Cole Easdon

TECHNICAL NOTE – 8241/01
FOUL & SURFACE WATER DRAINAGE DESIGN

Proposed Residential Redevelopment, Eddeys Lane, Bordon, Hampshire on Behalf of Cimbrone Developments TWO Limited

Project Title:	Proposed Residential Redevelopment, Eddeys Lane, Bordon, Hampshire				
Client:	Cimbrone Developments TWO Limited				
Project No.:	8241	Date:	December 2021	Issue No.:	1
Title:	Foul & Surface Water Drainage Design				
Written By:	S Starr BSc (Hons)	Checked By:	J. Pockett MEng (Hons)	Authorised By:	D. Frosoni CEng MICE MCIWEM

1.0 Introduction

1.1 This *Technical Note* has been prepared by Cole Easdon Limited (CE) on behalf of Cimbrone Developments TWO Limited in respect of a proposed residential redevelopment at Eddeys Lane, Bordon, Hampshire, GU35 8BH. Refer to CE Figure 8241/500/Figure 2 [*Site Location Plan*], enclosed with this *Technical Note*.

1.2 The proposals comprise the demolition of existing commercial premises and the construction of 6 No. detached houses with landscaping and parking.

1.3 Refer to Drawing No. GU35 8HU TP12(A) [*Proposed Site Plan*] by Clive Davis Architecture Limited enclosed with this *Technical Note*.

1.4 The proposals were granted planning approval in September 2020 (East Hampshire District Council Planning Reference 58616). Refer to the Decision Notice enclosed with this *Technical Note*.

1.5 This *Technical Note* provides the information required to address planning condition 2 relating to disposal of foul and surface water. Condition 2 states the following:
'Other than works for the demolition and site clearance, no development shall commence on site until details of a scheme for foul and surface water drainage has been submitted to, and approved in writing by, the Local Planning Authority. Such details should include provision for all surface water drainage from parking areas and areas of hardstanding to prevent surface water from discharging onto the highway and should be based on site investigation and percolation tests. The development shall be carried out in accordance with the approved details before any part of the development is first occupied and shall be retained thereafter'.

2.0 The Existing Site

2.1 The site is located on the corner of Eddeys Lane and Southview Road, Bordon, Hampshire, GU35 8BH. It covers 0.3ha and comprises an existing grocery store building, part of which is a converted two storey house, two semi-detached two storey houses, and an access and rear yard/parking area.

2.2 The site is bounded to the north by Eddeys Lane; to the east by neighbouring residential properties on Eddeys Lane; to the south by properties on Southview Road and Ludshott Grove; and to the west by Southview Road. Refer to CE Figure 8241/500 Figure 1 [*Site Location Plan*] enclosed with this *Technical Note*.

2.3 The site is accessed from Eddeys Lane via a track at the site's eastern boundary.

Existing Topography

2.4 A site topographical survey has been undertaken to Ordnance datum. Ground levels within the site fall to the south west. Ground levels within the site vary from 134mAOD in the north eastern corner of the site, to 131.70mAOD at the south western corner. Refer to CE Plan 8241/502 [*Proposed Drainage Layout*], enclosed with this *Technical Note*, which includes the topographical survey.

Existing Watercourses & Drainage Features

2.5 An unnamed watercourse flows in a westerly direction approximately 500m south of the site. It appears to be a tributary of the River Wey or River Shea.

Existing Sewers

2.6 Thames Water sewer records confirm that public foul sewers (150mm diameter) are located in Eddeys Lane and Southview Road. There are no public surface water sewers in the vicinity of the site. Refer to the public sewer records enclosed with this *Technical Note*.

Existing Site Drainage

2.7 Foul flows from the existing buildings are discharged into the adjacent public foul sewers.

2.8 There is currently no formal surface water drainage system in place at the site. Gutters and downpipes appear to discharge onto the adjacent road and hardstandings. It is understood that surface water runoff from the site is known to discharge overland onto the neighbouring property on Southview Road, to the south of the site.

Existing Ground Conditions

2.9 British Geological Survey (BGS) mapping indicates that the site is underlain by Sandstone bedrock (Hythe Formation).

July 2021 Site Investigation

2.10 An on-site intrusive site investigation comprising 5 No. bore holes and 2 No. trial pits trial pits were undertaken in July 2021. The works confirmed that the site is underlain by made ground/topsoil to between 0.3m and 0.8m below ground level (bgl), with Hythe Formation Strata (sand with gravel and some clay), below, to the maximum depth of the boreholes (2m). Refer to the Site Investigation Report excerpts enclosed with this *Technical Note*.

2.11 Groundwater monitoring standpipes were installed. Groundwater was recorded at a depth of 0.8m bgl at borehole WS02, which equates to a ground water level of 131.50mAOD.

2.12 Laboratory analysis confirms that contaminants are present within the made ground material at the site.

November 2021 Infiltration Testing

2.13 BRE 365 Infiltration testing was undertaken in November 2021, in 3 No. trial pits, within the Hythe Formation sands. The tests were performed at depths of 1.4 and 1.5m bgl in pits TP 1 and TP2, and at 0.9mbgl in test pit TP4. An infiltration rate of 6.21x10-6m/s was recorded in test pit TP4. A third test could not be completed in pits TP1 and TP2. The infiltration test report suggests that the slow infiltration rate observed at TP 1 and TP2 may be due to the influence of groundwater in these deeper pits. Refer to the infiltration test report enclosed with this *Technical Note.*

2.14 An exploratory pit (TP3) was excavated to a depth of 1.75m bgl in the lower lying southern part of the site. Groundwater seepage was encountered from 1m bgl which equates to a level of 131.00mAOD, which is lower than the level indicated by the groundwater monitoring undertaken in July 2021. Groundwater was not encountered in the remaining pits TP1, TP2 and TP4.

3.0 Proposed Surface Water Drainage Design

Refer to CE Plans 8241/502 [*Proposed Drainage Layout*] & 8241/503 [*Drainage Construction Details*] enclosed with this *Technical Note.*

3.1 Without suitable mitigation, water from the proposed development could increase the rate of surface water runoff from the site, thereby increasing flood risk to the locality.

Drainage Hierarchy

3.2 The drainage strategy for the site has been prepared according to the drainage discharge hierarchy from *CIRIA C753 The SuDS Manual*, as follows:

1. Infiltration to the maximum extent that is practical.
2. Discharge to surface waters.
3. Discharge to surface water sewer.
4. Discharge to combined sewer
5. Discharge to foul sewer

Infiltration Potential

3.3 The site is underlain by Hythe Formation sands, beneath a surface layer of topsoil/made ground. On site BRE365 compliant infiltration testing has confirmed that the sands are permeable at a relatively shallow depth, based on a tested rate of 6.21x10-6m/s. Refer to the infiltration test report enclosed with this *Technical Note.*

3.4 The maximum known groundwater level at the site is 131.50mAOD, recorded during the July 2021 Site Investigation. Refer to the Site Investigation Report excerpts enclosed with this *Technical Note*. East Hampshire District Council advise that the base of any proposed infiltration system must be a minimum of 1m above the groundwater level. Refer to the enclosed correspondence. Infiltration based Sustainable Drainage Systems (SuDS) will be provided wherever the base of the system can be accommodated at a level of 132.50mAOD or higher, in accordance with the council's requirements.

3.5 Proposed plots 1 and 2, and the driveway and front roof of proposed Plot 3 will therefore be drained into shallow infiltration SuDS. All made ground in the vicinity of the proposed infiltration systems will be removed and replaced with clean imported permeable material in order to prevent mobilisation of existing soil contaminants.

3.6 The lower lying proposed Plots 4 - 6 and the rear roof of Plot 3 will be drained into sealed attenuation SuDS.

Discharge Location

3.7 There are no watercourses or surface water sewers in the vicinity of the site. Attenuated flows from proposed Plots 4 – 6 and the rear roof of Plot 3 will therefore be drained to the public foul sewer in Southview Road, in accordance with the Drainage hierarchy.

Discharge Rate

3.8 Thames Water advise that discharge should be restricted to a rate not exceeding 5 l/s/ha, based on the development site area. This provides a proposed rate of 1.4 l/s based on development area. 2 No. surface water connections are proposed, each limited to 0.7 l/s. East Hampshire District Council confirm that discharge should be set in accordance with Thames Water's requirements. Refer to the correspondence enclosed with this *Technical Note*.

