summe in Summe in Summe	(mm/l r 138.2 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5 r 10.7 r 8.9 r 7.7 r 6.6	hr) (m: 220 266 817 511 643 757 517 710 935 702 089	ins) 14 19 38 68 102 132 196 252 312 384 504 504	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 600 m 720 m 960 m 1440 m	vent in Summe in Summe in Summe in Summe in Summe in Summe in Summe in Summe in Summe	(mm/l r 138.2 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5 r 10.7 r 8.9 r 7.7 r 6.0 r 4.3	hr) (m: 220 266 817 511 643 757 517 710 935 702 089 367	ins) 14 19 38 68 102 132 196 252 312 384 504 730	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 600 m 720 m 960 m 1440 m 216 m	rent in Summe in Summe in Summe in Summe in Summe in Summe in Summe in Summe in Summe	(mm/l r 138.2 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5 r 10.7 r 8.9 r 7.7 r 6.0 r 4.3 r 3.5	hr) (m: 220 266 817 511 643 757 517 710 935 702 935 702 089 367 127	ins) 14 19 38 68 102 132 196 252 312 384 504 730 1096	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 600 m 720 m 960 m 1440 m 2160 m	rent in Summe in Summe	(mm/l r 138.2 r 54.8 r 54.8 r 32.5 r 23.6 r 18.7 r 13.5 r 10.7 r 8.9 r 7.7 r 6.0 r 4.3 r 3.7	hr) (m: 220 266 817 511 643 757 517 710 935 702 935 702 089 367 127 465	ins) 14 19 38 68 102 132 196 252 312 384 504 730 1096 1444	
	15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 600 m 720 m 960 m 1440 m 2160 m 2880 m 4320 m	rent in Summe in Summe	(mm/l r 138.2 r 54.8 r 54.8 r 32.5 r 18.7 r 13.5 r 10.7 r 13.5 r 10.7 r 6.0 r 4.3 r 3.7 r 2.4 r 1.7	hr) (mi 220 266 817 511 643 757 517 710 935 702 089 367 127 465 761	ins) 14 19 38 68 102 132 196 252 312 384 504 730 1096 1444 2140	
	Et 15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 600 m 720 m 960 m 1440 m 2160 m 2880 m 4320 m 5760 m	rent in Summe in Summe	(mm/l r 138.2 r 54.8 r 54.8 r 32.9 r 23.6 r 18.7 r 13.9 r 10.7 r 8.9 r 7.7 r 6.0 r 4.3 r 3.7 r 2.4 r 1.7	hr) (mi 220 266 817 511 643 757 517 710 935 702 089 367 127 465 761 387	ins) 14 19 38 68 102 132 196 252 312 384 504 730 1096 1444 2140 2896	
	Et 15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 600 m 720 m 960 m 1440 m 2160 m 2880 m 4320 m 5760 m	rent in Summe in Summe	(mm/l r 138.2 r 54.8 r 54.8 r 32.9 r 23.6 r 18.7 r 13.5 r 10.7 r 6.0 r 7.7 r 6.0 r 4.3 r 3.7 r 1.3 r 1.3	hr) (mi 220 266 817 511 643 757 517 710 935 702 089 367 127 465 761 387 151	ins) 14 19 38 68 102 132 196 252 312 384 504 730 1096 1444 2140 2896 3584	
	Et 15 m 30 m 60 m 120 m 180 m 240 m 360 m 480 m 600 m 720 m 960 m 1440 m 240 m 2880 m 4320 m 5760 m 7200 m 8640 m	rent in Summe in Summe	(mm/1 r 138.2 r 89.2 r 54.8 r 32.9 r 23.6 r 18.7 r 13.9 r 10.7 r 1.3 r 7.7 r 6.0 r 4.3 r 2.4 r 1.7 r 1.3 r 2.4 r 1.7 r 1.3 r 0.9	hr) (m: 220 266 817 511 643 757 517 710 935 702 089 367 127 465 761 387 151 988	ins) 14 19 38 68 102 132 196 252 312 384 504 730 1096 1444 2140 2896 3584 4336	
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Micro Drainage	Source Control W.12.6			

Summary of Results for 100 year Return Period (+30%)

:	Stor Even	m t		Max Level (m)	Max Depth (m)	Max Contro (1/s)	Max l Volume (m³)	Status
960	min	Wint	er	28.846	0.026	0.	4 0.0	ОК
1440	min	Wint	er	28.842	0.022	0.	3 0.0	ОК
2160	min	Wint	er	28.838	0.018	Ο.	2 0.0	ОК
2880	min	Wint	er	28.835	0.015	0.	2 0.0	ΟK
4320	min	Wint	er	28.833	0.013	Ο.	1 0.0	ОК
5760	min	Wint	er	28.832	0.012	0.	1 0.0	ОК
7200	min	Wint	er	28.831	0.011	Ο.	1 0.0	ОК
8640	min	Wint	er	28.830	0.010	0.	1 0.0	ОК
10080	min	Wint	er	28.830	0.010	Ο.	1 0.0	ОК
			Sto	rm	Ra	in Tir	ne-Peak	
			Eve	nt	(mm/	'hr) (mins)	
		960	mir	n Winte	r 6.	089	508	
		1440	mir	n Winte	r 4.	367	734	
		2160	mir	n Winte	r 3.	127	1092	
		2880	mir	n Winte	r 2.	465	1516	
		4320	mir	n Winte	r 1.	761	2264	
		5760	mir	n Winte	r 1.	387	3000	
		7200	mir	n Winte	r 1.	151	3768	
		8640	mir	n Winte	r 0.	988	4096	
	1	0800	mir	n Winte	r 0.	869	5208	

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<u>Rainfall Details</u>

Yes	Winter Storms	FSR	Rainfall Model
0.750	Cv (Summer)	100	Return Period (years)
0.840	Cv (Winter)	gland and Wales	Region
15	Shortest Storm (mins)	20.800	M5-60 (mm)
10080	Longest Storm (mins)	0.438	Ratio R
+30	Climate Change %	Yes	Summer Storms

<u>Green Roof</u>

Roof Area (m²) 113 Evapo-transpiration (mm/day)3Depression Storage (mm)5Decay Coefficient - k 0.050

