SGN PLACE SEVENOAKS GASHOLDER STATION CRAMPTONS ROAD, SEVENOAKS, KENT, TN14 5ES PLANNING APPLICATION - MARCH 2021



whitby wood

Sevenoaks Gasholder Site

Drainage Strategy

Project No: P450483 P450483-REP-006 rev 02 19/03/21

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PREFACE

The following report has been prepared by our partner organisation Cube for the use of Kin Developments.

This report should be read in conjunction with the Architect's, Building Services Engineer's and all other consultant reports, who are engaged in the project. This report is for the exclusive use of Kin Developments and should not be used in whole or in part by any 3rd parties without the express permission in writing of Whitby Wood.



Sevenoaks Gas Holders Drainage Strategy

Project No.: 1020 Document Ref: 1020-C-RP-0100 Issue: P02 Date: 19/03/2021

Prepared in partnership with





Sevenoaks Gas Holders Drainage Strategy

QUALITY CONTROL

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EXECUTIVE SUMMARY

This report has been prepared for Kin Developments and outlines the proposed drainage strategy for the development the Sevenoaks Gas Holders. This document has been prepared to support the planning application for the development.

An existing surface water field drain has been located to the north west of the site which connects to the River Darent downstream. It is proposed to discharge the surface water at a restricted Qbar greenfield rate into this watercourse via gravity. There is evidence of a historic headwall at the head of the drainage ditch, from the evidence available this has been recently removed (before 2018). The ownership of the drainage ditch is yet to be confirmed and therefore the feasibility of this connection is to be confirmed. Should connection to this watercourse be shown not to be feasible then the next acceptable solution would be a connection to adjacent public sewerage.

The TW asset records for the area show that there is a 225mm diameter surface water sewer located in Crampton's Road to the east of the site. It would therefore be proposed to discharge the surface water to the Crampton's Road Surface water sewer at a restricted rate.

The onsite drainage network has been designed to manage all surface water runoff up to and including the 100year plus 40% climate change on site with no flooding. The surface water management system will include Greenroofs, permeable paving and below ground cellular attenuation tanks providing water quality and biodiversity benefits as well as water quantity management.

INTRODUCTION

Cube Consulting Engineers on behalf of Whitby Wood have been appointed to undertake this Drainage Strategy for the Sevenoaks Gas Holders development on behalf of Kin Developments. The purpose of this document is to support the planning application for the Sevenoaks Gas Holders.

This Drainage Strategy has been produced in line with the requirements of the National Planning Policy Framework (NPPF) and the London Plan. In addition to these the following documents, polices and resources have been used to inform this document:

- The Kent County Council (KCC) Strategic Flood Risk Assessment;
- The Kent County Council (KCC) Drainage and Planning Policy; and
- The Sevenoaks Surface Water Management Plan.

This Drainage Strategy makes partial use of third party information and may contain Google maps, Environment Agency, BGS and Defra copyright information.

EXISTING SITE

OVERVIEW

The site is known as the Sevenoaks Gas Holders and is a Brownfield site at the location of the former Gas Holders north of the town centre in Sevenoaks, Kent. The site area is approximately 0.91ha, historically it was occupied by 2no. gas holders (which have now been demolished), several existing buildings and hard paved car parks. The extent of the site boundary in red can be seen in the figure below. The site is bounded to the east by Crampton's Road, to the west by Otford Road and to the south by large commercial units.

The site is situated at:

- National Grid Reference: TQ528571
- OS Grid Reference: E552850, N157150
- Nearest Postcode: TN14 5DY

The existing site topography slopes relatively steeply from the South East to the North West with levels between 68 to 72.5m above ordinance datum. This would equate to an average slope of 1:28 across the site.



Figure 1 - Proposed Site

GEOLOGY AND HYDROGEOLOGY

The geology and hydrogeology of the site has been informed by mapping from the British Geological Survey (BGS) and historic site investigations. The BGS indicates that for the site the bedrock geology is Folkstone Sandstone Formation with no data on the superficial deposits.

Several historical site investigation reports have also been reviewed which indicate that the site has the following soil strata. Made Ground has been identified at variable depths across the site up to 4.2m below ground level comprising sandy, gravelly clay or clayey sand. This made ground is underlain by Gault Clay

which overlies the Folkestone Beds. The southern part of the site is directly underlain by the Folkestone Beds.

EXISTING FOUL WATER DRAINAGE

The site has been historically used as a gas holder site with ancillary buildings. The underground utility services layout survey undertaken by Intersect surveys in September '20 indicates some existing foul water on site. The survey shows an existing foul water manhole and connection to the Thames Water sewer in Crampton's Road. There is limited information on this connection however it is assumed that this is related to toilet(s) on the historic gas holders site. It is therefore expected that the existing foul water flows from the site are negligible.

The Thames Water (TW) asset records, extracted in Figure 2, indicate that there are public foul water sewers located in Crampton's Road and Otford Road (300mm diameter). The asset records indicate that the 225mm diameter sewer in Crampton's Road has an invert level of 69.54mAOD (1.82mbgl) and the 300mm diameter sewer in Otford Road has an invert level of 66.55mAOD (1.4mbgl).



Figure 2: Extract of Thames Water Asset Records

EXISTING SURFACE WATER DRAINAGE

Existing Surface Water Network

While there is limited information available there is evidence of piped surface water drainage on site and therefore it is assumed that the site is drained by an existing surface water drainage system, prior to discharging to the Thames Water foul water public sewer system in Otford Road (based on site levels). This understanding is based on the GPR survey provided by Intersect surveys dated September 2020. The GPR survey indicates that there is an existing soakaway on site however this is shown serving an offsite highway gully only and subject to confirmation.

Existing Surface Water Discharge Rates

The existing surface water discharge rates have been calculated using MicroDrainage and are shown in Table 1. The existing site appears to be circa 80% hardstanding and so the existing discharge rates have been calculated on this basis.

RETURN PERIOD	HARDSTANDING AREA	PEAK DISCHARGE RATE	
1 in 1 year	7,800m ²	100l/s	
1 in 30 year	7,800m ²	270l/s	
1 in 100 year	7,800m ²	351l/s	

Table 1: Existing Surface Water Discharge Rates

PROPOSED DRAINAGE STRATEGY

DEVELOPMENT PROPOSALS

The proposed development includes 136no. 1-3 bed residential units in a mix of townhouses and low-rise apartment blocks. The site includes approximately 7,120m² of building and hardstanding areas, this represents approximate 78% of the total site area, a reduction on the existing.

FOUL WATER DRAINAGE

Drainage Design Parameters

The below ground foul water drainage system will be designed in accordance with Design and Construction Guidance for foul and surface water sewers or "the Code", BS EN 752 Parts 3 & 4, and Building Regulations Approved Document H.

Proposed Foul Water Discharge

The proposed development includes 136no. 1-3 bed residential properties with associated hardstanding areas. The foul water discharge rate has been calculated assuming a peak residential discharge rate of 4000l/unit/day in accordance with "the Code".

DISCHARGE	NO. OF UNITS	PEAK DISCHARGE
POINT		RATE
Crampton's Rd	10	0.46l/s
Otford Rd	121	5.60l/s
Total	136	6.06l/s

Table 2: Proposed Foul Water Discharge Rate

A pre-planning enquiry has been submitted to Thames Water; TW have confirmed that there is sufficient capacity within the public sewerage network to accommodate the discharge from development with the split indicated.

Proposed Foul Water Drainage Strategy

The foul water drainage strategy is to collect foul water in the internal landscaped area in a piped system and convey it to two connections to Thames Water sewer. It is currently proposed to discharge foul water under gravity however this is subject to confirmation by a CCTV drainage survey. The proposed connection to Otford road will be with a new junction connection and with the Crampton's Road connection reusing the existing if feasible, this is subject to a connection agreement with Thames Water.

The proposed foul water discharge rate is 6.06l/s as per the calculations outlined in the section above.

SURFACE WATER DRAINAGE

Drainage Design Parameters

The below ground surface water drainage system will be designed in accordance with local policy, local Sustainable Drainage System (SuDS) guidance, national standards and best practice. Industry standards along with the Environment Agency and Design and Construction Guidance for foul and surface water sewers or "the Code" dictate that for below ground surface water systems:

- The system should not surcharge for a 1 in 2 year storm event;
- The system should not flood any part of the site in a 1 in 30 year storm event; and
- Controlled flooding of the site is permitted in a 1 in 100 year storm event including a climate change allowance provided the flood water is contained within the site and does not affect the safe ingress and egress from the site.

The Environment Agency have completed an assessment of the impacts of Climate Change on peak rainfall intensity for small catchments (less than 5km²). These are summarised in Table 3 extracted from EA guidance 'Flood Risk Assessments: Climate Change allowances' issued on 19th February 2016 with subsequent revisions.

APPLIES ACROSS	TOTAL POTENTIAL CHANGE	TOTAL POTENTIAL CHANGE	TOTAL POTENTIAL CHANGE
ALL OF ENGLAND	FOR '2020S' (2015 TO 2039)	FOR '2050S' (2040 TO 2069)	FOR '2080S' (2070 TO 2115)
Upper End	10%	20%	40%
Central	5%	10%	20%

Table 3: Peak rainfall intensity climate change allowances

A typical lifespan for a new development is 100years, under national and local policy this development will be assessed against a 1 in 100year storm event including a 40% climate change allowance using FEH rainfall.

Surface Water Disposal Hierarchy

In accordance with Building Regulations part H, all drainage strategies should manage surface water discharge based on the following hierarchy:

- 1. Infiltration or a soakaway on site;
- 2. Discharge to a watercourse; or
- 3. Discharge to a sewer.

Infiltration

There is some evidence on the GPR survey that there is an existing soakaway on site, this soakaway apparently serves an offsite highway gully only, this is subject to confirmation. This indicates that infiltration may be feasible on site, however an assessment of the pollution risks posed by infiltration suggests that this is not a viable solution. The site has historically been used as a gas storage depot and has large areas of made ground which has been shown to include contaminated soil posing a contamination risk. The site is underlain by the Folkstone formation indicating that infiltration may be feasible however the site is located within a Source Protection Zone 1 with multiple abstraction points within 500m of the site. On the basis of a sensitive receptor and high risk of water contamination at source it is deemed that infiltration is not a suitable approach for the development.

Watercourse

The nearest watercourse to the development is the River Darent which is situated circa 1km north west of the site. Some localised mapping does however indicate that there is a surface water field drain which connects to this watercourse on the opposite side of Otford Road. A review of historic site photos indicate that a brick headwall was previously located at the head of this watercourse suggesting that the watercourse received surface water flows from the surrounding area. It does however appear that this headwall has subsequently been removed as shown in Figure 4.





Figure 3: Google Streetview image dated October 2009

Figure 4: Google Streetview image dated June 2018

Unfortunately, it has not been possible to capture any more recent images and therefore the current status of the watercourse and headwall is unknown. Should it be practicable to make a new connection to this drain then this would be the preferred discharge point. This drain is not identified as a major watercourse and therefore is not managed by the EA, it is expected to fall within the Lead Local Flood Authority (LLFA) remit with various riparian owners. Assuming that the LLFA confirm that a connection can be made to this watercourse this will be the proposed outfall location and is shown on the attached drawing 1020-C-DR-0100. Should a new outfall to this drain not be feasible then a new outfall would be required into the River Darent, this would require a large amount of new public infrastructure in the public highway and on third party land. This is unlikely to be commercially viable location to discharge surface water for the development and therefore is deemed not feasible.