3.9 Discharge will be restricted by orifice flow control devices.

SuDS

3.10 Infiltration based permeable paving SuDS are proposed for proposed Plots 1 and 2, and the driveway and front roof of proposed Plot 3. Proposed Plots 4 – 6, and, and the rear roof of proposed Plot 3 will be drained into sealed permeable paving SuDS, with discharge to foul sewer.

3.11 The network design calculations, enclosed with this *Technical Note,* demonstrate that the proposed SuDS and pipework have the capacity required to accommodate the design storm. Refer to CE Plans 8241/502 [*Proposed Drainage Layout*] & 8241/503 [*Drainage Construction Details*] enclosed with the *Technical Note*, for the details and dimensions of the proposed systems.

Design Exceedance

3.12 The proposed drainage system has been designed to accommodate the extreme 1 in 100-year storm including a 40% allowance for climate change. Design exceedance is therefore unlikely. In the event of blockage or an

exceedance storm event, overflow from the proposed SuDS systems would flow away from the proposed houses and onto the adjacent highways, where it would be intercepted by the existing highway drainage system. Refer to CE Plan 8241/502 [*Proposed Drainage Layout*], enclosed with this *TN,* for exceedance flow routes.

Water Quality

3.13 Water quality has been assessed in line with the Simple Index approach from Chapter 26 of CIRIA *C753 The SuDS Manual:*

1. Step 1 – Allocate suitable pollution hazard indices for the proposed land use.
2. Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index.

3.14 The highest pollution hazard level for the proposed land use is Low (residential car parks and low trafficked roads). The pollution hazard indices for this land use are shown in Table 3.1 below.

Table 3.1: Pollution Hazard Indices for the Proposed Site (from Table 26.2 of CIRIA C753 The SuDS Manual)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Parking and Low traffic Roads	Low	0.5	0.4	0.4

3.15 All SuDS components to be used in the development have been assessed for their effectiveness in pollutant removal prior to discharge to surface waters in Table 26.3 in CIRIA *C753 The SuDS Manual.* The pollution mitigation indices are show in Table 3.2 below. The pollution mitigation indices for permeable pavements exceed the pollution hazard indices. Therefore, the proposed SuDS will provide adequate pollutant removal.

Table 3.2: Pollution Mitigation Indices for Permeable Paving (from Table 26.3 of CIRIA C753 The SuDS Manual)

SuDS Feature	Total suspended solids (TSS)	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7

3.16 There will be no discharge of surface water into made ground or directly into ground within 1m of the highest recorded ground water level at the site. All made ground in the vicinity of the proposed infiltration systems for Plots 1 – 3 will be removed and replaced with clean imported permeable material, in order to prevent mobilisation of existing soil contaminants.

Adoption & Maintenance

3.17 The on-site surface water drainage system will be maintained privately by the site owners, or by a management company acting on behalf of the owners, as part of the site's overall maintenance programme. SuDS maintenance should be carried out in accordance with CIRIA SuDS Manual guidance, as discussed below. A draft Maintenance Schedule is outlined in Table 3.3 below.

Permeable Paving

3.18 Permeable surfaces need to be regularly cleaned of silt and other sediments to preserve their infiltration capability. A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

1. End of winter (April) – to collect winter debris.
2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
3. After autumn leaf fall (November).

3.19 If reconstruction is necessary, the following procedure should be followed:

1. Lift surface layer and laying course.
2. Remove any geotextile filter layer.
3. Inspect sub-base and remove, wash and replace if required.
4. Renew any geotextile layer.
5. Renew laying course, and surface course.

3.20 Materials removed from the voids or the layers below the surface of the paving may contain hazardous substances such as heavy metals and hydrocarbons which may need to be disposed of as controlled waste.

Pipework and Catchpits

3.21 A suitable maintenance regime for the systems will comprise of routine inspection (every six months) and silt removal (as necessary).

Flow Control

3.22 The flow control should be inspected regularly for blockages and silt/ debris removed as necessary.

Table 3.3: Maintenance Schedule for Proposed Drainage Elements

Drainage Element	Schedule	Maintenance Requirement	Frequency
Permeable Paving	Regular	Brushing and vacuuming over whole surface	Once a year, after autumn leaf fall
	Occasional	Removal of weeds	As required
	Remedial	Remedial work to any depressions or damage considered a hazard to end users or detrimental to performance	As required
		Rehabilitation of surface and upper sub-structure by remedial clearance	Every 10 – 15 years, or as required
	Monitoring	Initial inspection	Monthly for 3 months after installation
		Inspect for evidence of weed growth or poor operation	Three monthly, 48 hours after large storms in first 6 months
		▪ Inspect silt accumulation rates ▪ Monitor inspection chambers	Annually

Drainage Element	Schedule	Maintenance Requirement	Frequency
Pipework, Catchpits & Flow Control	Regular	▪ Inspect for accumulation of silt ▪ Inspect for debris and litter ▪ Inspect inlets and outlets for blockages	Every six months
	Occasional	▪ Remove debris and litter ▪ Remove silt	As required

Note: In addition to the above maintenance requirements, it is recommended that all drainage elements are inspected:
- Following the first storm event
- Monthly for the first 3 months following commissioning

4.0 Foul Drainage Design

Refer to CE Plans 8241/502 [*Proposed Drainage Layout*] & 8241/503 [*Drainage Construction Details*] enclosed with this *Technical Note*.

4.1 Foul flows from the development will be discharged to the public foul sewer in Southview Road via a new adoptable manhole connection.

4.2 The total foul flow has been calculated to be 0.28 l/s, in accordance with Sewers For Adoption guidance. A foul sewer capacity check has been submitted to Thames Water and a response is awaited.

4.3 The proposed foul drains will not be offered for adoption.

5.0 Conclusions

5.1 The approved development proposal comprises the demolition of existing commercial buildings and the construction of 6 No. houses with parking and landscaping.

5.2 Infiltration based drainage is constrained by a shallow water table. The maximum known groundwater level at the site is 131.50mAOD, recorded during the July 2021 Site Investigation. Infiltration based SuDS will be provided for proposed Plots 1 and 2, and the driveway and front roof of proposed Plot 3 where a 1m buffer can be accommodated between the base of the proposed system and the recorded ground water level. All made ground in the vicinity of the proposed infiltration systems will be removed and replaced with clean imported permeable material in order to prevent mobilisation of existing soil contaminants.

5.3 The lower lying proposed Plots 4 – 6 and the rear roof of Plot 3, where the required groundwater buffer is not feasible, will be drained into sealed attenuation SuDS, with discharge to the public foul sewer in Southview Road. Discharge will be restricted to 5l/s/ha in accordance with Thames Water and East Hampshire District Council comments.

5.4 On site management of surface water runoff and water quality treatment will be provided within permeable paving SuDS.

5.5 All SuDS and surface water drainage systems will be managed privately, by the owners or by a management company acting on their behalf.

5.6 In the event of blockage or an exceedance storm event, overflow from the proposed SuDS system would flow onto the adjacent highway, where it would drain into the existing highway drainage system without impacting upon the site or the adjacent buildings.