<u> Time / Area Diagram</u>

Time (mins)	Area (ha)										
0-4	0.002053	20-24	0.000755	40-44	0.000278	60-64	0.000102	80-84	0.000038	100-104	0.000014
4-8	0.001681	24-28	0.000618	44-48	0.000228	64-68	0.000084	84-88	0.000031	104-108	0.000011
8-12	0.001376	28-32	0.000506	48-52	0.000186	68-72	0.000069	88-92	0.000025	108-112	0.000009
12-16	0.001127	32-36	0.000415	52-56	0.000153	72-76	0.000056	92-96	0.000021	112-116	0.000008
16-20	0.000923	36-40	0.000339	56-60	0.000125	76-80	0.000046	96-100	0.000017	116-120	0.000006

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Model Details

Storage is Online Cover Level (m) 29.600

<u>Pipe Structure</u>

Diameter (m) 0.150 Slope (1:X) 60.000 Length (m) 5.000 Invert Level (m) 28.820

Pipe Outflow Control

Diameter (m) 0.150 Roughness k (mm) 0.600 Upstream Invert Level (m) 28.820 Slope (1:X) 60.0 Entry Loss Coefficient 0.500 Length (m) 5.000 Coefficient of Contraction 0.600 Appendix I – Maintenance Manual



Infrastruct CS Ltd The Stables High Cogges Farm High Cogges Nr Witney Oxon OX29 6UN

Suds maintenance guide

OWNERS MANUAL

Scheme name: Regents Park Estate Document reference SE1238-07.010

Report Prepared By: Tim Trotman MEng (Hons), CEng, CWem, FIHE, MCIWEM

On behalf of Infrastruct CS Ltd

October 2020 Project Number: SE1238/ICS15-1872

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1.0 Introduction

This guidance provides best practice guidance on the maintenance of Sustainable Drainage Systems (SuDS) to facilitate their effective implementation within the Regents Park Estate Redevelopment.

Unlike conventional drainage systems, SuDS features are often visible and their function should be easily understood by those responsible for maintenance. When problems occur, they are generally obvious and can be remedied simply, using standard landscaping practice. If systems are properly monitored and maintained, any deterioration in performance can often be managed out.

Like any drainage system maintenance is a necessary and important consideration of SuDS design and sufficient thought should be given to long-term maintenance and its funding during feasibility and planning stages. In particular, the following requirements should be given full consideration:

1.1 Who is responsible for maintenance of the suds features used for this scheme

All SuDS measures will be the responsibility of Camden Council.

Following construction but prior to the completion/handover, the responsibility for maintenance shall lie with the developer.

1.2 Owner's manual

SuDS are different from conventional drainage and require different maintenance regimes. This manual details the following:

- location of all SuDS techniques in a site
- brief summary of how the techniques work, their purpose and how they can be damaged
- maintenance requirements (a maintenance plan) and a maintenance record
- explanation of the consequences of not carrying out the maintenance that is specified
- identification of areas where certain activities are prohibited (for example stockpiling materials on pervious surfaces)
- an action plan for dealing with accidental spillages
- advice on what to do if alterations are to be made to a development, if service companies undertake excavations or other similar works carried out that could affect the SuDS.

1.3 LOCATION OF SUDS TECHNIQUES USED ON THE SCHEME

The location of the SuDS features are shown on drawings included within the SUDS Report for the estate.

- 1.4 SUDS techniques used on this scheme:
 - Green Roofs
 - Geocellular/Modular Systems
 - Silt traps and catchpits
 - Flow control devices

1.5 Summary of how the techniques work for the scheme

Details of how the drainage has been designed for each site can be found within the SuDS drainage report under section 4.5.

1.6 Maintenance requirements

These are detailed in the appropriate section of this document.

1.7 Areas where activities are prohibited

Heavy loads should not be allowed in areas where cellular soakaways are located. Failure to do so may cause structural damage and collapse of the cellular limits.

1.8 Accidental spillages

Health and safety consideration are a priority and addressing accidental spillages should only be attempted if the nature of the spillage is known and it potential hazardous properties understood. The source of the spillage should be stopped and excess surface spillage removed by suction tank or absorption matts. Silt traps and sumps should be emptied by suction tanker. Areas of affected permeable paving should have the surface and laying course removed. The surfacing blocks should be cleaned and re-laid on new bedding material. Heavy pollution of the sub-base will require removal and replacement of the sub-base.

1.9 Alterations

If any alterations are proposed to the development, the design Engineer must be notified so that the impact/implications of the work can be assessed. Utilities should be restricted in the designated service zone areas.

1.10 Health and safety

To comply with the Construction (Design and Management) Regulations (CDM) 2015, designers must assess all foreseeable risks during construction and maintenance and the design must minimise them by the following (in order of preference):

- 1. Avoid.
- 2. Reduce.
- 3. Identify and mitigate residual risks.

CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated, reduced and/or controlled where appropriate. This information will be required as part of the health and safety file.

2.0 Operation and maintenance activity categories

There are likely to be three categories of maintenance activities:

- 1. Regular maintenance (including inspections and monitoring).
- 2. Occasional maintenance.
- 3. Remedial maintenance.

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

Occasional maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the regular tasks (e.g. sediment removal or filter replacement). Table 2 summarises the likely maintenance activities required for each SuDS component and guidance on specific maintenance activities is given in the following sections.

Remedial maintenance describes the intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design, construction and regular maintenance activities. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and so timings are difficult to predict. Remedial maintenance can comprise activities such as:

- inlet/outlet repairs
- erosion repairs
- reinstatement or realignment of edgings, barriers, rip-rap or other erosion control
- infiltration surface rehabilitation
- replacement of blocked filter fabrics
- construction stage sediment removal (although this activity should have been undertaken before the start of the maintenance contract)
- system rehabilitation immediately following a pollution event.

It is important to note that these remedial activities will not be required for all systems, but for the purpose of estimating whole life maintenance costs, a contingency sum of 15-20% should be

added to the annual regular and occasional maintenance costs to cover the risk of these activities being required.

Table 2 - Typical key SuDS components operation and maintenance activitiesFor full specifications, see individual chapters.

							9	SuDS	com	npon	ent							
O & M activity	Pond/wetland	Detention basin	Infiltration basin	Silt traps and catchpits	Soakaway	Infiltration trench	Filter trench	Modular storage	Pervious pavement	Swale/bioretention/green roofs	Filter strip	Sand filter	Pre-treatment systems	Perforated ring soakaways	Bio retention areas	Rain gardens	Oil interceptors	Flow control devices
Regular maintenance	2	T	1	T	T	1	1		1	1								
Inspection				-				-										
Litter/debris removal																		
Grass cutting																		
Weed/invasive plant control																		
Shrub management																		
Shoreline vegetation management																		
Aquatic vegetation managment																		
Irregular maintenand	e																	
Sediment management (*)				-				-										
Vegetation/plant replacement																		
Vacumn sweeping and brushing																		
Remedial maintenan	ce	r —	T	T	r —	I	1	r —	1	I	1	[1	[[[
Structure rehabilitation/repair																		
Infiltration surface reconditioning																		

■ Will be required

May be required

* Sediment should be collected and managed in pre-treatment systems, upstream of the main device.