Sewer

Should the proposed water course be deemed not feasible then the next acceptable solution would be a connection to adjacent public sewerage. It is understood that the site currently discharges into the Thames Water (TW) combined sewer in Otford Road. The TW asset records for the area show that there is a 225mm diameter surface water sewer located in Crampton's Road to the east of the site. Due to the topography of the area the invert level of this sewer is higher than the low point of the site. On this basis a gravity connection is not possible should the discharge rate be restricted to a very low rate. On this basis should a sewer connection be required then the surface water runoff from the site will be collected and pumped at a restricted rate to a demarcation chamber before gravity discharge into the TW surface water sewer.

A pre-planning enquiry has been submitted to Thames Water to confirm that the proposed discharge to the public sewer is acceptable at a restricted rate should other alternative disposal methods such as infiltration and discharge to a watercourse be shown not to be feasible. Refer to Appendix B for correspondence.

Proposed Surface Water Discharge

In accordance with the NPPF, London Plan and the local planning policy it is proposed to restrict the surface water discharge rate for the development to greenfield run-off rates. The greenfield runoff rates have been calculated using the HR Wallingford UKSuDS greenfield runoff rate tool, these are summarised in

Table 4.

RETURN PERIOD	HARDSTANDING AREA	GREENFIELD RUNOFF
1 in 1 year	9,100m ²	4.03l/s
Qbar	9,100m ²	4.74l/s
1 in 30 year	9,100m ²	10.9I/s
1 in 100 year	9,100m ²	15.12/s

Table 4: Greenfield Runoff Rates

In accordance with the KCC Drainage and Planning Policy as the site is previously developed 'brownfield' land the peak runoff rate from the development must be as close to the greenfield runoff rate as reasonably practicable for the same rainfall event. As it is not possible to restrict the volume of run off the outflow for the site should be restricted to Qbar for all rainfall events. To achieve a significant betterment for the area, should a gravity connection be feasible to the adjacent water course, it is proposed to control all storms to the Qbar Greenfield runoff rate of 4.71/s via a hydrobrake flow control device. Due to the capacity of the Thames Water sewer should a sewer connection be required then the surface water will be discharged at a restricted rate via a pump flow control into the TW surface water sewer.

Proposed Surface Water Drainage Strategy

A detailed hydraulic model of the development has been produced using the Microdrainage modelling software, this model indicates that approximately 650m³ for a restricted discharge rate of 4.7l/s for an impermeable area of 7120m².

Due to the significant level change and building density of the development the options for SuDS are limited. Due to the high volume of attenuation required the majority of attenuation will be provided using below ground cellular attenuation tanks. However, the development will also include extensive use of Greenroofs and permeable paving which will provide ecological and water quality benefits as well as providing interception and retention of surface water. The existing site is primarily hardstanding with limited landscaping, the proposals include areas of high quality landscape which will reduce the total runoff volume as well as providing biodiversity and amenity benefits.

The proposed below ground surface water drainage will be designed to accommodate a 1 in 100-year storm event + 40% climate change and therefore will protect the proposed development from the risk of surface water flooding. All surface water runoff will be managed onsite and stored in attenuation before being discharged into the nearby watercourse at a reduced rate via a new connection.

OVERLAND FLOW AND EXCEEDANCE

The hardstanding landscaped areas of the site will be constructed of permeable paving and therefore any overland flows which may occur on the site due to failure or blockage of the drainage system will enter the network in a different location by percolating through the surface. In an exceedance event or offsite infrastructure block surface water will surcharge at the low point of the site. This is located to the north west of the development, any exceedance flows will then drain into Otford Road away from the habitable areas of the site.



Figure 5: Overland Flow Paths

OFFSITE IMPACT

The proposed surface water drainage strategy outlined in this document demonstrates that the proposed drainage network included in the development will manage all surface water run off during events up to and including the 100 year return period storm including the upper end allowance for climate change. This represents an improvement in surface water management on the site. The discharge from site will be restricted to greenfield runoff rates for all storms up to and including the 100year plus climate change storm. It is understood that the site currently discharges at an unrestricted rate imparting significant hydraulic load to the surrounding infrastructure. As such, it is expected that the proposed development will have a positive impact on surface water flooding offsite reducing the surface water flood risk to downstream properties.

SUSTAINABLE DRAINAGE SOLUTIONS

CELLULAR ATTENUATION TANK

Cellular attenuation storage tanks are used to create a below ground void space for the temporary storage of surface water. These are comprised of structural plastics, usually polypropylene, and have a void ration of 95-96%. Various products are available on the market which can accommodate various vertical and lateral loading which are suitable for under vehicular loaded areas, public realm areas or landscaped areas. The inherent flexibility in size and shape means that they can be tailored to suit specific site characteristics and constraints. Tanks can be wrapped in geomembrane to create a sealed storage only system or can be wrapped in geotextile to allow for infiltration into the ground. Cellular attenuation tanks can be used below pervious surfacing systems to increase the storage volume ratio of these SuDS.



Image courtesy of graf-water.co.uk

- ADVANTAGES: High storage volume ratio, can be used under public realm areas, can be used below traffic areas, minimal maintenance.
- DISADVANTAGES: Cost of excavation, limited water quality treatment.
- WATER QUALITY: Low removal of suspended solids.

PERMEABLE PAVING

Pervious pavements provide a hardstanding area suitable for pedestrian and/or vehicular traffic. The surface allows rainwater to percolate down between the paving block units which have been designed with nibs to provide a rigid finish while providing adequate gaps for infiltration. The sub-base of the permeable paving is graded to include no fines which provides a void ratio for temporary water storage. Permeable paving can be be provide with a geomembrane below the system to create a sealed storage volume or a permeable geotextile can be used below the system to allow for infiltration into the ground.



Image courtesy of Marshalls

ADVANTAGES:	Good storage volume ratio, can be used under public realm areas, can be used below traffic areas, can be used for infiltration or as a lined storage only system, reduction of piped drainage network required, suitable for high density development, high pollutant removal
DISADVANTAGES:	High cost, not efficient on steep slopes, may be damaged by heavy vehicle loads or channelised traffic, risk of long term clogging due to poor maintenance.
WATER QUALITY:	High removal of suspended solids, heavy metals and hydrocarbons.

DRAINAGE MAINTENANCE STRATEGY

The following drainage maintenance and management strategy has been produced in accordance with the SuDS Manual, best practice and manufactures guidance. This is not intended to be an exhaustive list but outline guidance for the recommended requirements which are to be reviewed and updated based on the specific site requirements. It is expected that the maintenance for the drainage of the proposed development will be undertaken by the residential management company and will be suitably qualified to undertake the required maintenance.

This schedule should be read in accordance with the manufacturer's guidance and the SuDS Manual.

Maintenance Schedule	Required action	Typical frequency			
	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months then annually			
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly			
Regular 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

Table 5: Operation and maintenance requirements for attenuation storage tanks (from the SuDS Manual)

PERVIOUS PAVEMENTS

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

Table 6: Operation and maintenance requirements for pervious pavements (from the SuDS Manual)

Sevenoaks Gas Holders Drainage Strategy



Appendix A GPR Survey



	Electromagnetic and/or Ground Penetrating F to locate/map underground utilities and featu	Radar techniques have been used res on this drawing. Intersect
	Surveys Ltd has made every endeavour to m contained within this drawing is accurate and Surveys Ltd has used any record drawings p	ake sure that the information of the highest quality. Intersect rovided by the client or by the
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	cannot be relied upon. Intersect Surveys Ltd survey that has not been undertaken by us. A	is not liable for any topographical any inaccuracies relating to
	topographical plans/development plans/Ordn control over is the liability of the customer. W underground services/features is stated. Dep	ance Survey data that we have no here quoted, depth information of ths are generally within +/10%
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64801-001

Drawing Number

Sevenoaks Gas Holders Drainage Strategy



Appendix B Thames Water Asset records and Pre-Application Response



Ashley Gaughan WorleyParsons 1st Floor Parkview Great west Road BRENTFORD TW8 9AZ

Search address supplied 552850 157150 Former Gasworks Old Crampton Road Sevenoaks TN14 5DY

Your reference

Sevenoaks

Our reference

ALS/ALS Standard/2014_2775617

Search date

28 May 2014

You are now able to order your Asset Location Search requests online by visiting www.thameswater-propertysearches.co.uk



Thames Water Utilities Ltd, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T0845 070 9148Esearches@thameswater.co.uk I www.thameswater-propertysearches.co.uk



Search address supplied: 552850 157150, Former Gasworks, Old Crampton Road, Sevenoaks, TN14 5DY

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

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

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

Email: <u>searches@thameswater.co.uk</u> Web: <u>www.thameswater-propertysearches.co.uk</u>



Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

South East Water Ltd 3 Church Road

<u>Thames Water Utilities Ltd</u>, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T0845 070 9148<u>Esearches@thameswater.co.uk</u> <u>www.thameswater-propertysearches.co.uk</u>



Haywards Heath West Sussex RH16 3NY

Tel: 0845 301 0845

For your guidance:

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

Payment for this Search

An invoice is enclosed. Please send remittance to Thames Water Utilities Ltd., PO Box 3189, Slough, SL1 4WW.



Further contacts:

Waste Water queries

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

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

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

Tel: 0845 850 2777 Email: developer.services@thameswater.co.uk

Clean Water queries

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

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

Tel: 0845 850 2777 Email: developer.services@thameswater.co.uk



Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

<u>Thames Water Utilities Ltd</u>, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T 0845 070 9148 E <u>searches@thameswater.co.uk</u> I <u>www.thameswater-propertysearches.co.uk</u>