5.7 Foul flows will be discharged into the existing foul sewer in Southview Road.

Cole Easdon Consultants Limited
December 2021

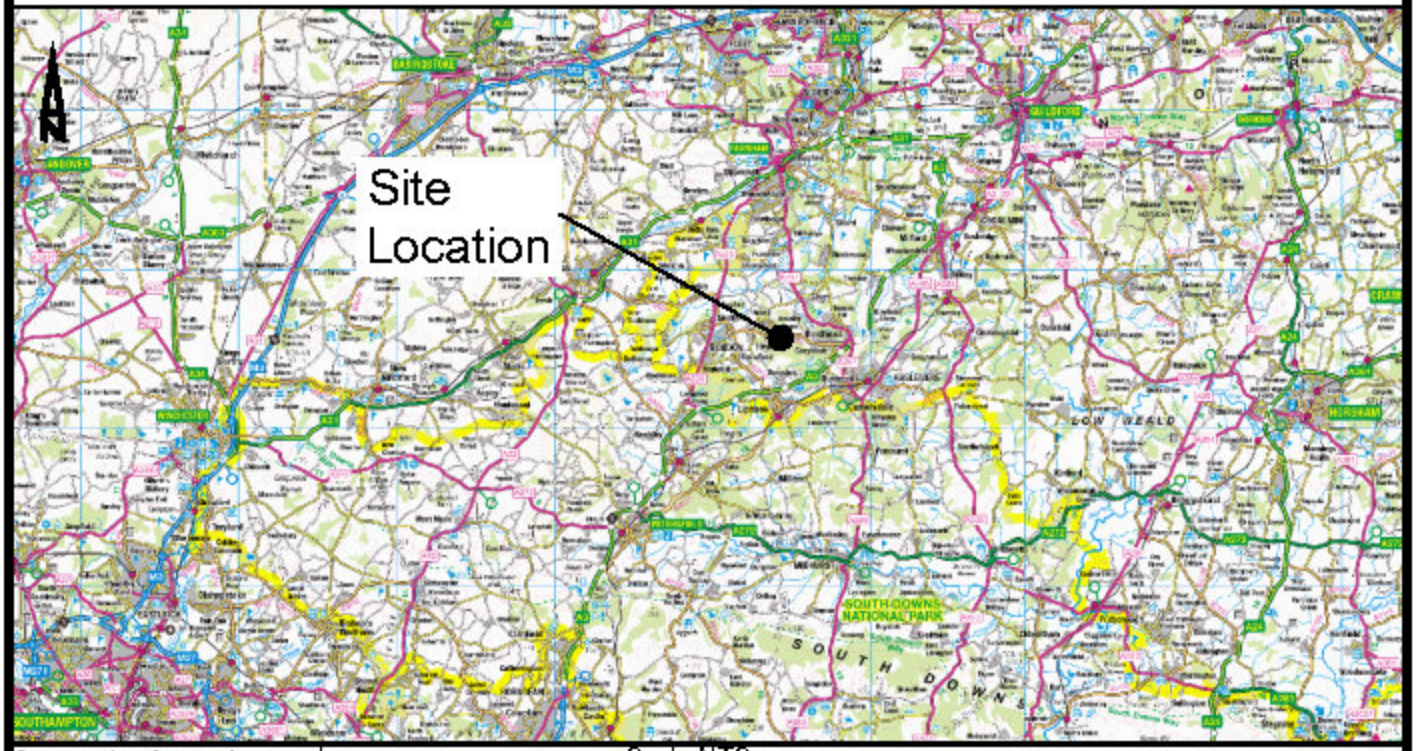
Enclosures

CE Figure 8241/500 Figure 1	Site Location Plan
CE Plan 8241/502	Proposed Drainage Layout
CE Plan 8241/503	Drainage Construction Details
Drawing No. GU35 8HU TP12(A)	Proposed Site Plan (by Clive Davis Architecture Limited)

Decision Notice
Public Sewer Records
East Hampshire District Council Correspondence
Thames Water Correspondence
MicroDrainage Design Calculations
BRE 365 Infiltration Test Report
July 2021 Site Investigation Report Excerpts

Enclosures

Scale 1:20,000



Scale NTS

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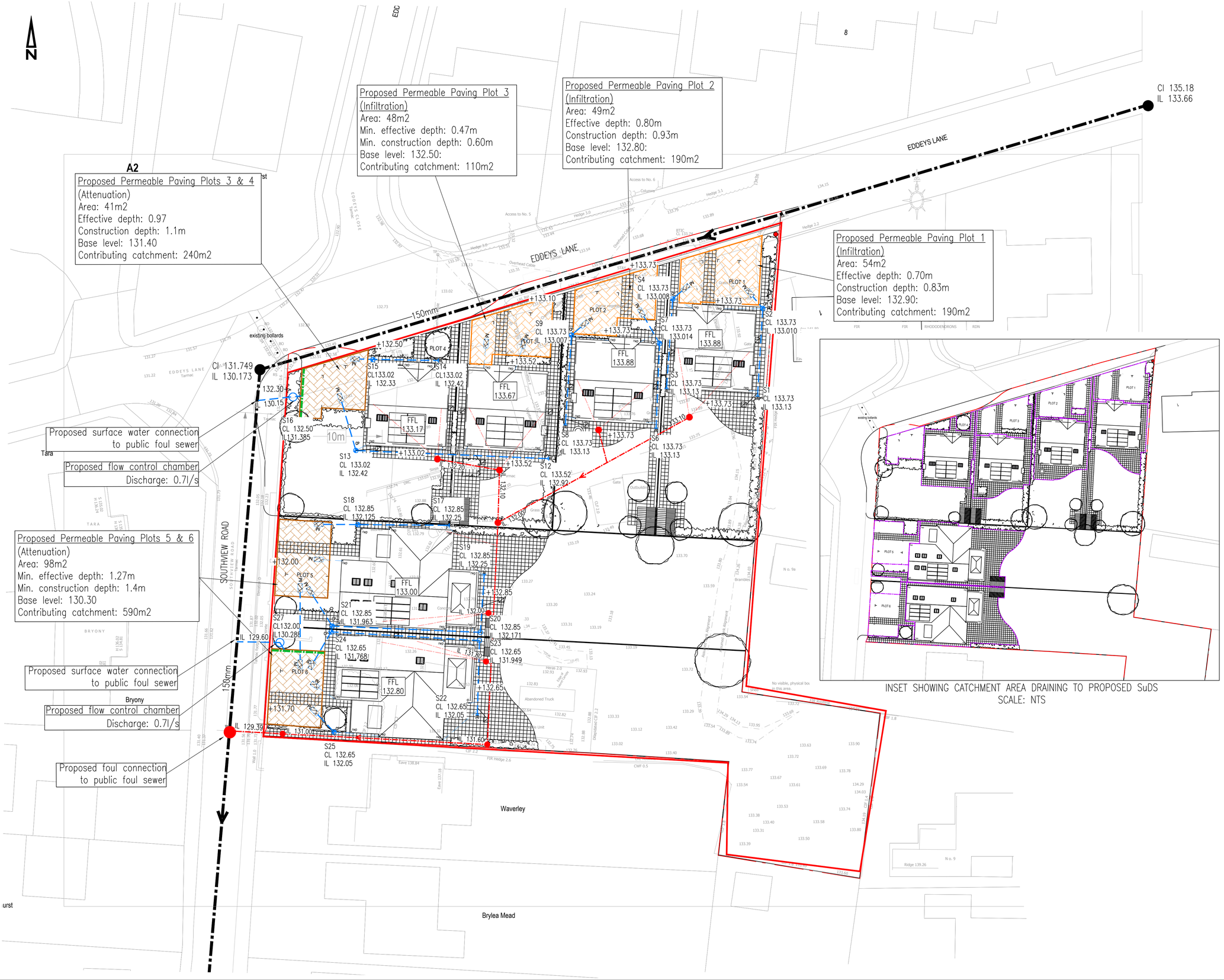
Job Title	Eddeys Lane Bordon Hampshire
Client	Cimbrone Developments TWO Limited
Drawing Title	Site Location Plan
Drawn By	SS
Date Drawn	Oct 2021
Scale	As Shown (A4)
Checked By	DF
Drawing No	8241 - 500 Figure 1
Revision	-

Drawing Status:

FOR COMMENT	
FOR PLANNING	X
FOR TENDER	
FOR APPROVAL	
FOR CONSTRUCTION	
AS BUILT	

CONSTRUCTION HAZARDS AND/OR CDM INFORMATION



Key:

- Proposed impermeable area Area = 1320m2
- Proposed 100mm dia. surface water drain and inspection chamber
- CP Proposed catchpit chamber
- Proposed permeable paving (infiltration)
- Proposed tanked permeable paving (attenuation)
- Proposed fin drain
- Proposed gully
- RE Proposed rodding eye
- Proposed 100mm dia. foul drain and inspection chamber
- Design exceedance route
- FFL 133.00 Proposed finished floor level
- 79.20+ Proposed finished external level
- 79.20+ Existing ground level
- Existing public foul sewer

REFERENCE DRAWINGS:				
Drawing No.	Drawing Title	Revision	Date	Company
19.19	Existing Topographical Survey	A	Dec 2019	D & H Surveys Ltd
GU356HUTP12	Proposed Site Plan	A	Nov 2021	Clive Davis Architects Ltd

NOTES

1. All levels are in metres above Ordnance datum
2. Refer to Drawing 8241 – 503 – Drainage Construction Details for detailed drainage notes
3. Public sewer details based on Thames Water Water records
4. All proposed SuDS and surface water drainage systems have been designed to accommodate the 1 in 100 year + 40% climate change critical storm
5. All proposed infiltration SuDS have ben designed using a BRE 365 tested infiltration rate of 6.21x10−6m/s
6. All made ground in the vicinity of the proposed infiltration SuDs to be removed and replaced with clean imported permeable fill
7. The base of all infiltration SUDs to be located at or above 132.50m AOD.