The maintenance regime of a site also needs to consider the response to extreme pollution events. A response action plan should be developed and communicated to all those involved in the operation of a site, so that if a spillage occurs it can be prevented from causing pollution to receiving waters.

2.1 Regular maintenance activities

Inspections and reporting

Regular SuDS scheme inspections will:

- help determine optimum future maintenance activities
- confirm hydraulic, water quality, amenity and ecological performance
- allow identification of potential system failures, e.g. blockage, poor infiltration, poor water quality etc.

Inspections can generally be required at monthly site visits (e.g. for grass cutting) for little additional cost, and should, therefore, be subsumed into regular maintenance requirements. During the first year of operation, inspections should ideally be carried out after every significant storm event to ensure proper functioning, but in practice this may be difficult or impractical to arrange. Typical routine inspection questions that will indicate when occasional or remedial maintenance activities are required, and/or when water quality requires investigation include:

- are inlets or outlets blocked?
- does any part of the system appear to be leaking (especially ponds and wetlands)?
- is the vegetation healthy?
- is there evidence of poor water quality (e.g. algae, oils, milky froth, odour, unusual colourings)?
- is there evidence of sediment build-up?
- is there evidence of ponding above an infiltration surface?
- is there any evidence of structural damage that requires repair?
- are there areas of erosion or channelling over vegetated surfaces?

Litter/debris removal

This is an integral part of SuDS maintenance and reduces the risks of inlet and outlet blockages, retains amenity value and minimises pollution risks. High litter removal frequencies may be required at high profile commercial/retail parks where aesthetics are a major driver.

Grass cutting

It is recommended that grass cutting be minimised around SuDS facilities, apart from swales and filter strips and structural embankments where a height of 100–150 mm is recommended to prevent the plants falling over, or "lodging", when water flows across the surface. In general, allowing grass to grow tends to enhance water quality performance. Short grass around a wet system such as pond or wetland provides an ideal habitat for nuisance species such as geese; allowing the grass to grow is an effective means of discouraging them. Grass around wet pond or wetland systems should not be cut to the edge of the permanent water.

Grass cutting is an activity undertaken primarily to enhance the perceived aesthetics of the facility. The frequency of cutting will tend to depend on surrounding land uses, and public requirements. Therefore, grass cutting should be done as infrequently as possible, recognising the aesthetic concerns of local residents. However, grass around inlet and outlet infrastructure should be strimmed closely to reduce risks to system performance. If a manicured, parkland effect is required, then cutting will need to be undertaken more regularly than for meadow type grass areas, which aim to maximise habitat and biodiversity potential.

Weed/invasive plant control

Weeds are generally defined as vegetation types that are unwanted in a particular area. For SuDS, weeds are often alien or invasive species, which do not enhance the technical performance or aesthetic value of the system, or non-native species and the spread of which is undesirable.

In some places, weeding has to be done by hand to prevent the destruction of surrounding vegetation (hand weeding should generally be required only during the first year, i.e. during plant establishment). However, over grassed surfaces, mowing can be an effective management measure. The use of herbicides and pesticides should be prohibited since they cause water quality deterioration. The use of fertilisers should also be limited or prohibited to minimise nutrient loadings which are damaging to water bodies.

Shrub management

Shrubs tend to be densely planted and are likely to require weeding at the base, especially during the first year to ensure that they get enough water. Shrubs should be selected so they can grow to their maximum natural height without pruning.

Management of green waste

Appropriate methods should be implemented to dispose of green waste, including:

1 The development of wildlife piles

These provide refuges, hibernation shelter, food and egg laying sites for a large number of animals. When rotted down at the end of 3–5 years they provide compost that can be used as fertiliser for planting areas outside of the SuDS system.

In general:

- wildlife piles should be located in sunny or semi-shaded areas away from direct access by people
- their bases should be constructed using substantial prunings or other branch material laid in a criss-cross pattern
- seasonal shrub and other woody prunings should be added through the winter
- non-woody and grass cuttings should be added through the summer
- wildlife piles should comprise tidy piles up to 1.2 m high
- new wildlife piles should be constructed each year and old wildlife piles should be used as compost to plant beds after 3–5 years
- wildlife piles should be located above normal flood level of watercourses and be protected by hedges or similar features.

A schematic of a typical wildlife pile structure is shown in Figure 1.1.



Figure 1.1 Schematic of a wildlife pile (courtesy of Steve Wilson and Robert Bray of Sustainable Drainage Associates)

2 On- or off-site composting

A compost facility allows all green waste, particularly grass cuttings and prunings to be recycled and provide compost for mulching ornamental plant beds. The following process should be followed for composting:

- shred all arisings from site
- combine all arisings in active compost bin with grass cuttings not exceeding 70%
- turn and mix active compost when bin is >50% full, at weekly intervals for at least four weeks
- turn and mix full bin every 28 days until used
- combine adjacent compost bins/bays when contents are settled to 50% volume reduction
- Use compost after 3-4 months.

A schematic/photo of a typical composting structure is given in Figure 1.2.



Figure 1.2 Schematic of a composting structure (courtesy Steve Wilson and Robert Bray of Sustainable Drainage Associates)

3 Disposal to landfill

As a last resort, green waste can be disposed of to some approved tips or landfill sites, although it is only accepted at certain locations.

2.2 Irregular maintenance activities

Sediment removal

To ensure long-term effectiveness, the sediment that accumulates in SuDS should be removed periodically. The required frequency of sediment removal is dependent on many factors including:

- design of upstream drainage system
- type of system
- design storage volume
- characteristics of upstream catchment area (eg land use, level of imperviousness, upstream construction activities, erosion control management and effectiveness of upstream pre-treatment).

Sediment accumulation will typically be rapid for the entire construction period (including time required for the building, turfing and landscaping of all upstream development plots). Once a catchment is completely developed and all vegetation is well-established, sediment mobility and accumulation is likely to drop significantly.