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8301 65.96 63.79 8302 67.489 63.859 8303 n/a n/a 9304 69.38 67.45 931A n/a n/a 931B n/a n/a 031E n/a n/a 031K n/a n/a 031D n/a n/a 031C n/a n/a 031J n/a n/a 031L n/a n/a 031H n/a n/a 031IL n/a n/a 031B n/a n/a 031G n/a n/a 031H n/a n/a 031N n/a n/a 031B n/a n/a 0311 n/a n/a 0313 n/a n/a 0314 n/a n/a 0315 n/a n/a 0316 n/a n/a 0317 n/a n/a 0318 n/a n/a <t< td=""><td>0206</td><td>n/a</td><td>n/a</td></t<>	0206	n/a	n/a
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8303 n/a n/a 9304 69.38 67.45 931A n/a n/a 931B n/a n/a 031E n/a n/a 031K n/a n/a 031D n/a n/a 031C n/a n/a 031J n/a n/a 031L n/a n/a 031G n/a n/a 031H n/a n/a 031N n/a n/a 031N n/a n/a 031N n/a n/a 031B n/a n/a	8302	67.489	63.859
9304 69.38 67.45 931A n/a n/a 931B n/a n/a 031E n/a n/a 031K n/a n/a 031K n/a n/a 031D n/a n/a 031C n/a n/a 031J n/a n/a 031L n/a n/a 031M n/a n/a 031L n/a n/a 031L n/a n/a 031L n/a n/a 031H n/a n/a 031N n/a n/a 031N n/a n/a 031N n/a n/a 031N n/a 66.83 031B n/a 65 031B n/a n/a	8303	n/a	n/a
931A n/a n/a 931B n/a n/a 931E n/a n/a 031E n/a n/a 031K n/a n/a 031D n/a n/a 031C n/a n/a 031J n/a n/a 031L n/a n/a 031H n/a n/a 031I n/a n/a 031L n/a n/a 031H n/a n/a 031N n/a n/a 031N n/a n/a 031N n/a n/a 031B n/a n/a	9304	69.38	67.45
931B n/a n/a 031E n/a n/a 031K n/a n/a 031M n/a n/a 031D n/a n/a 031C n/a n/a 031J n/a n/a 031L n/a n/a 031G n/a n/a 031H n/a n/a 031I n/a n/a 031B n/a n/a 031N n/a n/a 031N n/a n/a 031N n/a n/a 031B n/a 66.83 031B n/a n/a	931A	n/a	n/a
031E n/a n/a 031K n/a n/a 031M n/a n/a 031D n/a n/a 031C n/a n/a 031J n/a n/a 031M n/a n/a 031IL n/a n/a 031G n/a n/a 031H n/a n/a 031IN n/a n/a 031N n/a n/a 031N n/a n/a 031N n/a n/a 031B n/a n/a	931B	n/a	n/a
031K n/a n/a 031D n/a n/a 031C n/a n/a 031J n/a n/a 031J n/a n/a 031J n/a n/a 031M n/a n/a 031M n/a n/a 031M n/a n/a 031L n/a n/a 031G n/a n/a 031H n/a n/a 031I n/a n/a 031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031E	n/a	n/a
031D n/a n/a 031C n/a n/a 031J n/a n/a 031M n/a n/a 031M n/a n/a 031M n/a n/a 031M n/a n/a 031L n/a n/a 031G n/a n/a 031H n/a n/a 031I n/a n/a 031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031K	n/a	n/a
031C n/a n/a 031J n/a n/a 031M n/a n/a 031M n/a n/a 031L n/a n/a 031G n/a n/a 031H n/a n/a 031I n/a n/a 031H n/a n/a 031N n/a n/a 031N n/a n/a 031B n/a n/a	031D	n/a	n/a
031J n/a n/a 031M n/a n/a 031L n/a n/a 031G n/a n/a 031H n/a n/a 0311 n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031C	n/a	n/a
031M n/a n/a 031L n/a n/a 031G n/a n/a 031H n/a n/a 031I n/a n/a 031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031J	n/a	n/a
031L n/a n/a 031G n/a n/a 031H n/a n/a 031I n/a n/a 031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031M	n/a	n/a
031G n/a n/a 031H n/a n/a 031I n/a n/a 031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031L	n/a	n/a
031H n/a n/a 031I n/a n/a 031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031G	n/a	n/a
0311 n/a n/a 031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	031H	n/a	n/a
031N n/a n/a 0301 66.83 64.77 0304 67.59 65 031B n/a n/a	0311	n/a	n/a
0301 0304 031B 031B 031B 031B	031N	n/a	n/a
0304 031B 67.59 65 n/a n/a	0301	66.83	64.77
031B n/a n/a	0304	67.59	65
	031B	n/a	n/a





Sewer Fittings

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

Air Valve Dam Chase Fitting

≥ Meter

Vent Column

Operational Controls

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

Control Valve Drop Pipe

Ancillary Weir

Outfall

Inlet

 $\overline{}$

Undefined End

member of Property Insight on 0845 070 9148.

End Items

X

Ф

3

 \sim

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

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole

reference number and should not be taken as a measurement. If you are

unsure about any text or symbology present on the plan, please contact a

Other Symbols

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

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

Areas

Lines denoting areas of underground surveys, etc.



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



Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

 Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

Thames Water Utilities Ltd, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T 0845 070 9148 E searches@thameswater.co.uk I www.thameswater-propertysearches.co.uk Page 8 of 11

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- 2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
- 3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
- 4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
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A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

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

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

Ways to pay your bill

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



Cube Consulting Engineers 24 Carronade Court London N7 8EP Wastewater pre-planning Our ref DS6078371

17th November 2020

Pre-planning enquiry: Confirmation of sufficient capacity

Site Address: The Gas Holders Sevenoaks, Crampton's Road, Sevenoaks, Kent, TN14 5DQ

Dear Mr Ryan,

Thank you for providing information on the proposals to construct 15 houses and 124 flats to replace the existing gas holder facility and associated office and workshop at the above location.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewer capacity within the existing Thames Water sewer network.

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent foul water sewer networks to serve your development.

This is based on the foul water flows from the 15 houses gravitating from the site and being connected to the existing connection from the site to the East draining to the 225mm dia. foul water sewer in Crampton's Road and the foul water flows from the 124 flats gravitating from the site and being connected via a new connection onto the 300mm dia. foul water sewer in Otford Road to the West.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

Please note that you must keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient sewerage capacity.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to not be viable. In accordance with the Building Act 2000 Clause H3.3, positive connection to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. The disposal hierarchy being: 1st Soakaways; 2nd Watercourses; 3rd Sewers.

Only when it can be proven that soakage into the ground or a connection into an adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network in Crampton's Road.

If the peak surface water run-off discharge is then restricted to a maximum of 2l/s via the proposed private pumping station on the site as your drainage strategy indicates, then we would have no objections to the proposals.

We would encourage techniques such as green roofs and/or permeable paving that restricts surface water discharge from your site.

Please note that the Local Planning authority may comment on surface water discharge under the planning process.

Source Protection Zone

The development site boundary falls within a Source Protection Zone for groundwater abstraction. These zones may be at particular risk from polluting activities on or below the land surface. To prevent pollution, the Environment Agency and Thames Water (or other local water undertaker) will use a tiered, risk-based approach to regulate activities that may impact groundwater resources, this may potentially affect your drainage or surface water strategies where infiltration systems are proposed. The applicant is encouraged to read the Environment Agency's approach to groundwater protection (available at https://www.gov.uk/government/publications/ groundwater-protection-position-statements) and may wish to discuss the implications for their development with a suitably qualified environmental consultant.

Therefore, although we would encourage the use of soakaways, the proximity of the site to the abstraction zone may preclude their use in this case depending upon the Environment Agency's assessment of the risk involved.

Please Note

All connection requests are subject to a full Section 106 (Water Industry Act 1991) application before the Company can confirm approval to the connection itself. Please also note that capacity in the public sewerage system cannot be reserved. Please make sure you submit your connection application giving us at least 21 days' notice of the date you wish to make your new connection/s.

The discharge of non-domestic effluent is not permitted until a valid trade effluent consent has been issued by Thames Water. If anything other than domestic sewage is discharged into the

public sewers without the above agreement an offence is committed and the applicant will be liable to the penalties contained in Section 109(1) (WIA 1991).

Applicants should contact Trade Effluent prior to seeking a connection approval, to discuss trade effluent consent and conditions of discharge. A Trade Effluent reference number should be obtained and included in the relevant box of the attached application form. The address for Trade Effluent is - Thames Water Utilities Limited, Waste Water Quality, Crossness Sewage Treatment Works, Belvedere Road, Abbeywood, London. SE2 9AQ. Alternatively you can telephone them on 020 8507 4321.

The views expressed by Thames Water in this letter are in response to this pre-planning enquiry at this time and do not represent our final views on any future planning applications made in relation to this site.

Yours sincerely,

Jonathan Shildrick BSc Development Engineer Developer Services Sevenoaks Gas Holders Drainage Strategy



Appendix C Existing Greenfield Runoff Rates



Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Andrew O'Rourke	
Site name:	Sevenoaks Gas Holders	
Site location:	Sevenoaks	

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

the basis for setting consents for the drainage of surface water runoff from sites.

Site Details Latitude: 51.29317° N Longitude: 0.19059° E

Reference:

Date:

Mar 11 2021 17:04

2886646139

Runoff estimation approach		IH124				
Site characteristics				Notes		
Total site area (ha):		0.91		(1) Is Q _{BAB} < 2.0 I/s/ha?		
Methodology						
Q _{BAR} estimation method:	Calculate fr	om SPR and	ISAAR	When Q_{BAR} is < 2.0 I/s/ha then limiting discharge rates are set at 2.0 I/s/ha.		
SPR estimation method:	Calculate fr	om SOIL typ	е	<u>]</u>		
Soil characteristics		Default	Edited			
SOIL type:		4	4	(2) Are flow rates < 5.0 l/s?		
HOST class:		N/A	N/A	Where flow rates are less than 5.0 l/s consent for discharge is		
SPR/SPRHOST:		0.47	0.47	usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where		
Hydrological characteristics Default		Edited	the blockage risk is addressed by using appropriate drainage elements.			
SAAR (mm):		747	747			
Hydrological region:		7	7	$(3) \text{ is SPR/SPRHOST} \leq 0.3?$		
Growth curve factor 1 year:		0.85	0.85	Where groundwater levels are low enough the use of soakaways		
Growth curve factor 30 years:		2.3	2.3	to avoid discharge offsite would normally be preferred for disposal of surface water runoff.		
Growth curve factor 100 years:		3.19	3.19			
Growth curve factor 200 years:		3.74	3.74	í		

Greenfield	runoff	rates

	Default	Edited
Q _{BAR} (I/s):	4.74	4.74
1 in 1 year (I /s):	4.03	4.03
1 in 30 years (I /s):	10.9	10.9
1 in 100 year (I /s):	15.12	15.12
1 in 200 years (I /s):	17.73	17.73

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Sevenoaks Gas Holders Drainage Strategy



Appendix D Existing Brownfield Runoff Rates

Cube Consulting Engineers		Page 1
24 Carronade Court	Sevenoaks Gas Holders	
London	Existing Surface Water	
N7 8EP		Micco
Date 11/03/2021 18:09	Designed by AOR	
File Sevenoaks Existing Site.MDX	Checked by	Digiligaçı
Innovvze	Network 2020.1	
STORM SEWER DESIGN	by the Modified Rational Method	
Design	<u>Criteria for Storm</u>	
Pipe Sizes STA	ANDARD Manhole Sizes STANDARD	
FSR Rainfal Return Period (years) M5-60 (mm) Ratio R Maximum Rainfall (mm/hr) Maximum Time of Concentration (mins) Foul Sewage (l/s/ha)	<pre>1 Model - England and Wales 100 PIN 21.000 Add Flow / Climate Chang 0.350 Minimum Backdrop Heigh 550 Maximum Backdrop Heigh 30 Min Design Depth for Optimisation 0.000 Min Vel for Auto Design only</pre>	MP (%) 100 ge (%) 0 nt (m) 0.200 nt (m) 1.500 on (m) 1.200 (m/s) 1.00
Volumetric Runoff Coeff.	0.750 Min Slope for Optimisation	(1:X) 500
Design	ed with Level Soffits	
Time Ar	ea Diagram for Storm	
Time (mins	Area Time Area) (ha) (mins) (ha)	
0-	4 0.649 4-8 0.131	
Total Area	Contributing (ha) = 0.780	
Total Pi	pe Volume (m³) = 10.099	
©19	82-2020 Innovyze	