No.	By	Date	Revision Details

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Client
Cimbrone Developments TWO Limited

Job Title
Eddeys Lane
Bordon
Hampshire

Drawing Title
Proposed Drainage Layout

Drawing Status:

FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT
	X				

CONSTRUCTION AT CLIENT / CONTRACTOR RISK

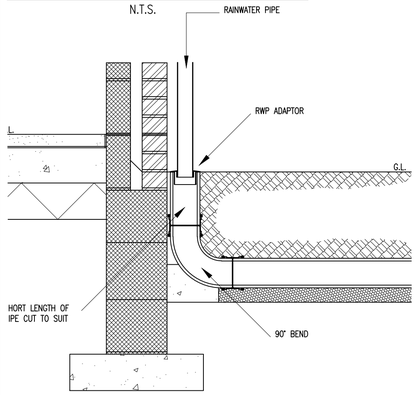
Designed by:	Drawn by:	Checked by:
SS	SS	DF

Date	Scale
December 2021	1:200@ A1

Drg. No. 8241/502 Rev.

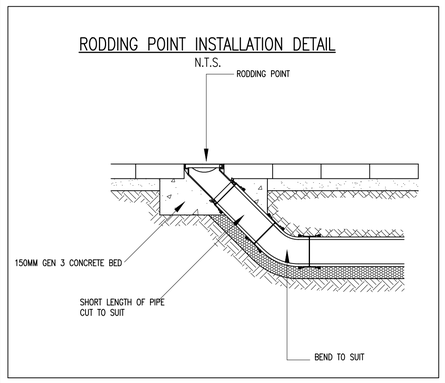
RNAL RAINWATER PIPE CONNECTION DETAIL

N.T.S.



RODDING POINT INSTALLATION DETAIL

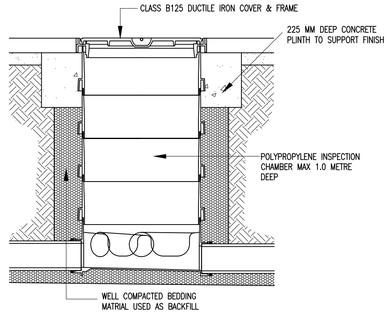
N.T.S.



POLYPROPYLENE INSPECTION CHAMBER INSTALLATION DETAIL

N.T.S.

SITED IN DRIVEWAYS / HARD LANDSCAPED AREAS



SITED IN SOFT LANDSCAPED AREAS

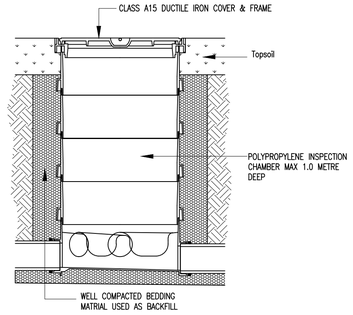
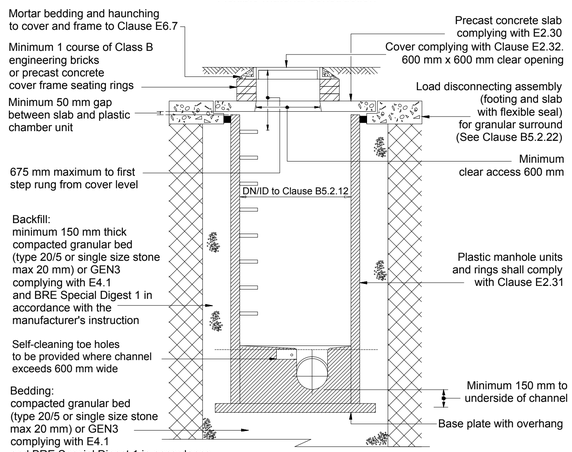
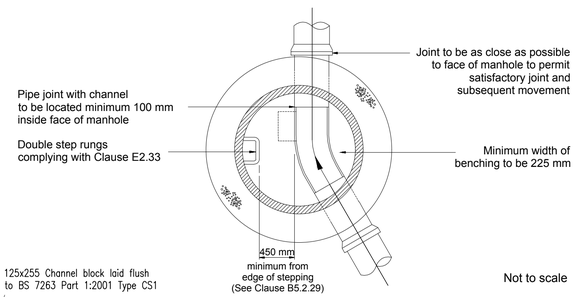


Figure B 12
Typical manhole detail - Type B
Depth from cover level to soffit of pipe 1.5 m to 3 m
Flexible material construction





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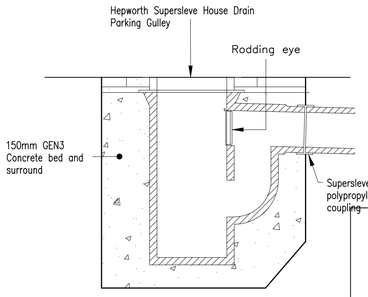

Private Yard Gully
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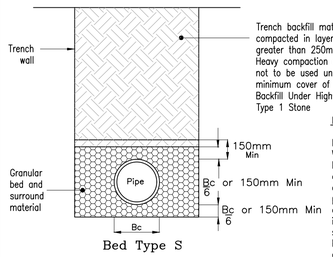

Pipe Bedding Detail
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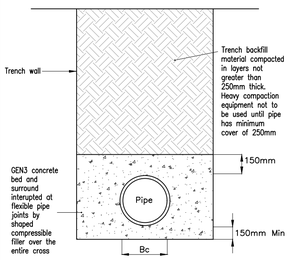


Concrete Surround

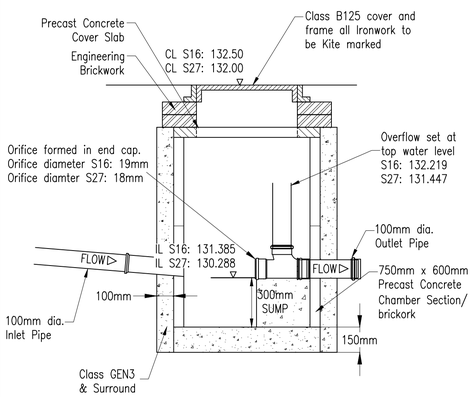
Bedding and Sidefill Material

Bedding, sidefill and surround materials shall comply with Water Industry Specification No. 4–08–02. Bedding and sidefill material may be selected as–dug granular material or processed granular material complying with Tables 1 and 2 for rigid and flexible pipes respectively. Material excavated from trenches dug through land contaminated with domestic, building or industrial waste should not be used as bedding and sidefill material. Selected excavated material should be readily compactable and be free from organic matter and combustible materials. Frozen soil should not be used. During selection, soil containing clay lumps larger than 75mm and stones larger than those permitted in Tables 1 or 2 as appropriate should be discarded. All selected as–dug granular bedding and sidefill material should be evaluated using the Compaction Fraction Test detailed in Appendix B of the Wls No. 4–08–02. Materials are suitable if the values obtained do not exceed those given in Table 1 and 2 as appropriate.

Trench Backfill Material

Where pipe trenches lie beneath road, footway and parking areas trench backfill material shall be type 1 up to formation level.