Vegetation/plant replacement

Some replacement of plants may be required in the first 12 months after installation, especially after storm events. Dead or damaged plants should be removed and replaced to restore the prescribed number of living plants per hectare.

Inspection programmes should identify areas of filtration, or infiltration surfaces where vegetation growth is poor and likely to cause a reduced level of system performance. Such areas can then be rehabilitated and plant growth repaired.

2.3 Remedial maintenance

Structure rehabilitation/repair

There will come a time with most SuDS techniques when a major overhaul of the system is required to remove clogged filters, geotextiles, gravel etc. This will typically be between 10 and 25 years, depending on the technique and factors such as the type of catchment and sediment load. The SuDS design allows for vehicle access to undertake this work and consider the need for the overhaul without causing major disruption. For example, the use of geotextiles close to the surface in pervious surfaces traps the majority of sediment in a relatively easily accessible location. Reconstruction of the surface layer and bedding layer is all that is required, rather than reconstruction of the whole pavement depth.

Major overhaul is most likely to be required on techniques that rely on filtration through soils or aggregates, such as sand filters and infiltration devices. Other SuDS techniques are unlikely to need major overhaul if routine maintenance is undertaken as required (for example ponds and wetlands). Rehabilitation activities for each SuDS component are described in the individual component chapters. The requirements should be identified in the owner's manual.

Infiltration surface rehabilitation

In the event that grassed surface permeability has reduced, there are a number of landscape techniques that can be used to open the surface to encourage infiltration.

Such activities are not commonplace and are likely to be required only in circumstances where silt has not been effectively managed upstream.

- 1. Scarifying to remove "thatch". Thatch is a tightly intermingled organic layer of dead and living shoots, stems and roots, developing between the zone of green vegetation and the soil surface. Scarifying with tractor-drawn or self-propelled equipment to a depth of at least 50 mm breaks up silt deposits, removes dead grass and other organic matter and relieves compaction of the soil surface.
- 2. Spiking or tining the soil, using aerating equipment to encourage water percolation. This is particularly effective if followed by top dressing with a medium to fine sand and is best undertaken when the soil is moist. Spiking or tining with tractor drawn or self-propelled equipment penetrates and perforates soil layers to a depth of at least 100 mm (at 100 mm centres) and allows the entry of air, water, nutrients and top-dressing materials.
- 3. As a last resort, it may be necessary to remove and replace the grass and topsoil by:
 - removing accumulated silt and (subject to a toxicity test) applying to land or dispose
 of to landfill
 - removing damaged turf which should be composted
 - cultivating remaining topsoil to required levels

- re-turfing (using turf of a quality and appearance to match existing) or reseeding (to BS 7370: Part 3, Clause 12.6 (BSI, 1991) using seed to match existing turf) area to required levels. It may be necessary to supply and fix fully biodegradable coir blanket to protect seeded soil. Turf and seeded areas should be top dressed with fine sieved topsoil to BS 3882 (BSI, 1994) to achieve final design levels. Watering will be required to promote successful germination and/or establishment.
- 3.0 Applications of the principles of landscape maintenance

In contrast to conventional drainage, which comprises mainly sub-surface pipework and associated infrastructure, SuDS are predominantly surface systems. A key feature of SuDS is their integration within the local landscape and their amenity contribution, and it is appropriate therefore that landscape maintenance practice is applied to their management.

Landscape maintenance documentation

Typical landscape maintenance documentation and its potential relevance to SuDS systems is summarised below:

(A) Management plan – describing the management objectives for a site over time, and the management strategies that should be employed to realise these objectives and reconcile any potential conflicts that may arise.

Management plans are most appropriate for application in major parks and open spaces, wherever there are alternative choices for future action, and potential conflicts of purpose and priorities that need to be resolved. The following extract from A guide to management plans for parks and open spaces (Barber, 1991) sets out the types of management plans that can be prepared:

(i) Management plan

This predicts a degree of physical change, and therefore should present design proposals in its recommendations. It puts the emphasis on the presentation of anticipated physical change with much of the documentation being in support.

(ii) Outline plan

This is generally accepted as a more appropriate title for a management plan that wishes to establish the guiding principles, without providing detailed proposals which might constrain future options for achieving the outline objectives.

(iii) Maintenance plan

This is appropriate if the principal interest is in establishing the best way of maintaining an area, or where there is a need to match maintenance aspirations to a secure financial base. Planned maintenance programmes over longer timescales can be made more secure by the more public exposure of the need and the commitment that the Maintenance Plan should be able to guarantee. A Maintenance Plan can also establish changes in maintenance regimes that may be required to match a change in objectives e.g. the need to adapt operation and maintenance practices to accommodate specific wildlife habitats that may develop.

For a SuDS scheme, the maintenance plan will generally be the most appropriate type of management plan to use. The document should include an explanation of the function of the SuDS scheme and why it is being used on the site.

Where the drainage system has an impact on the wildlife value or public use of a site, it would be prudent to develop this simple explanation further to explain habitat enhancement goals, health and safety issues and long-term management implications.

Sites with special wildlife or amenity interest may require detailed management plans, which monitor habitat development, infrastructure changes or damage to sites and ensure rapid responses to such changes, should they occur.

It is common for smaller commercial, industrial and housing sites to have a simple maintenance statement. In this case, a single page explaining the site management (including the sustainable drainage system) would be useful for all parties involved in the care of the development.

(B) Conditions of contract – appropriate conditions will be required. Advice can be sought from the Landscape Institute. Guidance is also provided in CIRIA publication C625 (Shaffer et al, 2004).

(C) Specification – detailing the materials to be used and the standard of work required. A specification, usually preceded by preliminaries, details how work shall be carried out and contains clauses that give general instructions to the contractor. Specific SuDS maintenance clauses may be included in a general specification or as a **separate "Sustainable drainage maintenance specification" section.**

(D) Schedule of work – itemising the tasks to be undertaken and the frequency at which they will be performed.

The tasks required to maintain the site and the frequency necessary to achieve an acceptable standard should be set out in the schedule of work.

Smaller sites will usually have simple specification notes given to a contractor as a basis for maintenance on a performance basis. Examples of performance criteria are items such as:

- length of grass
- tidiness
- extent of weed growth, etc.

This document will often form the basis of a pricing mechanism and can also act as a checklist to ensure the work has been carried out satisfactorily.

For additional information on the development of appropriate schedules, reference should be made to the operation and maintenance of sustainable drainage systems (HR Wallingford, 2004).