Cube Consulting Engineers	Page 2	
24 Carronade Court	Sevenoaks Gas Holders	
London	Existing Surface Water	
N7 8EP		Micro
Date 11/03/2021 18:09	Designed by AOR	
File Sevenoaks Existing Site.MDX	Checked by	Diamage
Innovyze	Network 2020.1	

Area Summary for Storm

Pipe	PIMP	PIMP	PIMP	Gross	Imp.	Pipe Total
Number	Туре	Name	(%)	Area (ha)	Area (ha)	(ha)
1.000	_	_	100	0.390	0.390	0.390
1.001	-	-	100	0.390	0.390	0.390
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.780	0.780	0.780

Cube Consulting Engineers		Page 3
24 Carronade Court	Sevenoaks Gas Holders	
London	Existing Surface Water	
N7 8EP		Micco
Date 11/03/2021 18:09	Designed by AOR	
File Sevenoaks Existing Site.MDX	Checked by	Digitigh
Innovyze	Network 2020.1	1
<u>1 year Return Period Summary of</u>	Critical Results by Maximum Level (<u>(Rank 1) for</u>
	<u>Storm</u>	
<u>S</u>	imulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	v 0.000
Hot Start (mins)	0 MADD Factor * 10m ³ /ha Storage	e 2.000
Manhole Headloss Coeff (Global)	0.500 Flow per Person per Day (1/per/day)	0.000
Foul Sewage per hectare (1/s)	0.000	
Number of Transf Hashermore by O. Number		Diaman O
Number of Input Hydrographs U Number Number of Online Controls O Number	r of Offline Controls U Number of Time/Are of Storage Structures O Number of Real Tim	ea Diagrams U me Controls O
Synth	netic Rainfall Details	
Rainfall Model Region Er	FSR Ratio R 0.350	
M5-60 (mm)	21.000 Cv (Winter) 0.840	
Margin for Flood Risk	Warning (mm) 200.0 DVD Status OFF	
	DTS Status ON	
Profile(s)	Summer and Winter	
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440	
Return Period(s) (years)	1, 30, 100	
Climate Change (%)	0,0,0	
		Water
US/MH Return Clima	te First (X) First (Y) First (Z) Over	flow Level
FN Name Storm Period Chang	e Surcharge Flood Overllow AC	c. (III)
S1.000 S1 15 Winter 1 +	0%	70.120
S1.001 S2 15 Winter 1 +	0% 100/15 Summer	69.176
SI.002 SS IS WINCEL I +		00.0/2
Surcharged Flooded	Half Drain Pipe	
DS/MH Depth Volume PN Name (m) (m ³)	Flow / Overflow Time Flow Cap (1/s) (mins) (1/s) Status B	Level
s1.000 s1 -0.255 0.000	0.22 53.6 OK	
51.001 52 -0.268 $0.00051.002$ 53 -0.296 0.000	0.34 100.2 OK 0.25 100.8 OK	
©19	082-2020 Innovyze	

Cube Consulting Engineers		Page 4		
24 Carronade Court	Sevenoaks Gas Holders			
London	Existing Surface Water			
N7 8EP		Micco		
Date 11/03/2021 18:09	Designed by AOR			
File Sevenoaks Existing Site.MDX	Checked by	Diginada		
Innovyze	Network 2020.1			
<u>30 year Return Period Summary o</u>	f Critical Results by Maximum Level	<u>l (Rank 1)</u>		
	<u>for Storm</u>			
Si	mulation Criteria			
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	1 0.000		
Hot Start (mins)	0 MADD Factor * 10m ³ /ha Storage	2.000		
Manhole Headloss Coeff (Global)	0.500 Flow per Person per Day (1/per/day)	0.000		
Foul Sewage per hectare (l/s)	0.000			
Nuclear of Transfer Understanding O. Nuclear		Diamana		
Number of Input Hydrographs 0 Number Number of Online Controls 0 Number o	of Offline Controls 0 Number of Time/Are f Storage Structures 0 Number of Real Tir	e Diagrams U ne Controls O		
Synthe Dainfall Madal	etic Rainfall Details			
Rainiali Model Region End	Iand and Wales Cv (Summer) 0.750			
M5-60 (mm)	21.000 Cv (Winter) 0.840			
Margin for Flood Risk Analy	warning (mm) 200.0 DVD Status OFF sis Timestep Fine Inertia Status OFF			
	DTS Status ON			
Profile(s)	Summer and Winter			
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440			
Return Period(s) (years)	1, 30, 100			
Climate Change (%)	0, 0, 0			
UC/NH Boturn Climat	e Finat (V) Finat (V) Finat (7) Oran	Water		
PN Name Storm Period Change	e first (X) first (I) first (Z) Over e Surcharge Flood Overflow Ac	t. (m)		
	-			
S1.000 S1 15 Winter 30 +0	% % 100/15 Summor	70.200		
S1.001 S2 15 Winter 30 +0 S1.002 S3 15 Winter 30 +0	% 100/13 Summer	68.995		
Queshaward Elandad	Welf Drain Dine			
US/MH Depth Volume H	Half Drain Pipe	Level		
PN Name (m) (m ³)	Cap. (1/s) (mins) (1/s) Status H	Ixceeded		
S1.000 S1 -0.175 0.000 S1.001 S2 -0.106 0.000	0.54 131.4 OK			
s1.002 s3 -0.173 0.000	0.68 269.6 OK			
©19	82-2020 Innovyze			

Cube Consu	lting Enginee	rs				Page 5
24 Carrona	de Court		Sevenoaks Ga	as Holders		
London			Existing Su	rface Water		
N7 8EP						Micro
Date 11/03	/2021 18:09		Designed by	AOR		
File Seven	oaks Existing	Site.MDX	Checked by			Diginada
Innovyze			Network 202	0.1		
1.0.0						
<u>100 year</u>	<u>Return Perioc</u>	1 Summary o	of Critical R	esults by Max	<u>ximum Leve</u>	<u>1 (Rank 1)</u>
			<u>ior Storm</u>			
		Si	imulation Crite	<u>tia</u>		
	Areal Reduc	tion Factor	1.000 Additio	onal Flow - % o:	f Total Flow	0.000
	Hot S Hot Start	Level (mm)	0 MAI	DD Factor * 10m Tnlet (°/na Storage Coeffiecient	0.800
Manho	ole Headloss Coe	ff (Global)	0.500 Flow per	Person per Day	(l/per/day)	0.000
Fou	ul Sewage per he	ctare (l/s)	0.000			
Number of T	nput. Hydrograph	s () Number	r of Offline Cor	trols () Number	of Time/Are	a Diagrams O
Number of	Online Control	s 0 Number o	of Storage Struc	tures 0 Number	of Real Tin	ne Controls 0
		a				
	Rainfa	<u>Syntn</u> all Model	<u>etic Rainfall D</u> FSR	<u>etails</u> Ratio R 0.	350	
		Region En	gland and Wales	Cv (Summer) 0.	750	
	MS	5-60 (mm)	21.000	Cv (Winter) 0.	840	
	Margin for	Flood Risk	Warning (mm) 20	0.0 DVD Sta	atus OFF	
	nargin ioi	Analy	vsis Timestep H	ine Inertia Sta	atus OFF	
			DTS Status	ON		
		Profile(s)		Summer	and Winter	
	Duration	n(s) (mins)	15, 30, 60, 120	, 240, 360, 480	, 960, 1440	
	Climate	(s) (years) Change (응)			1, 30, 100	
					-, -, -	
US	MH R	eturn Climat	te First (X)	First (Y) Fir	st (Z) Over	Water flow Level
PN Na	ame Storm P	eriod Chang	e Surcharge	Flood Ove	erflow Ac	t. (m)
a1 000	01 15 57	100				70.000
S1.000 S1.001	SI 15 Winter S2 15 Winter	100 +0	J%)% 100/15 Summeu	~		70.236
S1.002	S3 15 Winter	100 +0)%	-		69.050
	Gurahanaaa	Flooded		alf Drain Bing		
τ	US/MH Depth	Volume Fl	ow / Overflow	Time Flow		Level
PN	Name (m)	(m ³) C	ap. (1/s)	(mins) (1/s)	Status	Exceeded
g1 000	c1 0 1 20	0 000	0 70	170	5 07	
\$1.000 \$1.001	S2 0.108	0.000	1.17	346.3	SURCHARGED	-
S1.002	s3 -0.118	0.000	0.88	350.7	7 OK	
		©19	82-2020 Innov	vyze		