Trench backfill material, whether selected from locally excavated material or imported, shall consist of uniform, readily compactable material, free from vegetable matter, building rubbish and frozen material, or materials susceptible to spontaneous combustion, and excluding clay of liquid limit greater than 80 and/or plastic limit greater than 55 and materials of excessively high moisture content. Clay lumps and stones shall be retained on 75mm and 37.5mm sieves



Orifice Flow Control Manhole Detail (S16 & S27)
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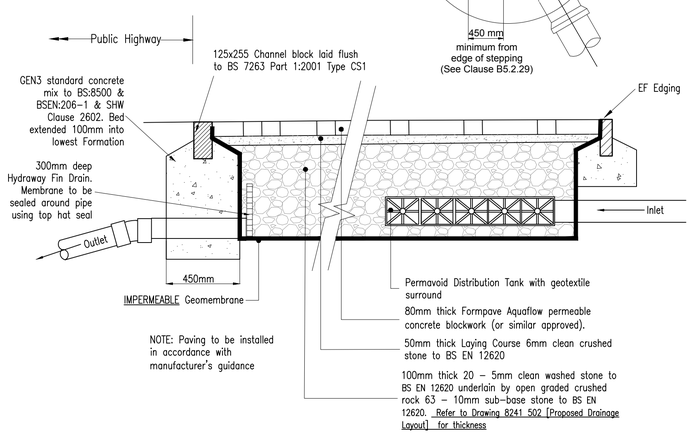
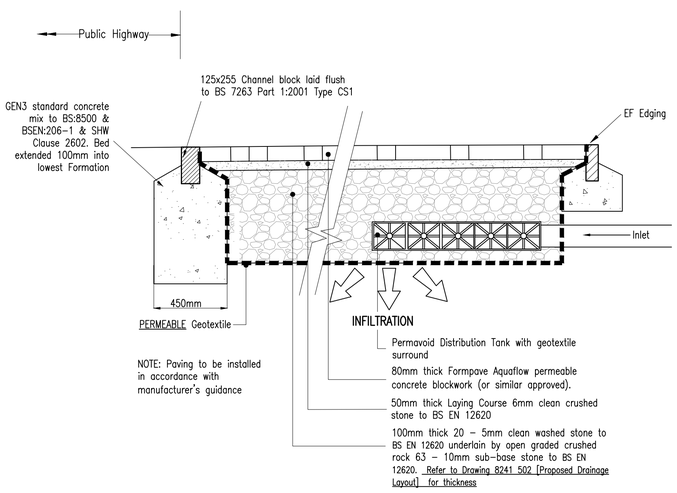


Tanked Permeable Paving Detail (Attenuation)
NTS



Permeable Paving Detail (Infiltration)
NTS

CATCH PIT

The references on this detail refer to "Hepworth Clay Drainage" products. Alternatives using similar approved products are also acceptable.

DOMESTIC DRAINAGE NOTES

All Domestic Drainage to comply with the British Standard BS EN 752:2008 'Drain and Sewer Systems Outside Buildings' and Part H of the Building Regulations 2000.

Underground drainage components shall be one of the following: i) Wavin Osma ii) Hepworth clay or iii) Polypipe and installed in accordance with the manufacturers recommendations.

Domestic drainage to be 100mm dia. laid at a minimum gradient of 1 in 80 unless stated otherwise on the drawings. All spur connections to be laid at 1 in 80 unless otherwise stated on the drawings. Minimum cover to be 350mm (600mm for UpVC) unless concrete bed and surround is provided.

Pipe bedding as specified by the drainage manufacturer. All pipes that pass under buildings to have a minimum 100mm granular surround. Where drains pass through external walls the pipe is to be lintelled over with a minimum 50mm clear space around the pipe. Rigid pipes to be fixed to the wall externally and internally to prevent movement within the granular material.

Types of access to be as follows :–

1. 0 to 0.6m deep: – Type A Inspection Chamber
2. 0.6m to 1m deep: – Type B Inspection Chamber
3. 1m to 1.8m deep:– Type C Inspection Chamber

Where required, Step Irons to be built into the inspection chamber in accordance with the requirements of the aforementioned British Standard and Building Regulations. The top step iron shall be fixed not more than 750mm below the surface and the lowest step to be fixed not more than 300mm above the benching.

Manhole Covers and Frames to comply with BS EN 124.

Class D400 for areas with frequent vehicular usage such as roads.
Class C250 for areas with light vehicular usage such as car parks.
Class B125 for pavements and pedestrian areas.
Class A15 for areas inaccessible to motor vehicles.

TABLE 1: PROCESSED AND AS–DUG GRANULAR BEDDING AND SIDEFILL MATERIALS FOR RIGID PIPES

Pipe nominal size (DN)	Nominal maximum particle size (mm) See note (c)	Class of bedding See note (d)	Suitable Materials	
			EITHER: Maximum CF value for acceptability See note (b)	OR: Materials specified in British Standards See note (a)
100	10	S	0.15	10mm nominal single–size
		B	0.30	
		F	0.15	
		N	0.30	Fine aggregate
Over 100 to 150	16	S	0.15	10mm or 14mm nominal single–size or 14mm to 5mm graded
		B	0.30	
		F	0.15	
		N	0.30	Fine aggregate
Over 150 to 300	20	S	0.15	10, 14 or 20mm nominal single–size or 14mm to 5mm graded or 20 to 5mm graded
		B	0.30	
		F	0.15	
		N	0.30	All–in aggregate or fine aggregate
Over 300 to 550	20	S	0.15	14mm or 20mm nominal single–size or 14mm to 5mm graded or 20 to 5mm graded
		B	0.30	
		F	0.15	
		N	0.30	All–in aggregate or fine aggregate
Over 550	40	S	0.15	14, 20 or 40mm nominal single–size crushed rock or 14mm to 5mm, 20 to 5mm or 40 to 5mm graded
		B	0.30	
		F	0.15	
		N	0.30	All–in aggregate or fine aggregate

Notes:
(a) Processed granular materials to include aggregates to BS EN 13242.
(b) Compaction Fraction value (CF), see Appendix B of Wls IGN No. 4–08–02.
(c) The nominal maximum particle sizes apply both to processed and as–dug materials (see Section 4 of IGN No. 4–08–01–Issue 4 and No.4–08–01 Amendment [Nov 2008]).
(d) Bedding classes are defined in:– BS EN 1295–1:1997 Structural Design of Buried Pipelines under various conditions of loading. TRRL – Simplified Table of External Loads on Buried Pipelines.
(e) The sulphate content of bedding and sidefill materials for use with cementitious pipe should not be greater than 0.3% as sulphur trioxide.

TABLE 2: PROCESSED GRANULAR BEDDING AND SIDEFILL MATERIALS FOR FLEXIBLE PIPES

Pipe nominal bore (mm) (See note (d))	Nominal maximum particle size (mm)	Suitable Materials		
		EITHER: Maximum CF value for acceptability See note (b)		OR: Materials specified in British Standards See note (a)
		Non–pressure pipe	Pressure pipe	
100	10	0.15	0.30	10mm nominal single–size
Over 100 to 150	16	0.15	0.30	10 or 14mm nominal single–size or 14mm to 5mm graded
Over 150 to 300	20	0.15	0.30	10, 14 or 20mm nominal single–size or 14mm to 5mm graded or 20mm to 5mm graded
Over 300 to 550	20	0.15	0.30	14mm or 20mm nominal single–size or 14mm to 5mm graded or 20 to 5mm graded
Over 550	40	0.15	0.30	14, 20 or 40mm single–size or 14mm to 5mm graded or 20mm to 5mm graded or 40 to 5mm graded.

Notes:
(a) Processed granular materials to include aggregates to BS EN 13242.
(b) Compaction Fraction value (CF), see Appendix B of Wls IGN No. 4–08–02.
(c) For the purpose of this table, PE pipes of 630mm OD can be regarded as having nominal bore of over 550mm, irrespective of wall thickness.
(d) Nominal bore is used in preference to DN because of the different nominal size classification for flexible pipes.
(e) For PE80 and PE100 polyethene pipe complying with current relevant Water Industry Specification the maximum sidefill particle size may be increased to 10% of the pipe nominal size.
(f) For E' values for processed granular materials reference should be made to Table A.3 of Wls IGN No. 4–08–02 where specific site tests have not been performed.
(g) For ferrous cementitious pipeline materials, the sulphate content of bedding and sidefill materials should not be greater than 0.3% as sulphur trioxide.

No.	By	Date	Revision Details

Cole Easdon
01793 619 965 | cec@ColeEasdon.com | www.ColeEasdon.com

Client
Cimbrone Developments TWO Limited

Job Title
Eddeys Lane
Bordon
Hampshire

Drawing Title
Drainage Construction Details

Drawing Status:

FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT

"CONSTRUCTION AT CLIENT / CONTRACTOR RISK"

Designed by:	Drawn by:	Checked by:
SS	SS	DF

Date: December 2021
Scale: NTS

Drg. No.: 8241/503
Rev.