4.0 Frequency of maintenance tasks

Landscape maintenance contract periods are usually of one to three years' duration. The three-year period is increasingly common to ensure continuity and commitment to long-term landscape care. The frequency of regular landscape maintenance tasks in a contract period can range from daily to once in the contract period. In practice most site tasks are based on monthly or fortnightly site visits, except where grass or weed growth requires a higher frequency of work. In many cases a performance specification is used with terms such as "beds shall be maintained weed-free" or "grass shall be cut to a height of 50 mm with a minimum height of 25 mm and a maximum height of 100 mm" to obtain the required standards.

Frequency can be specified within the schedule to include irregular items such as "'meadow grass' cut two times annually in July and September to a height of 50 mm, all arisings raked off and removed to wildlife features, compost facility or to tip", which provides flexibility for work that is not critical to the management of the site.

Maintenance tasks which suit a performance approach commonly include plant growth, grass cutting, pruning and tree maintenance. However, work tasks such as sweeping paths, regular litter collection and cleaning road surfaces will require work at an agreed frequency with more specific timings such as weekly, monthly or annually.

Where the frequency and timing of tasks is critical, a mixture of performance and frequency specification is necessary to provide effective maintenance.

SuDS maintenance generally tends towards a frequency requirement to ensure a predicable standard of care which can be recorded on site and which provides a reasonable basis for pricing work. A convenient frequency for many tasks is at a monthly inspection as this is the usual minimum site attendance required in a landscape specification. The monthly frequency should provide for an inspection of all SuDS features and checking all inlets and outlets.

Certain SuDS maintenance tasks however fall outside this monthly cycle and need to be accommodated in the contract. The two most obvious are:

- wetland vegetation maintenance
- silt management.

There are other tasks associated with ensuring the long-term performance of the systems that may be more difficult to predict and could even fall outside any contract period. It may therefore be more appropriate to review requirements for system rehabilitation at interim periods, when contracts are falling due for renewal.

5.0 References

- CIRIA C753 (2015) The SuDS Manual
- Wildfowl & Wetlands Trust guidance (2012) Maximising the potential for people and wildlife
- HR WALLINGFORD (2004). Whole Life Costing for Sustainable Drainage. Report SR 627.
- DEFRA (2010). Surface Water Management Plan Technical Guidance.
- Environment Agency (2015) Cost estimation for SUDS. Summary of evidence.

GREEN ROOFS

DESCRIPTION

Green roofs are areas of living vegetation, installed on the top of buildings, for a range of reasons including visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff.

OPERATION AND MAINTENANCE REQUIREMENTS

The most maintenance is generally required during the establishment stage (12 to 15 months), and this should usually be made the responsibility of the green roof provider. Maintenance contractors with specialist training in green roof care should be used, where possible.

Table below provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions may not always be required. Actual requirements will depend on the planting, the desired aesthetic and visual effect and the biodiversity objectives for the system. Maintenance specifications and schedules should therefore be specified for any individual green roof. If mechanical systems are located on the roof, then spill prevention measures should be exercised to ensure that roof runoff is not contaminated. The mechanical system area should be bunded and provided with separate drainage.

All maintenance actions carried out at roof level must be in full compliance with the appropriate health and safety regulations, and particularly those specifically dealing with working at height. Training and guidance information on operating and maintaining the roof should be provided to all property owners and tenants. Safety fastenings will be required for personnel working on the roof. Access routes to the roof should be designed and maintained to be safe and efficient, and walkways should always be kept clear of obstructions. Secure points for harness attachments should be provided when access near to the roof edges is required. Specific maintenance needs of the green roof should be monitored, and maintenance schedules adjusted to suit requirements.

Maintenance schedule	Required action	Frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (i.e. year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leave and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled.	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

SILT TRAPS AND CATCHPITS

DESCRIPTION

Silt traps and catch pits are circular or rectangular manholes and /or chambers with a sump in them to collect suspended solids. Some chambers have removeable silt buckets to assist with the removal of accumulated silt deposits. Catch pits are usually concrete ring or segment structures and silt traps preformed plastic chambers.

OPERATION AND MAINTENANCE REQUIREMENTS

Regular inspection and maintenance is required to ensure the effective long-term operation of below ground silt traps and catch pits systems. Maintenance responsibility for systems should be placed with a responsible organization. Maintenance requirements are described in the table below. Maintenance plans and schedules should be developed during the design phase. Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
Decular	Debris removal from catchment surface (where may cause risks to performance)	Monthly
maintenance	Inspection of silt traps and catch pits to assess silt accumulation	Monthly (and after large storms)
	Removal of accumulated silt from silt trap and catch pit sumps	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms

Silt traps and catch pits – operation and maintenance requirements

ATTENUATION STORAGE TANKS

DESCRIPTION

Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before infiltration, controlled release or use. The storage structure is usually formed using one of the following methods:

- 1. geo-cellular storage systems
- 2. plastic corrugated arch structures (constructed over and backfilled with an open-graded
- 3. aggregate base)
- 4. oversize concrete pipes
- 5. oversize plastic pipes
- 6. corrugated steel pipes
- 7. precast or/ in situ concrete box culvert sections and tanks (including flat-packed
- 8. concrete panels)
- 9. glass-reinforced plastic (GRP) tanks
- 10. hybrid structures using reinforced earth walls and concrete roof panels

OPERATION AND MAINTENANCE REQUIREMENTS

Regular inspect ion and maintenance is required to ensure the effective long-term operation of belowground storage systems. Maintenance responsibility for systems should be placed with a responsible organisation. The table below provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of act ions is not exhaustive, and some actions may not always be required.

Maintenance Plans and schedules should be developed during the design phase and will be specific to the type of tank that is adopted. Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements. Further detail on the preparation of maintenance specifications and schedules of work is given in Chapter 32 of CIRIA C753.

CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated, reduced and/or controlled where appropriate. This information will be required as part of the health and safety file.

Maintenance schedule	Required action	Frequency
	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
Dogular	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
maintenance	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Attenuation Storage Tanks – operation and maintenance requirements

FLOW CONTROL CHAMBERS AND DEVICES

Description

Flow control devices are usually installed in circular or rectangular manholes and are small orifice or vortex devices designed to hold back surface water and discharge at a low pre-specified rate. They are usually associated with up-stream storage tanks or modular storage that accommodates the peak flow volume until drain down at the attenuated discharge rate controlled by the flow control device.