Sevenoaks Gas Holders Drainage Strategy



Appendix E Proposed Drainage Layout



<u>NOTES</u> : 1. DO NOT SCALE FIGURED DIMEN 2. ALL DIMENSION	FROM THIS DRAWING. ONLY
FIGURED DIMEN	
2. ALL DIMENSION	ISIONS ARE TO BE USED.
3. ALL LEVELS ARE	IS ARE IN MILLIMETRES U.N.O. IN METRES ABOVE ORDNANCE
WITH ALL RELEV	ANT ARCHITECTS AND ENGINEERS
DRAWINGS AND) SPECIFICATIONS. NNELS AND GUILLIES, DRAIN POINT
CONNECTIONS	ETC ARE NOT SHOWN AT THIS
THESE.)WANCE SHOULD BE MADE FOR
5. FOUL AND SURF	ACE WATER DISCHARGE LOCATION
SEWERAGE UND	DERTAKER AND THE LEAD LOCAL
	RAINAGE INIVERT I EVELS ARE TO BE
CONFIRMED ON	ISITE PRIOR TO CONSTRUCTION. IF
LEVELS ARE DIFF	ERENT TO THAT ASSUMED THEN
PUMPING STATI	ONS PROVIDED.
 THE FEASIBILITY EXISTING SURFA 	OF THE CONNECTION TO THE
WATERCOURSE	IS TO BE CONFIRMED THROUGH
FEASIBLE SURFA	CE WATER IS TO BE PUMPED TO TH
	R SEWER IN CRAMPTON'S ROAD.
SUBJECT TO CH	ANGE BASED ON FURTHER
CO-ORDINATIO LEVELS.	N WITH SOFT LANDSCAPING AND
10. ALL FOUL AND	SURFACE WATER DRAIN POINTS AR
TO BE RODDAB	LE FROM ABOVE GROUND.
TO BE CONFIRM	IED BY THE LANDSCAPE ARCHITECT
2. EXTENT OF GRE	ENROOFS INDICATIVE TO BE
CONFIRMED BY	ARCHITECT.
KEY	
<u> </u>	SITE BOUNDARY
	EXISTING FOUL WATER PUBLIC
	SLVVER FXISTING SLIRFACE WATED DI DI
	SEWER
── ─ FW──FW──	PROPOSED FOUL WATER SEWER
\bigcirc	PROPOSED FOUL WATER
>	INSPECTION CHAMBER
\bigcirc	PROPOSED FOUL WATER
+	RODDING EYE
*	PROPOSED FOUL WATER DRAIN
*	POINT
── ─ SW ─ SW─	PROPOSED SURFACE WATER SEWER
\sim	PROPOSED SURFACE WATER
Q	INSPECTION CHAMBER
\bigcirc	PROPOSED SURFACE WATER
+	PROPOSED SURFACE WATER RODDING EYE
*	PROPOSED RAIN WATER PIPE
+	
•	
•	PROPOSED GREEN ROOF AREA
	PROPOSED GREEN ROOF AREA
	PROPOSED GREEN ROOF AREA
	PROPOSED GREEN ROOF AREA PROPOSED ATTENUATION TANK PROPOSED PERMEABLE PAVING
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P02 19/03/2021 PARKI	PROPOSED GREEN ROOF AREA PROPOSED ATTENUATION TANK PROPOSED PERMEABLE PAVING
P02 19/03/2021 PARKI P01 12/03/2021 ISSUE REV DATE DESCI	PROPOSED GREEN ROOF AREA PROPOSED ATTENUATION TANH PROPOSED PERMEABLE PAVING NG LAYOUT UPDATED AOR D FOR PLANNING AOR RIPTION DRN
P02 19/03/2021 PARKI P01 12/03/2021 ISSUE REV DATE DESCI STATUS	PROPOSED GREEN ROOF AREA PROPOSED ATTENUATION TANH PROPOSED PERMEABLE PAVING NG LAYOUT UPDATED AOR D FOR PLANNING AOR MINIARY ICCLIE
P02 19/03/2021 PARKI P01 12/03/2021 ISSUE REV DATE DESCI STATUS PREPARED IN PARTNIEDCLIID	PROPOSED GREEN ROOF AREA PROPOSED ATTENUATION TANK PROPOSED PERMEABLE PAVING NG LAYOUT UPDATED D FOR PLANNING RIPTION AOR AOR D FOR PLANNING MINARY ISSUE
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PO2 PO2 PO3 PO3 PO3 PO3 PO3 PO3 PO3 PRELI PREPARED IN PARTNERSHIP PREPARED IN PARTNERSHIP LOR +44 (0)20 744 PREPARED BY LOR +44 (0)20 744 PREPARED BY CLIENT KIN DEVELOPN PROJECT SEVENOAKS GA DRAWING TITLE BELOW GROUN DRAWING TITLE BELOW GROUN	PROPOSED GREEN ROOF AREA PROPOSED ATTENUATION TANK PROPOSED PERMEABLE PAVING MINARY ISSUE MINARY ISSUE MINARY ISSUE 91-94 LOWER MARSH NDON SE1 7AB, UNITED KINGDOM 2 2216 www.whitbywood.com CONSULTHECUBE.CO.UK MENTS AS HOLDERS SITE ND DRAINAGE LAYOUT DATE 30/09/2020 SCALE 30/09/2020 SCALE 1:250
PO2 19/03/2021 PARKI PO1 12/03/2021 PARKI STATUS PREPARED IN PARTNERSHIP +44 (0)20 744 PREPARED BY CLIENT KIN DEVELOPN PROJECT SEVENOAKS GA DRAWING TITLE BELOW GROUN PROJECT SEVENOAKS GA	PROPOSED GREEN ROOF AREA PROPOSED ATTENUATION TANK PROPOSED PERMEABLE PAVING PROPOSED PERMEABLE PAVING MINARY ISSUE MINARY ISSUE MINARY ISSUE 91-94 LOWER MARSH NDON SE1 7AB, UNITED KINGDOM 2 2216 WWW.Whitbywood.com CONSULTHECUBE.CO.UK MENTS AS HOLDERS SITE ND DRAINAGE LAYOUT DATE 30/09/2020 SCALE 30/09/2020 SCALE 1.250 CR CHK AOR APP AOR

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Appendix F Proposed Surface Water Calculations

Cube Consulting Engineers		Page 1
24 Carronade Court	Sevenoaks Gasholder	
London	Proposed Surface Water	
N7 8EP		Mirco
Date 17/03/2021 15:45	Designed by AOR	
File Sevenoak Planning Model.MDX	Checked by AP	Diamage
Innovyze	Network 2020.1	
STORM SEWER DESIGN	by the Modified Rational Metho	<u>od</u>
Design	Criteria for Storm	
Pipe Sizes STA	ANDARD Manhole Sizes STANDARD	
F	EH Rainfall Model	100
Return Peri FEH Painfa	od (years) 11 Version	2013
Sit	e Location GB 552836 157170 TQ 52836	5 57170
	Data Type	Point
Maximum Rainfa	ll (mm/hr)	50 30
Foul Sewag	e (l/s/ha)	0.000
Volumetric Run	off Coeff.	0.750
Add Eloy / Climato	PIMP (%)	100
Add Flow / Climate Change (%) Minimum Backdrop Height (m)		0.200
Maximum Backdrop Height (m)		1.500
Min Design Depth for Optimisation (m) 1.200		1.200
Min Vel for Auto Design only (m/s) 1.00 Min Slope for Optimisation (1:X) 500		1.00 500
Design	ed with Level Soffits	
Time Are	ea Diagram for Storm	
Time (mins)	Area Time Area) (ha) (mins) (ha)	
0-4	4 0 485 4-8 0 227	
	1 0 100 1 0 0.227	
Total Area	Contributing (ha) = 0.712	
Total Pi	pe Volume (m³) = 18.019	

Cube Consulting Engine	ers						Page 2
24 Carronade Court			Se	evenoaks	Gasholder	-	
London			P	roposed S	urface Wa	ater	
N7 8FD							
			D		3.05		— MIC(O
Date 17/03/2021 15:45			De	esigned b		Drainage	
File Sevenoak Planning	Mode	el.MD	X Cl	hecked by	AP		brainage
Innovyze			Ne	etwork 20	20.1		
		_	~	-	~ .		
		<u>Are</u>	<u>a Su</u>	immary for	<u>storm</u>		
Pipe	PIMP	PIMP	PIMP	Gross	Imp.	Pipe Total	
Number	Туре	Name	(%)	Area (ha)	Area (ha)	(ha)	
1.000	User	_	100	0.030	0.030	0.030	
1.001	User	-	100	0.031	0.031	0.031	
1.002	User	-	100	0.036	0.036	0.036	
1.003	-	-	100	0.000	0.000	0.000	
1.004	User	-	100	0.036	0.036	0.036	
	User	-	100	0.010	0.010	0.046	
2.000	User	-	100	0.047	0.047	0.047	
2.001	User	-	100	0.077	0.077	0.077	
2.002	-	-	100	0.000	0.000	0.000	
2.003	-	-	100	0.000	0.000	0.000	
2.004	User	-	100	0.025	0.025	0.025	
1.005	User	-	100	0.031	0.031	0.031	
	User	-	100	0.112	0.112	0.143	
	User	-	100	0.012	0.012	0.155	
	User	-	100	0.030	0.030	0.185	
1.006	-	-	100	0.000	0.000	0.000	
1.007	User	-	100	0.054	0.054	0.054	
	User	-	100	0.003	0.003	0.057	
3.000	User	-	100	0.029	0.029	0.029	
3.001	-	-	100	0.000	0.000	0.000	
3.002	-	-	100	0.000	0.000	0.000	
3.003	-	-	100	0.000	0.000	0.000	
3.004	-	-	100	0.000	0.000	0.000	
4.000	-	-	100	0.000	0.000	0.000	
4.001	User	-	100	0.015	0.015	0.015	
3.005	-	-	100	0.000	0.000	0.000	
3.006	User	-	100	0.030	0.030	0.030	
	User	-	100	0.045	0.045	0.075	
3.007	-	-	100	0.000	0.000	0.000	
5.000	User	-	100	0.023	0.023	0.023	
5.001	-	-	100	0.000	0.000	0.000	
5.002	User	-	100	0.038	0.038	0.038	
1.008	-	-	100	0.000	0.000	0.000	
1.009	-	-	100	0.000	0.000	0.000	
				Total	Total	'l'otal	
				0./12	0./12	0./12	

Cube Consulting Engineers P													
24 Carronade Court	Sevenoaks	Gashold	er										
London	Proposed	Surface N	Water										
N7 8EP					Mirro								
Date 17/03/2021 15:45	Designed	by AOR											
File Sevenoak Planning Model.MDX	Checked b	у АР			Diamage								
Innovyze	Network 2	020.1											
Online	Controls	for Stor	<u>n</u>										
Hydro-Brake® Optimum Manho	ole: 7, DS	/PN: 1.0)6. Voj	lume (m³)	: 3.0								
Unit. Reference MD-SHE-0054-2000-2500-2000													
Unit	Reference 1	MD-SHE-005	4-2000-	2500-2000									
Desig	n Head (m)			2.500									
Design	Flow (1/S) Flush-Flo™		C	2.U alculated									
	Objective	Minimise	upstrea	m storage									
A	pplication		÷	Surface									
Sump	Available			Yes									
Dia	meter (mm)			54									
Invert Minimum Outlet Pipe Dia	meter (mm)			69.278 75									
Suggested Manhole Dia	meter (mm)			1200									
		_											
Control Points Head (m) Flor	w (l/s)	Control	Points	Head	(m) Flow (1/s)								
Design Point (Calculated) 2.500	2.0		Kick-	-Flo® 0.	.484 1.0								
Flush-Flo™ 0.239	1.2 Mean	Flow over	r Head F	Range	- 1.4								
The hydrological calculations have been	en based on	the Head/D	ischarg	e relation	ship for the								
Hydro-Brake® Optimum as specified. Sh	nould anothe	r type of	control	device ot	her than a								
Hydro-Brake Optimum® be utilised then	these stora	ge routing	calcul	ations wil	l be invalidated								
Depth (m) Flow (l/s) Depth (m) Flow	w (l/s) Dept	h (m) Flor	w (l/s)	Depth (m)	Flow (l/s)								
0 100 1 0 1 200	1 4	3 000	2.2	7 000	3 2								
0.200 1.2 1.400	1.5	3.500	2.3	7.500	3.3								
0.300 1.2 1.600	1.6	4.000	2.5	8.000	3.4								
0.400 1.1 1.800	1.7	4.500	2.6	8.500	3.5								
	1.8	5.000	2.8	9.000	3.6								
0.800 1.2 2.400	2.0	6.000	2.9	9.300	5.7								
1.000 1.3 2.600	2.0	6.500	3.1										
<u>Hydro-Brake® Optimum Manho</u>	<u>le: 28, DS</u>	S/PN: 1.0	09, Vo	lume (m³): 2.1								
Unit	Peference	MD-SHE-000	7-4700-	1400-4700									
Desia	n Head (m)	009-2013 مت	, -,00-	1.400									
Design	Flow (l/s)			4.7									
	Flush-Flo™		C	alculated									
	Objective	Minimise	upstrea	m storage									
A	ppication Available			Surface Yes									
Dia	meter (mm)			97									
Invert	Level (m)			66.940									
Minimum Outlet Pipe Dia	meter (mm)			150									
©198	32-2020 In	novyze											