A2

Glenhurst

The Firs

refer to all relevant detail drawings before undertaking any work

read this drawing in conjunction with Consultant's relevant drawings

verify all dimensions on site before undertaking any work or preparing any shop drawings

refer any discrepancies to the architect immediately

refer to the architect before undertaking work or giving instructions if in doubt

notes

0 1 2 3 4 5 10

1:200 scale bar

existing bollards

back edge of pavement

new section of pavement along Eddeys Lane frontage

2000

dropped curb

back edge of pavement

shaded area controlled by Hampshire CC Highways

back edge of pavement

post box relocated

no pavement exists beyond this point

2000

PLOT 1

PLOT 2

PLOT 3

PLOT 4

PLOT 5

PLOT 6

big

big

dropped curb

N

broken red line indicates site boundaries

Bryony

Waverley

1

2

9a

9

PRELIMINARY 15/12/21

A 10/12/21 Plot 4 parking layout changed. Eddey's Lane pavement width increased

revisions

CLIVE DAVIS 137 HARROWDENE GARDENS
TEDDINGTON TW11 0DN 07766 912382
info@clivedavisarchitect.co.uk

project
Beech Hill Stores redevelopment

drawing
Proposed site plan

drawing number
GU35 8HU TP12
scale
1.200 at A2

date
NOV 2021

revision **A**

East Hampshire DISTRICT COUNCIL

Penns Place, Petersfield, Hampshire GU31 4EX
Telephone 01730 266551 • DX100403 Petersfield
info@easthants.gov.uk • www.easthants.gov.uk
@EastHantsDC
/EastHampshireDistrictCouncil

Miss Parsons
CPC Limited
Unit 3
Broadbridge Business Centre
Delling Lane
Bosham
PO18 8NF

Case Officer: Jon Holmes
Direct Dial: 01730 234243
Our Ref: 58616
Your Ref:
Date: 09 September 2020
email: jon.holmes@easthants.gov.uk

Dear Miss Parsons

Proposal: Six dwellings following demolition of existing buildings, together with associated parking and landscaping (as amended by plans received 17 April and 3 June 2020 and bat survey received 19 June 2020)[Amended layout and elevations received 31 July 2020] (Further amended site layout received 14 August 2020)
Site Address: Beech Hill Stores, Eddeys Lane, Headley Down, Bordon, GU35 8HU

I am pleased to enclose the Notice of the Council's formal decision in relation to the above application. **Before proceeding please read the following important information which affects this Notice.**

All the conditions of the Notice are legally binding, failure to comply may invalidate the permission and result in the Council taking action against you. Please check the Notice to see if there are any conditions which require discharge/approval before works commence. Some conditions may require further details or samples to be submitted for approval. If this is the case a **fee of £116 is payable with the request for discharge/approval.** If you are unclear about the procedures, the fee required or how to pay, then please contact our Customer Service Centre 01730 234246. The fee can be paid by cheque made payable to EHDC or phone 01730 234246, in either case please quote the **planning no: 58616, site address and "fee payment for discharge of planning conditions".**

Before the development or change in the use is started **please complete the tear-off section below** and return to Planning Compliance who will then check the details of the consent, **no fee required**. Failure to do so could result in difficulties or delays when the property is sold. Please also note that once work has commenced on site, developers should apply for addresses to the East Hampshire District Council street naming and numbering department.

Yours sincerely

Simon Jenkins Director of Regeneration and Place

No fee required with the return of this slip. Please return to: 58616
Planning Compliance
East Hampshire District Council
Penns Place, Petersfield
Hants GU31 4EX

Name: _____
Address: _____
_____
Email/Tel No: _____
I anticipate that the works/use will begin on _____
Signed: _____ Date: _____

Reference No: 58616

East Hampshire DISTRICT COUNCIL

Penns Place, Petersfield, Hampshire GU31 4EX
Telephone 01730 266551 • DX100403 Petersfield
info@easthants.gov.uk • www.easthants.gov.uk
@EastHantsDC
/EastHampshireDistrictCouncil

For: Cordage 15 Limited
c/o CPC Limited
Unit 3
Broadbridge Business Centre
Delling Lane
Bosham
PO18 8NF

TOWN & COUNTRY PLANNING ACT 1990 (as amended)
TOWN & COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015

NOTICE OF PERMISSION: 58616

Proposal: Six dwellings following demolition of existing buildings, together with associated parking and landscaping (as amended by plans received 17 April and 3 June 2020 and bat survey received 19 June 2020)[Amended layout and elevations received 31 July 2020] (Further amended site layout received 14 August 2020)

Site Address: Beech Hill Stores, Eddeys Lane, Headley Down, Bordon, GU35 8HU (Headley Parish)

The Planning Authority GRANTS Planning Permission in accordance with your application, plans and details submitted therewith, which was registered on 2 March, 2020, subject also to the following conditions:-

1 The development hereby permitted shall be begun **before the expiration of three years** from the date of this planning permission.
Reason - To comply with Section 91 of the Town and Country Planning Act 1990

2 Other than works for the demolition and site clearance, no development shall commence on site until details of a scheme for foul and surface water drainage has been submitted to, and approved in writing by, the Local Planning Authority. Such details should include provision for all surface water drainage from parking areas and areas of hardstanding to prevent surface water from discharging onto the highway and should be based on site investigation and percolation tests. The development shall be carried out in accordance with the approved details before any part of the development is first occupied and shall be retained thereafter.
Reason - To ensure adequate provision for drainage.

3 Other than works for the demolition of existing buildings, no development shall commence on site until a scheme has been submitted to, and agreed in writing

by, the Local Planning Authority to demonstrate that the built development hereby permitted incorporates measures that provides at least 10% of energy demand from decentralised and renewable or low carbon energy sources.

Before any part of the development is first occupied a verification report and completion certificate shall be submitted in writing to the Local Planning Authority confirming that the built development hereby permitted has been constructed in accordance with the approved scheme.

The developer shall nominate a competent person for the purpose of assessing and providing the above required report and certificate to confirm that the completed works incorporate such measures as to provide these requirements. The measures shall thereafter be retained and maintained to the agreed specification for the lifetime of the development.

Reason - To ensure that the development incorporates necessary mitigation and adaptation measures with regard to climate change.

4 Notwithstanding any indication of materials that may have been given in the application or in the absence of such information, no development above slab level shall take place on site until samples / details including manufacturers details of all the materials to be used for external facing and roofing for the development hereby approved have been submitted to, and approved in writing by, the Local Planning Authority. The development works shall be carried out in accordance with the approved details.
Reason - To ensure that the materials used in the construction of the approved development harmonise with the surroundings.

5 **No development shall commence on site until** the following details have been submitted to, and approved in writing by, the Local Planning Authority:-
(a) a scheme outlining a site investigation and risk assessments designed to assess the nature and extent of any contamination on the site.
(b) a written report of the findings which includes, a description of the extent, scale and nature of contamination, an assessment of all potential risks to known receptors, an update of the conceptual site model (devised in the desktop study), identification of all pollutant linkages and unless otherwise agreed in writing by the Local Planning Authority and identified as unnecessary in the written report, an appraisal of remediation options and proposal of the preferred option(s) identified as appropriate for the type of contamination found on site.
and (unless otherwise first agreed in writing by the Local Planning Authority)
(c) a detailed remediation scheme designed to bring the site to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historical environment. The scheme should include all works to be undertaken, proposed remediation objectives and remediation criteria, timetable of works, site management procedures and a verification plan outlining details of the data to be collected in order to demonstrate the completion of the remediation works and any arrangements for the continued monitoring of identified pollutant linkages.
The above reports should be completed by a competent person, as stipulated in the National Planning Policy Framework, Annex 2, and site works should be undertaken in accordance with DEFRA and the Environment Agency's 'Model Procedures for the Management of Land Contamination, CLR 11' and BS10175:2011 Investigation of potentially contaminated sites - Code of

practice.

Reason - To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite. It is considered necessary for this to be a pre-commencement condition as these details need to be agreed prior to the construction of the development and thus go to the heart of the planning permission.

6 **Before any part of the development is first occupied or brought into use** (unless otherwise first agreed in writing by the Local Planning Authority) a verification report demonstrating the effectiveness of the remediation works carried out and a completion certificate confirming that the approved remediation scheme has been implemented in full shall both have been submitted to and approved in writing by the Local Planning Authority.
The verification report and completion certificate shall be submitted in accordance with the approved scheme and undertaken by a competent person in accordance with DEFRA and the Environment Agency's 'Model Procedures for the Management of Land Contamination, CLR 11'.
Reason - To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors.

7 Development shall proceed in accordance with the ecological mitigation, compensation and enhancement measures detailed within the Bat Survey report (WYG, June 2020) unless otherwise agreed in writing by the Local Planning Authority. Bat mitigation, compensation and enhancement features shall be installed as per the ecologists' instructions and retained in perpetuity in a condition suited to their intended function.
Reason - To protect biodiversity in accordance with the Conservation Regulations 2017, Wildlife & Countryside Act 1981, the NERC Act (2006), NPPF and with Policy CP21 of the East Hampshire District Local Plan: Joint Core Strategy.