OPERATION AND MAINTENANCE REQUIREMENTS

Regular inspection and maintenance is required to ensure the effective long-term operation of flow control devices. Maintenance responsibility for systems should be placed with a responsible organization. Maintenance requirements are described in the table below. Maintenance plans and schedules should be developed during the design phase. Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

Silt traps and catchpits - operation and maintenance requirements

			-
		Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
		Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Regular maintenance	Inspection of flow control chamber to assess if system is draining down correctly and that the orifice or flow control device is not blocked. Assess if there are any silt accumulations in the chamber sump.	Monthly (and after large storms)
		Removal of accumulated silt from silt trap and catchpit sumps	Annually, or as required
	Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents	As required
	Monitoring	Inspect/check all inlets, outlets, and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms

APPENDIX A - MONITORING AND MAINTENANCE RECORD

You need to keep a record of the checks you have completed that are set out in the checklist below along with any additional checks you have made.

If you have a maintenance contract with a contractor, keep a record of any work carried out on your pond system by them. If invoices state the work carried out, these will be sufficient.

- If you do the checks you should enter: •
- The check or maintenance job
- Who did it;
- The result (for example when abnormal noise heard, called in specialist to investigate). •

Action	Date and Time	Carried out by	Result
For example, inlet and outlet pipes checked	06/04/2012 09.30	Mr A N Other	Obstruction cleared.

APPENDIX B - ACCIDENT AND INCIDENT RECORD

You should record any accidents, other incidents or near misses relating to the operation of the SUDS system for example untreated sewage being released into the ponds. The form could also be used to record health and safety incidents.

"Other incidents" covers impacts on the environment that are not accidents, such as failing to maintain the system, or vandals causing damage to the detention pond.

Date and time of the incident	
What happened, what was it about?	
Was anyone else aware of this – other witnesse	es? If so who?
What caused it?	
What action did you take to fix the problem?	
What have you done to make sure that it does	s not happen again?
Was there any significant pollution – for exan drain, river or stream? Yes / No If yes, what pollution occurred?	nple: untreated sewage being discharged into a
If there was significant pollution then you must notify the Environment Agency on 0800 807060 as soon as possible. Have you done so?	Yes/No/not applicable At what time did you phone? EA Incident reference no.
You must also write or send an email to confirm this to the local office (see your accident management plan for the address). Have you done so?	Yes/No/not applicable
Please print your name, sign and date.	

APPENDIX C - KEY SITE AND EMERGENCY CONTACTS

This table contains information and contacts you may need in an emergency

SITE DETAILS	SITE DETAILS				
Address:					
Postcode:					
Site access gric	reference:				
SITE CONTACTS		Office Hours (specify)	Out of hours		
Owner:					
General manag	ger:				
Site manager:					
Site supervisor:					
Security contac	et:				
Landowner / a	gent:				
EMERGENCY SERVICES		Office Hours	Out of hours		
Emergency					
Medical:					
Police:					
Fire:					
REGULATORS		Office Hours	Out of hours		
Health and Saf	ety Executive (HSE):				
Local Authority	-				
Environment	General number:	08708 506 506			
Agency	24 hour emergency hotline:	0800 80 70 60	0800 80 70 60		
Natural England	d/Countryside Council for Wales				
OTHER KEY CONTACTS		Office Hours	Out of hours		
Adjacent landowners:					
Neighbours:					
Specialist advis	ors:				

Appendix J – Thames Water Section 106 consents

Mr. Tim Trotman

Tasman House The Waterfront Elstree Road Borehamwood WD6 3BS

27 May 2016

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Dear Mr. Tim Trotman,

Notice of consent to connect to a public sewer/public lateral drain under Section 106 of the Water Industry Act 1991 Site Address: Robert Street Car Park, Robert Street, London, NW1 3JS

Thank you for sending us your sewer connection application for the above address.

We're pleased to let you know that your application has received our conditional consent for the proposed connection(s) to the public sewer.

This does not guarantee capacity exists within our network and is given for the legal right of communication with the public sewer only in accordance with the description below. For capacity based enquiries and capacity checks within our network please make a Pre Development Enquiry application. Applications can be made on the Thames Water website. It does not infer any right to enter or cross third party land and must not be used for the discharge of any drainage related planning conditions.

You will be responsible for obtaining any necessary licenses and or permission from the Highway Authority, Planning Authority and or third party land owners

The connection to our sewer will need to be inspected by us before the trench is backfilled. We require at least five working days' notice before the connection works begin to ensure we can attend site. You can arrange our attendance by calling 0800 009 3921.

Please make sure that this Notice is to be available on site for inspection during the course of these works.

Our consent is subject to the Consent.	Developer Servicus 1st Foor West Oesewater Count Vestern Road Reading	
LOCATION	DESCRIPTION	RG11 HDE
Robert Street Car Park, Robert Street, London, NW1 3JS	x1 new 150mm diameter direct connection into an existing manhole on a public sewer.	T 6900 009 3921 Www.Shameswallar.ol.uk Thanse Water Galles SM Regatered to England and Water As 256561 Registered inter



The reference number for your application is 50082179; please quote this in any future correspondence.

If you have any questions please give the Helpdesk a call on 0800 009 3921. We're open 8am-5pm, Monday to Friday, or you can email us at <u>developer.services@thameswater.co.uk</u>.

Yours sincerely,

AdeOluwa Bankole Technical Coordinator Developer Services - Wastewater

Thames Water Developer Services 1st Floor West Clearwater Court Vastern Road Reading RG1 8DB

T 0800 009 3921 www.thameswater.co.uk

Thames Water Ull/Itles Ltd Registered in England and Wales No. 2366661, Registered office

Developer Services

Mr Tim Trotman Infrastruct CS The Stables High Cogges Farm High Cogges OX29 6UN Your ref50082150Our ref1013399798NameWilliam NodesPhone0800 009 3921Emaildeveloper.services@thameswater.co.uk

07 June 2016

Dear Mr Trotman,

Notice of consent to connect to a public sewer/public lateral drain under Section 106 of the Water Industry Act 1991 Site Address: Land adjacent, Rydal Water, Robert Street, Camden, NW1 3ED

Thank you for sending us your sewer connection application for the above address.

We're pleased to let you know that your application has received our conditional consent for the proposed connection(s) to the public sewer.

This does not guarantee capacity exists within our network and is given for the legal right of communication with the public sewer only in accordance with the description below. It does not infer any right to enter or cross third party land and must not be used for the discharge of any drainage related planning conditions.