Cube Consult	ing H	Engin	eers										Pa	ge 4	
24 Carronade	e Coui	rt				Seven	oaks (Gash	olde	r					
London						Propos	sed Sı	ırfa	ce Wa	ater					
N7 8EP													M	irm	
Date 17/03/2	2021 1	15 : 45				Desig	ned by	/ AC	R				n	aina	סחו
File Sevenoa	ak Pla	annin	g Mode	el.M	IDX	Checke	ed by	AP							icje
Innovyze						Netwo	rk 202	20.1							
Hydro	o-Bra	ker O	ntimuu	n Ma	anhol	e. 28	DS/	PN•	1 00	9. VC	lume	(m ³)• 2	1	
<u>IIYUI</u>	<u>o Dru</u>	<u>kce o</u>	Sug	aest	ed Ma	nhole	Diamet	er (<u>200</u>	Tunic	(III		<u> </u>	
Control	Point	s	Head	(m)	Flow	(1/s)		Cont	rol P	oints		Head	(m) E	'low (]	L/s)
Design Point	(Calcu	lated)	1.	400		4.7				Kick-	Flo®	0.	859		3.8
	Flus	sh-Flo ^r	Μ Ο.	421		4.7	Mean H	Flow	over	Head F	lange		-		4.1
The hydrolog	gical (calcul	ations	have	e beei	n based	d on th	ie He	ead/Di	scharg	e rela	ation	ship :	for the	e
Hydro-Brake) Optin	mum as	speci	fied	. Sho	ould ar	nother	type	e of c	ontrol	devid	ce ot	her tl	nan a	,
Hydro-Brake	Optim	um® be	utilis	sed t	then	these s	storage	rou	iting	calcul	ations	s wil	l be :	invali	dated
Depth (m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	Depth	(m)	Flow	(l/s)	
0.100		3.1	1.	200		4.4	3.	.000		6.7	7	.000		10.0	
0.200		4.3	1.	400		4.7	3.	.500		7.2	7	.500		10.4	
0.300		4.6	1.	600		5.0	4.	.000		7.7	8	.000		10.7	
0.400		4.7	1.	000		5.3	4.5	.000		8.5	8 9	.000		11.0	
0.600		4.6	2.	200		5.8	5.	.500		8.9	9	.500		11.6	
0.800		4.1	2.	400		6.0	6.	.000		9.3					
1.000		4.0	2.	600		6.3	6.	.500		9.7					
				(©198	2-2020) Innc	ovyz	е						

Cube Consulting Engineers		Page 5
24 Carronade Court	Sevenoaks Gasholder	
London	Proposed Surface Water	
N7 8EP		Mirro
Date 17/03/2021 15:45	Designed by AOR	Dcainago
File Sevenoak Planning Model.MDX	Checked by AP	Diamage
Innovyze	Network 2020.1	
<u>Storage</u>	Structures for Storm	
<u>Porous Car Par</u>	k Manhole: 2, DS/PN: 1.001	
Infiltration Coefficient Base	(m/hr) 0.00000 Width (m)	10.0
Membrane Percolation (mm/hr) 1000 Length (m)	22.0
Max Percolation	n (1/s) 61.1 Slope (1:X)	0.0
Salety	Factor 2.0 Depression Storage (mm) prosity 0.30 Evaporation (mm/day)	3
Invert Lev	rel (m) 71.650 Cap Volume Depth (m)	0.150
<u>Porous Car Par</u>	<u>ck Manhole: 7, DS/PN: 2.001</u>	
Infiltration Coefficient Base	(m/hr) = 0.00000 Width (m)	86.0
Membrane Percolation ((m/hr) 1000 Length (m)	10.0
Max Percolation	n (1/s) 238.9 Slope (1:X)	0.0
Safety	Factor 2.0 Depression Storage (mm)	5
PC Invert Lev	rel (m) 70.620 Cap Volume Depth (m)	3 0.150
<u>Cellular Stora</u>	ge Manhole: 6, DS/PN: 1.005	
Inve:	rt Level (m) 69.500 Safety Factor 2.0	
Infiltration Coefficient	Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf. Ar	ea (m ²) Depth (m) Area (m ²) Inf. Area (m	m²)
0.000 300.0	0.0 1.501 0.0	0.0
1.500 300.0	0.0	
<u>Porous Car Par</u>	k Manhole: 24, DS/PN: 5.002	
Infiltration Coefficient Base	(m/hr) 0.00000 Width (m)	10.0
Membrane Percolation (mm/hr) 1000 Length (m)	18.0
Max Percolation	(1/s) 50.0 Slope (1:X)	0.0
Safety	Factor 2.0 Depression Storage (mm)	5
Invert Lev	rel (m) 68.830 Cap Volume Depth (m)	0.150
<u>Cellular Stora</u>	ge Manhole: 9, DS/PN: 1.008	
Inve:	rt Level (m) 67.000 Safety Factor 2.0	
Intiltration Coefficient	Base (m/hr) 0.00000 Porosity 0.95	
	5140 (m/m) 0.00000	
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Cube Consi	ulting E	ngineers								Page 6
24 Carron	ade Cour	+	ç	Seven	oaks Ga					
London	446 0041	0	T T	Propo	and Sur	face W	ator			
N7 OFD			1	горо	seu sui	.iace w	ater			
N/ OEP	2/0001 1	- 4					– Micro			
Date 1//0.	3/2021 1	5:45	_)esig:	ned by		Drainage			
File Seve	noak Pla	nning Mode	el.MDX (Check	ed by A		Brainage			
Innovyze			Ν	Jetwo	rk 2020					
						,				
		<u>Cellular</u>	s Storage	e Man	nole: 9	, DS/P	N: 1.	008		
	Depth (m)	Area (m^2)	Inf Area	(m ²)	Denth (m) Area	(m ²)	Tnf 7	Aroa	(m ²)
	Depth (m)	Area (m ⁻)	INI. Area	(m-)	Depth	m) Area	(m-)	1111. 1	Area	(
	0.000	110.0		0.0	1.4	01	0.0			0.0
	1.400	110.0		0.0						
			©1982	2-202) Innov	yze				

Cube Consulting Engineers Page 7															
24 Carro	onade	Cou	rt		5	eveno	aks Ga	sholder							
London					E	ropos	ed Sur	face Wat	er						
N7 8EP											Micco				
Date 17,	/03/20)21	15:45		Γ	esign	ed by	AOR							
File Sev	venoak	< Pl	anning	Model	.MDX C	hecke	d by A	ΔP			Digiligada				
Innovyze	9				N	letwor	- k 2020	.1							
2 year 1	Returi	n Pe	eriod S	Summary	of Cr	itical	Resu	lts by Ma	aximum Le	vel (F	Rank 1) for				
						<u>Sto:</u>	rm								
	Simulation Criteria Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000														
		Are	ear Redu Hot	Start (actor I. mins)	000 1	MAC	DD Factor *	10m³/ha S	torage	2.000				
		H	lot Star	t Level	(mm)	0		In	let Coeffi	ecient	0.800				
Ма	inhole	Head	lloss Cc	eff (Gl	obal) 0.	500 Flo	ow per	Person per	Day (l/pe	r/day)	0.000				
	Foul S	Sewag	le ber p	ectare	(l/s) 0.	000									
Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0															
Number of Input Hydrographs 0Number of Offline Controls 0Number of Time/Area Diagrams 0Number of Online Controls 2Number of Storage Structures 5Number of Real Time Controls 0															
Number of Online Controls 2 Number of Storage Structures 5 Number of Real Time Controls 0															
					Synthet	ic Rain	fall De	<u>etails</u>							
			FEH R	Kainfall	Version				РЕН 2013						
				Site I	Location	GB 552	836 15	7170 TQ 528	836 57170						
Data Type Point															
	Cv (Summer) 0.750														
				Cv	(Winter)				0.840						
	M	argi	n for F	lood Ris	sk Warnin	ng (mm)				200.0					
				Ana	alysis T:	imestep	2.5 Se	econd Incre	ement (Exte	ended)					
					DTS	Status				OFF					
					DVD	Status				ON					
					Inerula	Status				ON					
				Profil	Le(s)			S1	ummer and N	Winter					
	R	etur	Durati n Perio	on(s) (r d(s) (ve	nins) 15 Pars)	, 30, 6	0, 120,	, 240, 360,	, 480, 960, 2. 3(, 1440 D. 100					
	10	ecui	Climat	e Change	e (%)				0, 2	20, 40					
				2											
				Poturn	Climato	Fire	- (V)	First (V)	First (7)	Orrowf	Water				
PN	Name	s	torm	Period	Change	Surch	narge	Flood	Overflow	Act	. (m)				
		-			onango						,				
1.000	1	15	Winter	2	+0%	30/15	Summer				70.749				
1.001	2	15 15	Winter Winter	2	+U% ⊥∩⊆	30/15 30/15	Summer				/U.518 70 065				
1.002	4	15	Winter	2	+0%	30/15	Summer				69.972				
1.004	5	480	Winter	2	+0%	30/15	Summer				69.795				
2.000	6	15	Winter	2	+0%	30/15	Summer				70.070				
2.001	7	30	Winter	2	+0%	30/15	Summer				70.010				
2.002	8 0	30 480	Winter Winter	2	+U% ⊥∩©	3U/15 30/15	Summer				69.889 69.796				
2.003	10	480	Winter	2	+0%	2/360	Winter				69.795				
1.005	6	480	Winter	2	+0%	2/30	Winter				69.794				
1.006	7	480	Winter	2	+0%	2/15	Summer				69.802				
					©1982	-2020	Innov	yze							

Cube Cons	sultin	g Enginee	rs						Page 8
24 Carror	nade C	ourt		Se	venoaks	Gasholder	2		
London				Pr	oposed S	urface Wa	ater		
N7 8EP					1				Micco
Date 17/0)3/202	1 15:45		De	signed b	y AOR			
File Seve	enoak	Planning I	Model.M	DX Ch	ecked by	AP			Diginglig
Innovyze		ر <u>-</u>		Ne	twork 20	20.1			
<u>2 year R</u>	eturn	Period Su	mmary c	of Crit	<u>storm</u>	ults by i	Maximu	ım Level (<u>Rank 1) for</u>
					<u>5001111</u>				
		Surcharged	Flooded			Half Drain	Pipe		
	US/MH	Depth	Volume	Flow /	Overflow	Time	Flow		Level
PN	Name	(m)	(m³)	Cap.	(1/s)	(mins)	(1/s)	Status	Exceeded
1.000	1	-0.101	0.000	0.23			5.0	OK	
1.001	2	-0.085	0.000	0.38		6	8.6	OK	
1.002	3	-0.136	0.000	0.31			13.0	OK	
1.003	4	-0.142	0.000	0.28			13.4	OK	
1.004	5	-0.112	0.000	0.07			3.3	OK	
2.000	6	-0.155	0.000	0.21			7.7	OK	
2.001	7	-0.128	0.000	0.37		9	13.8	OK	
2.002	8	-0.131	0.000	0.35			13.7	OK	
2.003	9	-0.085	0.000	0.08			2.8	OK	
2.004	10	0.024	0.000	0.09			3.3	SURCHARGED	
1.005	6	0.162	0.000	0.02			1.3	SURCHARGED	
1.006	7	0.224	0.000	0.02			1.2	SURCHARGED	