8 Notwithstanding any indication shown on the approved plans, and notwithstanding the provisions of the Town and Country Planning (General Permitted Development) Order 2015 (or any order revoking, re-enacting or modifying that Order) prior to the first occupation of Plot 1 hereby approved the first-floor window in the east (side) elevation of the building shall be permanently;
(i) glazed with obscure glass with a glass panel which has been rendered obscure as part of its manufacturing process to Pilkington glass classification 5 (or equivalent of glass supplied by an alternative manufacturer), and
(ii) non-opening.
Reason - To protect the privacy of the occupants of the adjoining residential property/ies.

9 Notwithstanding the provisions of the Town and Country Planning (General Permitted Development) (England) Order 2015 (or any order revoking,

re-enacting or modifying that Order) no windows or doors shall at any time be inserted in the first-floor east elevation of Plot 1 hereby permitted without the prior written consent of the Local Planning Authority.
Reason - To protect the privacy of the occupants of the adjoining residential property.

10 The development hereby permitted shall not be brought into use until the area(s) shown on the approved plan for the parking of vehicles (including garages and those areas marked out on the plan as being unallocated) shall have been made available, surfaced and marked out. The parking area(s) shall then be permanently retained and reserved for that purpose at all times.
Reason - To make provision for off street parking for the purpose of highway safety.

11 No part of the development hereby approved shall be occupied until details for the on site provision of [bin & cycle] storage facilities have been submitted to and approved in writing by the Local Planning Authority. The development shall not be occupied until the [bin & cycle] storage has been constructed in accordance with the approved details and thereafter retained and kept available.
Reason - To ensure the adequate provision of on site facilities.

12 The development hereby approved shall not be first brought into use until a fully detailed landscape and planting scheme for the site has been submitted to and approved in writing by the Local Planning Authority. The works shall be carried out in accordance with the approved details and in accordance with the recommendations of the appropriate British Standards or other recognised codes of good practice. These works shall be carried out in the **first planting season after practical completion or first occupation of the development,** whichever is earlier, unless otherwise first agreed in writing by the Local Planning Authority.
Any trees or plants which, within **a period of 5 years** after planting, are removed, die or become seriously damaged or defective, shall be replaced as soon as is reasonably practicable with others of species, size and number as originally approved unless a suitable alternative species are otherwise agreed in writing by the Local Planning Authority.
Reason - In the interests of the visual amenities of the locality and to enable proper consideration to be given to the impact of the proposed development on existing trees.

13 The development hereby permitted shall be carried out in accordance with the following approved plans and particulars:

Application form
CIL form 1 - additional information
Covering letter
Transport statement
Planning, design and access statement
Ecological appraisal
Habitats regulations assessment (stage 1 and 2)
Bat Survey Report, June 2020
Appendix B - advertisement

Appendix C - marketing details
Appendix A - sales details
Marketing report
0.00 Rev A - location plan
10.00 Rev B - proposed site plan
10.02 Rev A - proposed elevations (plots 1-4)
10.01 Rev A - proposed floor plans (plots 1-4)
10.03 Rev A - proposed floor plans (plot 5-6)
10.04 Rev A - proposed elevations (plot 5-6)
0.01 Rev A - existing elevations (store)
0.02 Rev A - existing floor plans (store)
0.03 Rev A - existing elevations & floor plans (house)
0.05 Rev A - existing street scene

Reason - To ensure provision of a satisfactory development

Any variation or departure from the approved plans will require the prior approval of the Planning Authority before works commence.

Simon Jenkins
Director of Regeneration and Place
Date: 09 September 2020

Supplementary Information

These are advice notes to the applicant and are not part of the planning conditions.

1 The proposed development referred to in this planning permission is a chargeable development liable to pay Community Infrastructure Levy (CIL) under Part 11 of the Planning Act 2008 and the CIL Regulations (as amended)

In accordance with CIL Regulation 65, East Hampshire District Council will issue a Liability Notice in respect of the chargeable development referred to in this planning permission as soon as practicable after the day on which planning permission first permits development. Further details on the Council's CIL process can be found on the East Hampshire District Council website:

http://www.easthants.gov.uk/sites/default/files/documents/Planning%20Contributions%20and%20CIL%20Supplementary%20Planning%20Document%20-%20April%202016.pdf

2 The site should be assessed for any asbestos materials prior to any demolition or development and prior to any demolition work asbestos must be removed and disposed of in accordance with the Control of Asbestos at Work Regulations 2002 and approved code of practice.

3 All development shall be stopped immediately in the event that contamination not previously identified is found to be present on the development site and details of the contamination shall be reported immediately in writing to **Environmental Health**. An investigation and risk assessment should then be undertaken by competent persons and in accordance with 'Model Procedures for the Management of Land Contamination, CLR 11'. A written report of the findings, to include a remediation statement, should then be forwarded to the Local Planning Authority for appraisal. Following completion of remedial measures a verification report should be prepared that demonstrates the effectiveness of the remediation carried out. It is recommended that no part of the development be occupied until all remedial and validation works are complete and a Completion Certificate has been issued. This would ensure that no future investigation is required under Part2A of the Environmental Protection Act 1990.

4 In accordance with paragraphs 38 and 39 of the NPPF East Hampshire District Council (EHDC) takes a positive and proactive approach and works with applicants/agents on development proposals in a manner focused on solutions by:

- offering a pre-application advice service,
- updating applicant/agents of any issues that may arise in the processing of their application and where possible suggesting solutions.
- In this instance the applicant was updated following the initial site visit.

The applicant is advised that there may be a need to comply with the requirements of the Party Wall etc Act 1996 before starting works on site. The Act relates to work which involves:

- work on an existing wall shared with another property

- building on the boundary with a neighbouring property
- work involving excavating near a boundary

The Party Wall etc Act is not enforced or administered by the Council but you should understand your obligations to notify adjoining owners and be aware of the circumstances under which a dispute can arise. For further information on the Party Wall Act 1996 there is an explanatory booklet available at the Planning Portal: www.planningportal.gov.uk

The following Planning Policies were considered when making the above decision:-

East Hampshire District Local Plan: Joint Core Strategy
CP1 - Presumption in favour of sustainable development
CP2 - Spatial Strategy
CP10 - Spatial strategy for housing
CP20 - Landscape
CP21 - Biodiversity
CP22 - Internationally designated sites
CP24 - Sustainable construction
CP25 - Flood Risk
CP27 - Pollution
CP29 - Design
CP31 - Transport
CP32 - Infrastructure

East Hampshire District Local Plan: Second Review (2006)
S5 - Local and Village Shops
H3 - Residential Development within Settlement Policy Boundaries

Building Regulations

This decision is not an approval under the Building Regulations. It is your responsibility to make any necessary applications. If in doubt, you are advised to contact the Council's Building Control Section on 01730 234207.

NOTIFICATION
Planning permission/refusals

Appeals to the Secretary of State
If you are aggrieved by the decision of your Local Planning Authority to refuse permission for the proposed development or to grant it subject to conditions, then you can appeal to the Secretary of State under Section 78 of the Town and Country Planning Act 1990.

1. If you want to appeal – For householder development and minor commercial you must appeal within 12 weeks of the date of this notice, for all other development you must appeal within six months of the date of this notice. Appeals can be made online at: **https://www.gov.uk/planning-inspectorate .** If you are unable to access the online appeal form, please contact the Planning Inspectorate to obtain a paper copy of the appeal form on tel: **0303 444 5000.** The Secretary of State can allow a longer period for giving notice of an appeal, but will not normally be prepared to use this power unless there are special circumstances that excuse the delay in giving notice of appeal.
2. The Secretary of State need not consider an appeal if it seems that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to the provisions of any development order and to any directions given under a development order.
3. In practice, the Secretary of State does not refuse to consider appeals solely because the Local Planning Authority based their decisions on directions given by the Secretary of State.
4. As from 6 April 2010 if an enforcement notice has been served in the previous 2 years you will have only 28 days in which to lodge the appeal following the refusal. Equally, if an enforcement notice is served after the refusal it will truncate the period for lodging the appeal against the refusal of planning permission to 28 days after the enforcement notice has been served.
5. If you intend to submit an appeal that you would like examined by inquiry then you must notify the Local Planning Authority and Planning Inspectorate (inquiryappeals@planninginspectorate.gov.uk) at least 10 days before submitting the appeal. Further details https://www.gov.uk/government/collections/casework-dealt-with-by-inquiries
6. The Secretary of State can allow a longer period for giving notice of an appeal but will not normally be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal.