You will be responsible for obtaining any necessary licenses and or permission from the Highway Authority, Planning Authority and or third party land owners

The connection to our sewer will need to be inspected by us before the trench is backfilled. We require at least five working days' notice before the connection works begin to ensure we can attend site. You can arrange our attendance by calling 0800 009 3921.

Please make sure that this Notice is to be available on site for inspection during the course of these works.

Our consent is subject to the conditions laid out in the enclosed Conditions of Consent.

LOCATION	DESCRIPTION	Thames Water Developer Services 3 rd Floor West
Land adjacent, Rydal Water, Robert Street,	1 No. 150mm diameter indirect combined water connection to existing 1422mm by 940mm diameter public combined water sewer in Hampstead Road via	Clearwater Court Vastern Road Reading RG1 8DB
Camden, NW1 3ED	existing lateral drain.	T 0800 009 3921 I <u>www.thameswater.co.uk</u>

Thames Water Utilities Ltd Registered in England and Wales No. 2366661, Registered office The reference number for your application is 50082150; please quote this in any future correspondence.

If you have any questions please give the Helpdesk a call on 0800 009 3921. We're open 8am-5pm, Monday to Friday, or you can email us at <u>developer.services@thameswater.co.uk</u>.

Yours sincerely,

Will Nodes – BSc, MSc, PhD Project Engineer - Wastewater

> Thames Water Developer Services 3rd Floor West Clearwater Court Vastern Road Reading RG1 8DB

T 0800 009 3921 I <u>www.thameswater.co.uk</u>

Thames Water Utilities Ltd Registered in England and Wales No. 2366661, Registered office


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Developer Services

Mr Tim Trotman Infrastruct CS The Stables High Cogges Farm High Cogges OX29 6UN Your ref Dur ref Name Phone Email

50082148 1013399794 William Nodes 0800.009.3921 developer services@mamnswater.co.uk

23 December 2015

Dear Mr Trotman,

Notice of consent to connect to a public sewer/public lateral drain under Section 106 of the Water Industry Act 1991 Site Address: Varndell Street Corner, Varndell Street, Camden, NW1 3RG

Thank you for sending us your sewer connection application for the above address.

We're pleased to let you know that your application has received our conditional consent for the proposed connection(s) to the public sewer.

This does not guarantee capacity exists within our network and is given for the legal right of communication with the public sewer only in accordance with the description below. It does not infer any right to enter or cross third party land and must not be used for the discharge of any drainage related planning conditions.

You will be responsible for obtaining any necessary licenses and or permission from the Highway Authority, Planning Authority and or third party land owners

The connection to our sewer will need to be inspected by us before the trench is backfilled. We require at least five working days' notice before the connection works begin to ensure we can attend site. You can arrange our attendance by calling 0800 009 3921.

Please make sure that this Notice is to be available on site for inspection during the course of these works.

LOCATION	DESCRIPTION	Developer Services
Varndell Street Corner, Varndell Street, Camden, NW1 3RG	1 No 150mm diameter direct combined water connection to existing 1143mm x 762mm diameter public combined water sewer in Varndell Street via core-drilled saddle connection. Connection to be made 380mm above existing sewer invert level, 150mm diameter lateral drain to demarcation chamber on property boundary.	Clearwater Court Vastern Road Reading RG1 8DB T 0800 009 3921 <u>Voww.thameowater.co.uk</u> Themes Water Ottilies Ud Registered in England and Visite No. 236561, Registered utility



The reference number for your application is 50082148; please quote this in any future correspondence.

If you have any questions please give the Helpdesk a call on 0800 009 3921. We're open 8am-5pm, Monday to Friday, or you can email us at developer services@thameswater.co.uk.

Yours sincerely,

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Will Nodes - BSc, MSc, PhD Project Engineer - Wastewater

Thurnes Water Decemper Services 3rd Floor West Clearweiter Oourt Vastern Road Reading RG1 808

T 0800 009 3821 From themistellist cauls

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1.9 NOV 2015



Thorms Water

Developer Services

Mr Tim Trotman Infrastruct CS Ltd The Stables **High Cogges Farm** High Cogges **OX29 6UN**

Your rai 60062165 Our ref. 1013399797 Name William Nodes Phone 0800 009 3821 developer.services@thatheewatef.co.uk Email

18 November 2015

Dear Mr Trotman,

Notice of consent to connect to a public sewer/public lateral drain under Section 106 of the Water Industry Act 1991 Site Address: Newlands, Varndell Street, Camden, NW1 3SJ

Thank you for sending us your sewer connection application for the above address.

We're pleased to let you know that your application has received our conditional consent for the proposed connection(s) to the public sewer.

This does not guarantee capacity exists within our network and is given for the legal right of communication with the public sewer only in accordance with the description below. If does not infer any right to enter or cross third party land and must not be used for the discharge of any drainage related planning conditions.

You will be responsible for obtaining any necessary licenses and or permission from the Highway Authority, Planning Authority and or third party land owners

The connection to our sewer will need to be inspected by us before the trench is backfilled. We require at least five working days' notice before the connection works begin to ensure we can attend site. You can arrange our attendance by calling 0800 009 3921.

Please make sure that this Notice is to be available on site for inspection during the course of these works.

1 No 150mm diamater direct combined water	Sector Sect
connection to existing 1168mm x 787mm diameter public combined water sewer in Varndell Street via core-drilled saddle connection. Connection to be made 390mm above existing sewer invert level.	Vestern Road Anading RG1 808 11000 009 3921 1 <u>seen thurnat water too un</u> thomas Water Oillies Lto Magazand Bingland Bingland
	connection to existing 1168mm x 787mm diameter public combined water sewer in Varndell Street via core-drilled saddle connection. Connection to be made 390mm above existing sewer invert level.



The reference number for your application is 50082165; please quote this in any future correspondence.

If you have any questions please give the Helpdesk a call on 0800 009 3921. We're open 8am-5pm, Monday to Friday, or you can email us at developer.services @thameswater.co.uk.

Yours sincerely, NA

Will Nodes - BSc, MSc, PhD Project Engineer - Wastewater

Thamps Water Developet Services J^o Rose West Clearwater Court Vastern Roat Reading RG1 8D8

1 (2500 009 SH21) 4 point thereis water color

Transa Water Utilitias Ltd. Regaining in Regional and Wales nal. \$2000031. Regioned office



Thamas Water

Developer Services

Mr Tim Trotman Infrastruct CS Ltd The Stables High Cogges Farm High Cogges OX29 6UN Your ref 50082145 Our ref 1013090795 Name William Nodes Phone 0600.009.3921 Email developer services @thameswater.co.uk

18 November 2015

Dear Mr Trotman,

Notice of consent to connect to a public sewer/public lateral drain under Section 106 of the Water Industry Act 1991 Site Address: The Cape of Good Hope, Albany Street, Camden, NW1 4EE

Thank you for sending us your sewer connection application for the above address.