Cube Consulting Engineers												Pag	re 9
24 Carr	onac	le Co	urt			Sev	enoa	aks Ga	sholder				
London						Pro	pose	ed Sur	face Wate	er			
N7 8EP							-					N A	
Date 17	/03/	2021	15:45			Des	iane	ed by	AOR				ici u
File Se	,, venc	ak P	lanning	n Mode	אסא ו	Che	- y	d by A	D				anage
Tanarua				j Model	L.HDA	Not			1				
INNOVYZ	e					Net	WOL	K 2020	• 1				
2 waar	Pot	irn D	eriod	Summar	v of C	riti	cal	Posul	te hu Ma	vimum	Tevrel	(Pan)	k 1) for
<u>z year</u>	Neu		errou	Juninar	y OI C		Stor	rm	to by Ma	AIIIUIII	пелет	. (Itali	<u>K I) IUI</u>
						-	5001	<u>_ 111</u>					
													Water
	US/M	н		Return	Climate	e E	'irst	t (X)	First (Y)	First	(Z) Ov	verflow	Level
PN	Nam	e S	Storm	Period	Change	S	urch	narge	Flood	Overf	low	Act.	(m)
1.007		8 15	Winter	2	+0	00							69.239
3.000	1	4 15	Winter	2	+0	100	/15	Summer					70.753
3.001	1	5 15	Winter	2	+0	\$ 100	/15	Summer					70.622
3.002	1	6 15	Winter	2	+0	\$ 100	/15	Summer					70.539
3.003	1	7 15	Winter	2	+0	8 100	/15	Summer					70.296
3.004	1	8 15	Winter	2	+0	\$ 100	/15	Summer					70.167
4.000	1	9 15	Summer	2	+0	00							69.600
4.001	2	0 15	Winter	2	+0	8 100	/15	Summer					69.155
3.005	1	9 15	Winter	2	+0	8 100	/15	Summer					68.867
3.006	2	0 15	Winter	2	+0	30	/15	Summer					68.501
3.007	2	1 15	Winter	2	+0	8 30	/15	Summer					68.288
5.000	2	2 15	Winter	2	+ 0 *	00							70.031
5.001	2	3 15	Winter	2	+ 0 *	00							69.039
5.002	2	4 15	Winter	2	+0	\$ 100	/15	Winter					68.730
1.008		9 120	Winter	2	+0	8 30	/15	Summer					67.235
1.009	2	8 120	Winter	2	+0	30	/15	Summer					67.232
			Surchar	aed Fla	oded			1	Half Drain	Pipe			
		US/MH	Dept	h Vo	lume F	Low /	Ove	erflow	Time	Flow		Leve	1
	PN	Name	(m)	(:	m ³) (Cap.	(1/s)	(mins)	(1/s)	Status	Excee	ded
						-							
1.	.007	8	-0.	.256 (0.000	0.05				9.2	OF	C .	
3.	.000	14	-0.	.097 (0.000	0.27				4.9	Oŀ	ζ.	
3.	.001	15	-0.	.095 (0.000	0.29				4.8	OF	5	
3.	.002	16	-0.	.098 (0.000	0.26				4.8	OF	-	
3.	.003	17	-0.	.097 (0.000	0.27				4.9	OF	<	
3.	.004	18	-0.	.096 (0.000	0.28				4.9	OF	5	
4.	.000	19	-0.	.150 (0.000	0.00				0.0	OF	-	
4.	.001	20	-0.	.118 (0.000	0.10				2.1	Or		
3.	.005	19	-0.	.169 (0.000	0.14				6.8	OF		
3.	.006	20	-0.	.131 (.000	0.36				17.1	OF		
3.	.007	21	-0.	.131 (0.000	0.36				1/.0	Or		
5.	.000	22	-0.	.119 (0000	0.10				3./	OF 07		
5.	. UUI	23	-0.	1 A 1 C		0.10			0	3./	OF	· · ·	
5.	002	24	-0.	.141 (065 (0.30			8 0 =	9.0	OF		
1.	000	9	-0.			0.08			60	4./	Or		
1.	.009	28	-0.		.000	0.06				4.0	OF		
					©198	32-2	020	Innov	vze				

Cube Consulting Engineers		Page 10
24 Carronade Court	Sevenoaks Gasholder	
London	Proposed Surface Water	
N7 8EP		Mirro
Date 17/03/2021 15:45	Designed by AOR	
File Sevenoak Planning Model.MDX	Checked by AP	Diamage
Innovyze	Network 2020.1	
30 year Beturn Period Summary of	f Critical Results by Mavimum Leve	l (Bank 1)
<u>50 year Neturn reriod Summary 0.</u>	for Storm	
	<u>101 0001m</u>	
Si	mulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	v 0.000
HOT START (MINS) Hot Start Level (mm)	0 MADD Factor ^ Ium*/na Storage	- 0.800
Manhole Headloss Coeff (Global)	0.500 Flow per Person per Day (1/per/day)	0.000
Foul Sewage per hectare (1/s)	0.000	
Number of Input Hydrographs 0 Number of Online Controls 2 Number of	of Offline Controls 0 Number of Time/Are	ea Diagrams O me Controls O
	i boorage beractareb o hamber of hear in	
<u>Synthe</u>	etic Rainfall Details	
Rainiall Mode FEH Rainfall Versic	2013	
Site Locatio	n GB 552836 157170 TQ 52836 57170	
Data Typ	Point	
Cv (Summer	c) 0.750	
Cv (Winter	0.840	
Margin for Flood Risk Warr	ing (mm) 200.0	
Analysis	Timestep 2.5 Second Increment (Extended)	
DT	'S Status OFF	
DV	D Status ON	
THETCI		
Profile(s)	Summer and Winter	
Duration(s) (mins) 1	5, 30, 60, 120, 240, 360, 480, 960, 1440	
Return Period(s) (years)	2, 30, 100	
Climate Change (%)	0, 20, 40	
WARNING: Half Drain Time has not	been calculated as the structure is too	full.
		Water
US/MH Return Climat	e First (X) First (Y) First (Z) Over	flow Level
PN Name Storm Period Change	e Surcharge Flood Overflow Act	t. (m)
1.000 1 15 Winter 30 +20	% 30/15 Summer	71.060
1.001 2 15 Winter 30 +20	0% 30/15 Summer	70.961
1.002 3 15 Winter 30 +20	% 30/15 Summer	70.396
1.003 4 960 Winter 30 +20	0% 30/15 Summer	70.351
1.004 5 960 Winter 30 +20 2.000 6 15 Winter 30 +20	18 JU/15 Summer 18 JU/15 Summer	70.350
2.001 7 15 winter 30 +20	% 30/15 Summer	70.594
2.002 8 15 Winter 30 +20	1% 30/15 Summer	70.394
2.003 9 960 Winter 30 +20	% 30/15 Summer	70.351
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01)		

Cube Cons	sulting	g Enginee	rs						Page 11
24 Carror	nade Co	ourt		S	evenoaks	Gasholder			
London				P	roposed S	urface Wa	ter		
N7 8EP					-				Micco
Date 17/0	3/2021	15:45		D	esigned b	V AOR			
File Seve	enoak E	lanning	Model.M	DX C	hecked by	AP			Drainage
Innovyze				N	etwork 20	20.1			
<u>30 year</u>	Retur	n Period	Summar	y of	Critical	Results b	y Max	imum Level	l (Rank 1)
					for Storm	<u>l</u>			
	9	Surcharged	Flooded			Half Drain	Pipe		
	US/MH	Depth	Volume	Flow ,	/ Overflow	Time	Flow		Level
PN	Name	(m)	(m³)	Cap.	(1/s)	(mins)	(l/s)	Status	Exceeded
1 000	1	0 210	0 000	0 6	4		12 7	CUDCUADCED	
1.000	2	0.210	0.000	1.1	9	3	27.4	SURCHARGED	
1.002	3	0.195	0.000	1.0	2		42.6	SURCHARGED	
1.003	4	0.237	0.000	0.0	6		2.9	SURCHARGED	
1.004	5	0.443	0.000	0.0	8		4.1	SURCHARGED	
2.000	6 7	0.419	0.000	0.5	4 5	6	19.7 51 2	SURCHARGED	
2.001	8	0.430	0.000	1.2	5	0	48.1	SURCHARGED	
2.003	9	0.470	0.000	0.0	9		3.5	SURCHARGED	
				<u>a1000</u>	2000 -				
1			(91982	-ZUZU INN	lovyze			

Cube Consulting Engineers												Page	e 12
24 Carro	onade	Coi	ırt			Seven	oaks Ga	sholde	r				
London						Propo	sed Sur	face Wa	ater				
N7 8FD													a com
Data 17	(02/2	0.0.1	1 5 . 4 5			Deele		100				MI	
Date 17	/03/2	021	15:45			Desig	nea by	AOR				Dra	ninage
File Se	venoa	k P.	lanning	Model	.MDX	Check	ed by A	AP					
Innovyze	е					Netwo	rk 2020	.1					
30 vez	ar Re	turr	Perio	d Summ	ary of	Crit	ical Re	sults }	ov Max	imum	T.eve	1 (Ra	ank 1)
<u>00 yee</u>		CULI			ury or	for	Storm	JULICO I	<u> </u>	LIIIGIII		<u> </u>	<u> </u>
						101	<u>0001111</u>						
													Water
	US/MH		:	Return	Climate	Fir	st (X)	First	(Y) Fir	st (Z)	Over	flow	Level
PN	Name	S	torm	Period	Change	Sur	charge	Flood	d Ove	rflow	Ac	t.	(m)
2 004	10	960	Winter	30	+20≗	2/36	0 Winter						70 350
1.005	10	960	Winter	30	+20%	2/30	0 Winter 0 Winter						70.349
1.006	7	960	Winter	30	+20%	2/1	5 Summer						70.360
1.007	8	15	Winter	30	+20%	_, _							69.279
3.000	14	15	Winter	30	+20%	100/1	5 Summer						70.803
3.001	15	15	Winter	30	+20%	100/1	5 Summer						70.674
3.002	16	15	Winter	30	+20%	100/1	5 Summer						70.586
3.003	17	15	Winter	30	+20%	100/1	5 Summer						70.345
3.004	18	15	Winter	30	+20%	100/1	5 Summer						70.216
4.000	19	15	Summer	30	+20%								69.600
4.001	20	15	Winter	30	+20%	100/1	5 Summer						69.186
3.005	19	15	Winter	30	+20%	100/1	5 Summer						68.915
3.006	20	15	Winter	30	+20%	30/1	5 Summer						68.738
3.007	21	15	Winter	30	+20%	30/1	5 Summer						68.466
5.000	22	15	Winter	30	+20%								70.055
5.001	23	15	Winter	30	+20%								69.071
5.002	24	15	Winter	30	+20%	100/1	5 Winter						68.826
1.008	9	120	Winter	30	+20%	30/1	5 Summer						67.816
1.009	28	240	Winter	30	+20%	30/1	5 Summer						67.827
		S1	urcharge	d Flood	led		Ha	lf Drair	1 Pipe			-	
	05/1	MH	Depth	Volu	ne Flow	/ Ove	rflow	Time	FLOW	~ .		Lev	7e⊥ , ,
PN	мап	e	(m)	(m ⁻) Cap	. (.	./s)	(mins)	(1/S)	Sta	tus	Exce	eaea
2.00	4	10	0.57	9 0.0	00 0.	11			4.2	SURCH	ARGED		
1.00	5	6	0.71	7 0.0	00 0.	03			1.5	SURCH	ARGED		
1.00	16	7	0.78	1 0.0	00 0.	02			1.4	SURCH	ARGED		
1.00	7	8	-0.21	6 0.0	00 0.	17			30.8		OK		
3.00	0	14	-0.04	7 0.0	00 0.	80			14.2		OK		
3.00	1	15	-0.04	3 0.0	00 0.	84			14.0		OK		
3.00	2	16	-0.05	1 0.0	00 0.	76			14.1		OK		
3.00	3	17	-0.04	8 0.0	00 0.	80			14.2		OK		
3.00	4	18	-0.04	7 0.0	00 0.	82			14.2		OK		
4.00	0	19	-0.15	0.0	00 0.	00			0.0		OK		
4.00	1 :	20	-0.08	7 0.0	00 0.	38			7.9		OK		
3.00	5	19	-0.12	1 0.0	00 0.	43			21.2		OK		
3.00	6	20	0.10	6 0.0	00 1.	13			53.3	SURCH	ARGED		
3.00	1/	21	0.04	/ 0.0	1.	13			53.1	SURCH	ARGED		
5.00		22 22	-0.09	o 0.0	00 0.	28 44			10.0		OK		
5.00	12 .	∠ ⊃ 2 /I	-0.07	9 U.U 5 0 0		98 98		F	10.8	FI OOD	UK DTCV		
1 00		9	0.04	6 0.0	00 0	09			, 2,,9 5 5	SURCH	ARGED		
±.00	-	-	0.01	- 0.0					5.5	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			

Cube	Cons	ulting	Engineer	ſS						Page 13
24 Ca	arror	ade Cou	ırt		S	evenoaks	Gasholder			
Londo	on				P	roposed S	urface Wa	ter		
N7 8E	ΞP									Micco
Date	17/0	3/2021	15:45		D	esigned k	y AOR			
File	Seve	enoak Pl	anning N	Model.M	DX C	hecked by	AP			Dialitacje
Innov	yze				N	etwork 20	20.1			
<u>30</u>	year	Return	Period	Summary	y of (Critical	Results b	y Max	imum Leve	<u>l (Rank 1)</u>
					-	for Storm	<u>l</u>			
		Su	rcharged	Flooded			Half Drain	Pipe		
		US/MH	Depth	Volume	Flow ,	/ Overflow	Time	Flow		Level
	PN	Name	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded
1	.009	28	0.587	0.000	0.06	5		4.7	SURCHARGED)
-		20	0.007	0.000	0.00	5		1.,	DOIGHINGED	, ,
				(D1982	-2020 Inr	ovyze			

Cube Consulting Engineers		Page 14					
24 Carronade Court	Sevenoaks Gasholder						
London	Proposed Surface Water						
N7 8EP		Micco					
Date 17/03/2021 15:45	Designed by AOR						
File Sevenoak Planning Model.MDX	Checked by AP	Drainage					
Innovyze	Network 2020 1						
	NCCWOIN 2020.1						
100 year Return Period Summary c	f Critical Results by Maximum Leve	el (Rank 1)					
	for Storm	<u> </u>					
Si	mulation Criteria						
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	w 0.000					
Hot Start (mins)	0 MADD Factor * 10m³/ha Storage	e 2.000 ⊢ 0.800					
Manhole Headloss Coeff (Global)	0.500 Flow per Person per Dav (1/per/dav)) 0.000					
Foul Sewage per hectare (1/s)	0.000						
Number of Input Hydrographs 0 Number	of Offline Controls 0 Number of Time/Are	ea Diagrams 0					
Number of Online Controls 2 Number o	I Storage Structures 5 Number of Real III	me controis u					
Synthe	etic Rainfall Details						
Rainfall Mode	el FEH						
FEH Rainfall Versio	on 2013						
Site Locatio	on GB 552836 157170 TQ 52836 57170						
Data Typ Cv. (Summer) 0.750						
Cv (Winter	c) 0.840						
Margin for Flood Risk Warr	ling (mm) 200.0						
Analysis	Timestep 2.5 Second Increment (Extended)	,					
DI	D Status ON	Ī					
Inerti	a Status ON	T					
Profile(s)	Summer and Winter						
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440							
Return Period(s) (years) 2, 30, 100							
Climate Change (%) 0, 20, 40							
WARNING: Half Drain Time has not	been calculated as the structure is too	full.					
US/MU Boturn Clima	to First (V) First (V) First (7) Oron	Water					
PN Name Storm Period Chanc	re Surcharge Flood Overflow Ac	t. (m)					
		()					
1.000 1 15 Winter 100 +4	0% 30/15 Summer	71.929					
1.001 2 15 Winter 100 +4	0% 30/15 Summer	71.678					
1.002 3 15 Winter 100 +4 1.003 4 15 Winter 100 +4	us JU/IJ Summer N% 30/15 Summer	/L.U66 70 912					
1.004 5 1440 Winter 100 +4	0% 30/15 Summer	70.800					
2.000 6 1440 Winter 100 +4	0% 30/15 Summer	70.803					
2.001 7 1440 Winter 100 +4	0% 30/15 Summer	70.803					
2.002 8 1440 Winter 100 +4	0% 30/15 Summer	70.802					
2.003 9 1440 Winter 100 +4	U% 30/15 Summer	70.801					
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Cube Cons	sultin	ng Enginee	rs						Page 15	
24 Carron	nade C	Court		Se	Sevenoaks Gasholder					
London					Proposed Surface Water					
N7 8EP							Micco			
Date 17/03/2021 15:45 Designed						signed by AOR				
File Sevenoak Planning Model.MDX Checked by AP									urainage	
Innovyze Network 2020.1										
<u>100 yea</u>	r Reti	urn Period	Summar	y of (Critical	Results b	y Max	<u>imum Leve</u>	<u>l (Rank 1)</u>	
				<u>f</u>	or Storm	L				
		Surcharged	Flooded			Half Drain	Pipe			
	US/MH	Depth	Volume	Flow /	Overflow	Time	Flow		Level	
PN	Name	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded	
1 000	1	1 079	0 000	0 99			21 3	GUDCUADCED		
1.000	2	1.075	0.000	1.60		3	36.6	SURCHARGED		
1.002	3	0.865	0.000	1.35			56.3	SURCHARGED		
1.003	4	0.798	0.000	1.16			55.0	SURCHARGED		
1.004	5	0.893	0.000	0.09			4.6	SURCHARGED		
2.000	6 7	0.578	0.000	0.04		602	1.5 4 0	FLOOD RISK		
2.001	8	0.782	0.000	0.10		002	3.9	FLOOD RISK		
2.003	9	0.920	0.000	0.10			3.9	FLOOD RISK		

Cube Cor	nsult	ing	Engine	ers							I	Page 16
24 Carro	onade	e Cou	irt		0	Sevenoa	ks Gas	sholder	2			
London					F	Propose	d Sur	face Wa	ater			
N7 8FD												
Doto 17	102/2	0.01	15.45		т		d bre i					MICLO
Date I//	/ 03/2	.021	13:43					AUR -				Drainage
File Sev	venoa	ik Pl	anning	Model	.MDX (Checked	l by Al	P				Brainacje
Innovyze	9				1	Jetwork	2020	.1				
<u>100 ye</u>	ar Re	eturr	n Perio	d Summ	ary of	Criti	cal Re	sults	by Max	imum	Level	<u>(Rank 1)</u>
						<u>for St</u>	orm					
_									···· _·			Water
t	JS/MH	~		Return	Climate	First	t (X)	First	(Y) Fir	st (Z)	Overf	low Level
PN	Name	S	torm	Period	Change	Surc	narge	F.T000	1 Ove	erilow	Act	. (m)
2.004	10	1440	Winter	100	+40%	2/360	Winter					70.800
1.005	6	1440	Winter	100	+40%	2/30	Winter					70.799
1.006	7	1440	Winter	100	+40%	2/15	Summer					70.810
1.007	8	15	Summer	100	+40%							69.298
3.000	14	15	Winter	100	+40%	100/15	Summer					71.005
3.001	15	15	Winter	100	+40%	100/15	Summer					70.834
3.002	16	15	Winter	100	+40%	100/15	Summer					70.720
3.003	17	15	Winter	100	+40%	100/15	Summer					70.443
3.004	10	15	Winter	100	+40%	100/15	Summer					/0.28/
4.000	19	15	Summer	100	+40%	100/15	0					69.600
4.001	20	15	Winter	100	+40%	100/15	Summer					69.431
3.005	20	15	Winter	100	+40%	30/15	Summer					69 281
3.007	21	15	Winter	100	+40%	30/15	Summer					68.724
5.000	22	15	Winter	100	+40%	00, 10	0 animo 1					70.069
5.001	23	15	Winter	100	+40%							69.091
5.002	24	15	Winter	100	+40%	100/15	Winter					68.874
1.008	9	240	Winter	100	+40%	30/15	Summer					68.330
1.009	28	240	Winter	100	+40%	30/15	Summer					68.340
		S 11	rcharge	d Flood	ad		Нај	lf Drain	Pipe			
	us/	мн	Depth	Volum	eu Flow	/ Overf	low	Time	Flow			Level
PN	Nar	ne	(m)	(m ³)	Сар.	(1/:	s)	(mins)	(1/s)	Stat	tus 1	Exceeded
			. ,	. ,			- •	,	() =)			
2.00	4	10	1.029	9 0.0	00 0.1	.2			4.7	SURCHA	ARGED	
1.00	5	6	1.160	6 0.0	00 0.0)3			1.8	SURCHA	ARGED	
1.00	6	7	1.233	1 0.0	00 0.0)2			1.6	SURCHA	ARGED	
1.00	7	8	-0.19	7 0.0	00 0.2	26			45.7		OK	
3.00	0	14	0.15			.8			21.0	SURCHA	ARGED	
3.00	1	15	0.11		00 1.2	1			20.3	SURCHA	ARGED	
3.00	2	17	0.08		00 I.U	1			20.0 10 7	SURCHA	ARGED	
3.00	4	± / 18	0.000	4 0.0	00 I.I 00 1 1	.± 3			19.1 19.6	SUBCH	ARCED	
4 00	- 0	19	-0 150		00 0 0	0			19.0	Sorcut	OK	
4.00	1	20	0.158	B 0.0	00 0.5	54			11.5	SURCH	ARGED	
3.00	5	19	0.342	2 0.0	00 0.6	55			32.2	SURCHA	ARGED	
3.00	6	20	0.649	9 0.0	00 1.5	58			74.6	SURCHA	ARGED	
3.00	7	21	0.305	5 0.0	00 1.5	59			74.7	SURCHA	ARGED	
5.00	0	22	-0.082	1 0.0	00 0.4	3			16.5		OK	

5.001 23 -0.059 0.000 0.67 5.002240.0030.0001.121.00891.0300.0000.09

74.7 SURCHARGED 16.5 OK 16.3 OK

5 34.3 FLOOD RISK 5.3 SURCHARGED

Cube Consulting Engineers							
24 Carronade Court							
London	Proposed Surface Wat	ter					
N7 8EP	Micco						
Date 17/03/2021 15:45	Designed by AOR						
File Sevenoak Planning Model.MDX	Checked by AP		Urainage				
Innovyze	Network 2020.1						
100 year Return Period Summary o	of Critical Results b	y Maximum Leve	el (Rank 1)				
	<u>for Storm</u>		<u>.</u>				
Surcharged Flooded	Half Drain	Pipe					
DN Name (m) (m ³) Ca	w / Overilow Time	FLOW (1/s) Status	Level				
	p. (1/3) (mins)	(1/5) Status	Exceeded				
1.009 28 1.100 0.000 0	.06	4.7 FLOOD RISK					
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Sevenoaks Gas Holders



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