We're pleased to let you know that your application has received our conditional consent for the proposed connection(s) to the public sewer.

This does not guarantee capacity exists within our network and is given for the legal right of communication with the public sewer only in accordance with the description below. It does not infer any right to enter or cross third party land and must not be used for the discharge of any drainage related planning conditions.

You will be responsible for obtaining any necessary licenses and or permission from the Highway Authority, Planning Authority and or third party land owners

The connection to our sewer will need to be inspected by us before the trench is backfilled. We require at least five working days' notice before the connection works begin to ensure we can attend site. You can arrange our attendance by calling 0800 009 3921.

Please make sure that this Notice is to be available on site for inspection during the course of these works.

LOCATION	DESCRIPTION	Developer Services 3 th Fister West
The Cape of Good Hope, Albany Street, Camden, NW1 4EE	1 No. 150mm diameter direct combined water connection to existing public combined water sewer in Land adjacent to St. Bede's hall via existing manhole as per drawing 306 Rev. P01. 150mm diameter lateral drain to demarcation chamber on property boundary.	Clearwater Court Vastern Road Reading RG1 808 1 0800 009 3921 1 mov. (Camera value 10 up Pharms Water Utilies Ltd Restauration Documents Court



The reference number for your application is 50082145; please quote this in any future correspondence.

If you have any questions please give the Helpdesk a call on 0800 009 3921. We're open 8am-5pm, Monday to Friday, or you can email us at developer services @ thameswater.co.uk.

Yours sincerely,

Will Nodes - BSc, MSc, PhD Project Engineer - Wastewater

Thumes Water Developer Services 3rd Foor West Clearwater Court Vastern Road Reading Reading Read EDB

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Developer Services

Mr Tim Trotman Infrastruct CS Ltd The Stables High Cogges Farm High Cogges OX29 6UN Your ref 50382144 Out ref 1013399810 Name William Nodes Phone 0800.009.3921 Email developer services @thaineswater.co.uk

18 November 2015

Dear Mr Trotman,

Notice of consent to connect to a public sewer/public lateral drain under Section 106 of the Water Industry Act 1991 Site Address: The Victory Pub, Nash Street, Camden, NW1 2DY

Thank you for sending us your sewer connection application for the above address.

We're pleased to let you know that your application has received our conditional consent for the proposed connection(s) to the public sewer.

This does not guarantee capacity exists within our network and is given for the legal right of communication with the public sewer only in accordance with the description below. It does not infer any right to enter or cross third party land and must not be used for the discharge of any drainage related planning conditions.

You will be responsible for obtaining any necessary licenses and or permission from the Highway Authority, Planning Authority and or third party land owners

The connection to our sewer will need to be inspected by us before the trench is backfilled. We require at least five working days' notice before the connection works begin to ensure we can attend site. You can arrange our attendance by calling 0800 009 3921.

Please make sure that this Notice is to be available on site for inspection during the course of these works.

LOCATION	DESCRIPTION	Developer Services
The Victory Pub, Nash Street, Camden, NW1 2DY	 No. 150mm diameter direct combined water connection to existing 305mm diameter public combined water sewer in Nash Street via preformed junction connection. 150mm diameter lateral drain to demarcation chamber on property boundary. 	Clearwater Court Vasiam Road Roading RG1 808 T 0800 009 3921 I which amplication could Names Water United Lot Received a Direct State



The reference number for your application is 50082144; please quote this in any future correspondence.

If you have any questions please give the Helpdesk a call on 0800 009 3921. We're open 8am-5pm, Monday to Friday, or you can email us at developer.services@thameswater.co.uk.

Yours sincerely.

Will Nodes - BSc, MSc, PhD Project Engineer - Wastewater

Thamos Water Developer Services 3" Floor West Citeerwater Court Vastern Road Reading RG1 8DB

T 0900 009 3921

Tramas Water Utilities Citl Registered in Brigland and Wates No. 2008001, Registered office



Thamas Wales

Daveloper Services

Mr Tim Trotman Infrastruct CS The Stables High Cogges Farm High Cogges OX29 6UN Your ref Our ref Name Phone Email

50082147
 1013399799
 William Nodes
 0600 009 3921
 developer services @thameswater.co.uk

23 December 2015

Dear Mr Trotman,

Notice of consent to connect to a public sewer/public lateral drain under Section 106 of the Water Industry Act 1991 Site Address: St. Bedes Mews, Camden, NW1 4DY

Thank you for sending us your sewer connection application for the above address.

We're pleased to let you know that your application has received our conditional consent for the proposed connection(s) to the public sewer.

This does not guarantee capacity exists within our network and is given for the legal right of communication with the public sewer only in accordance with the description below. It does not infer any right to enter or cross third party land and must not be used for the discharge of any draInage related planning conditions.

You will be responsible for obtaining any necessary licenses and or permission from the Highway Authority, Planning Authority and or third party land owners

The connection to our sewer will need to be inspected by us before the trench is backfilled. We require at least five working days' notice before the connection works begin to ensure we can attend site. You can arrange our attendance by calling 0800 009 3921.

Please make sure that this Notice is to be available on site for Inspection during the course of these works.

LOCATION	DESCRIPTION	3 rd Floor West
St. Bedes Mews. Carnden, NW1 4DY	1 No. 150mm diameter direct combined water connection to existing 150mm diameter public combined water sewer in St. Bedes Mews via existing manhole reference TQ28828503. 150mm diameter lateral drain to demarcation chamber on property boundary.	Disawester Court Vastem Road Reading RG1 8D5 17 0600 000 3921 A www.thamaswater.co.u Tremes Wate Utilies Lat



The reference number for your application is 50082147; please quote this in any future correspondence.

If you have any questions please give the Helpdesk a call on 0800 009 3921. We're open 8am-5pm, Monday to Friday, or you can email us at developer.services@thameswater.co.uk.

Yours sincerely,

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Will Nodes - BSc, MSc, PhD Project Engineer - Wastewater

Thames Water Developer Services 3rd Floor West Clearwater Court Vastem Road Reading RG1 808

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Thankus Water Offices Lid Registered in England and Water Mo. 2056651, Registered office