Purchase Notice

If either the Local Planning Authority or the Secretary of State refuses permission to develop land or grants it subject to conditions, the owner may claim that he can neither put the land to a reasonable beneficial use in its existing state nor render the land capable of a reasonable beneficial use by the carrying out of any development which has been or would be permitted.
7. In these circumstances, the owner may serve a purchase notice on the Council (District Council, London Borough Council or Common Council of the City of London) in whose area the land is situated. This notice will require the Council to purchase his interest in the land in accordance with the provisions if Part VI of the Town and Country Planning Act 1990.
8. The applicant is recommended to retain this form with the title deed of the property.

Notes Specific to any Grant of Planning Permission
Any grant of permission does not purport to convey any approval or consent which may be required under the Town and Country Planning Act 1990 otherwise than under Sections 69-76 or which may be required under any other Acts including any Bylaws, Orders or Regulations made under such other Acts.
9. Applicants are reminded that any grant of planning permission does not entitle them to obstruct a right of way and that, if it is necessary to stop up or divert a right of way in order to enable the development to be carried out, they should apply without delay:- a) in the case of a footpath or bridleway, for an Authority under Section 257 of the Town and Country Planning Act 1990; b) in any other case to the Secretary of State for an Order under Section 247 of the Town and Country Planning Act 1990.
10.Attention is drawn to the provisions of Section 12 of the Hampshire Act 1983 relating to access for the Fire Brigade.
11.If this permission relates to buildings or premises to which the public are to be admitted or to offices, shops and railways premises or factories then your attention is drawn to the relevant provisions of the Chronically Sick and Disabled Persons Act 1970, Disabled Persons Act 1981, Building Regulations Part M and the Disability Discriminations Act 1995.

IMPORTANT - Any failure to adhere to the details of any plans approved or to comply with any conditions detailed in this notice constitutes a contravention of the provision of the Town and Country Planning Act 1990 in respect of which enforcement action may be taken. If you want to depart in any way from approved development, you must seek the agreement of the Council before carrying out any work.

Asset location search

Property Searches

stats-search.co.uk Limited
1 Foxfield Road
WIRRAL
CH47 0NJ

Search address supplied Eddeys Lane
Headley Down
Bordon
GU35 8HU

Your reference Headley Down

Our reference ALS/ALS Standard/2021_4514241

Search date 1 October 2021

Knowledge of features below the surface is essential for every development

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

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

Contact us to find out more.

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

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

0800 009 4540

Asset location search

Property Searches

Search address supplied: Eddeys Lane, Headley Down, Bordon, GU35 8HU

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 0800 009 4540, or use the address below:

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

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

Asset location search

Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

South East Water
Rocfort Road
Snodland
Kent
ME6 5AH

Asset location search

Property Searches

Tel: 0845 301 0845

www.southeastwater.co.uk.

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Asset location search

Property Searches

Further contacts:

Waste Water queries

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

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

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

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

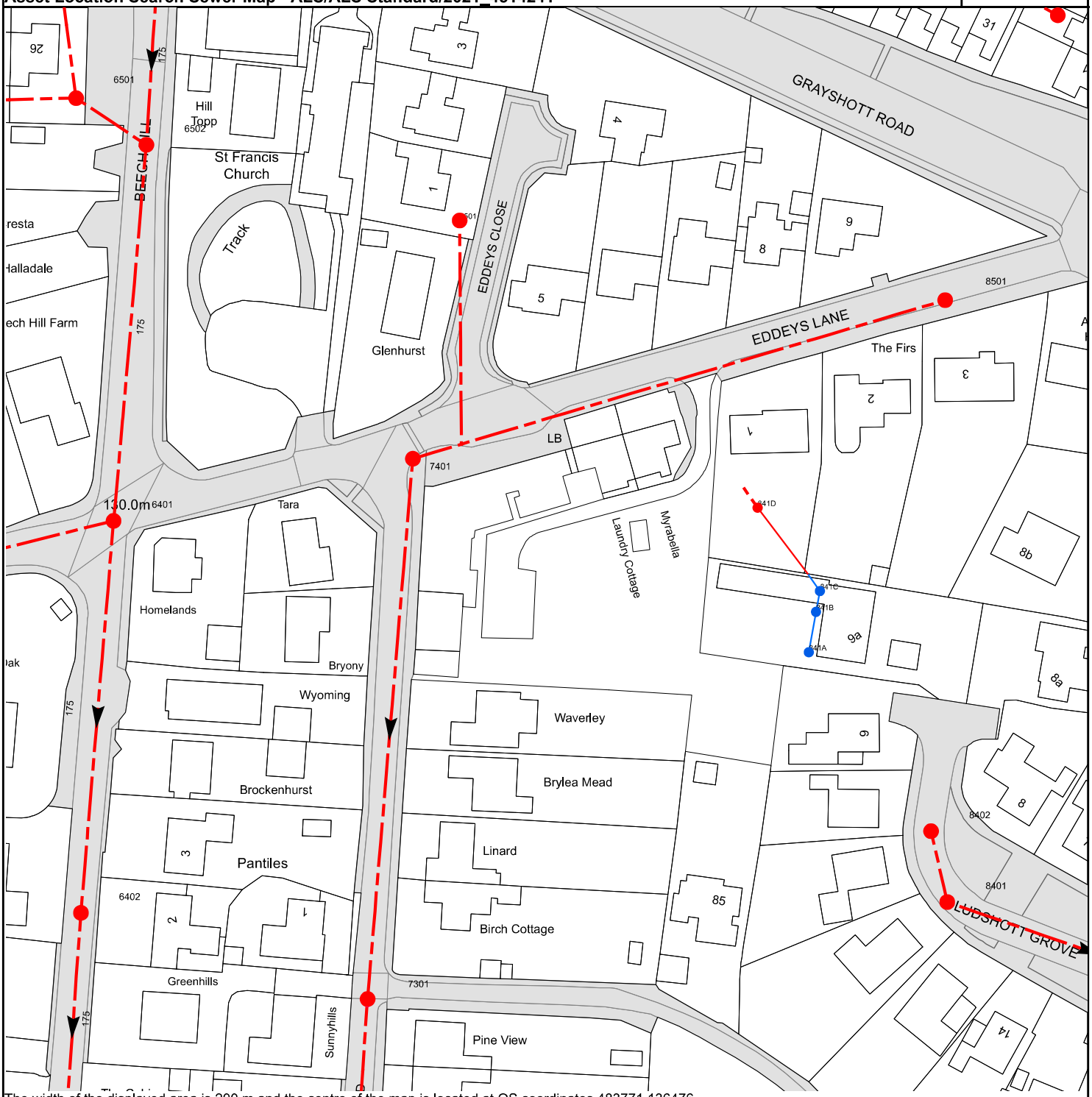
Clean Water queries

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

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

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

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4514241



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 483771,136476

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
8401	134.19	132.46
8402	134.32	132.54
841B	n/a	n/a
841C	n/a	n/a
8501	135.18	133.66
8502	n/a	n/a
6501	n/a	n/a
6402	126.3	124.57
6401	129.21	127.52
6502	132.27	130.71
7301	129.16	127.75
7401	131.748	130.173
7501	133.59	132.24
841D	n/a	n/a
841A	n/a	n/a

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

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

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

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

Sewer Fittings

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

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

Operational Controls

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

- Control Valve
- Drop Pipe
- Ancillary
- Weir

End Items

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

- Outfall
- Undefined End
- Inlet

Other Symbols

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

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

Areas

Lines denoting areas of underground surveys, etc.

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

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

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

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Stuart Starr

From: Burton, Roger
Sent: 04 November 2021 10:12
To: Stuart Starr
Subject: Re: Eddeys Lane, Bordon, Hants (8241)
Attachments: image002.png; image003.png

Hi Stuart,

Thanks for the various attachments and note your comments.

My view is, unless you can demonstrate that there will be at least 1m unsaturated zone between the base of any infiltration feature, then run-off will need to drain to a sealed attenuation tank. You will obviously need to agree the discharge rate to the public foul sewer with Thames Water.

regards, Roger

From: Stuart Starr <SStarr@ColeEasdon.com>
Sent: 27 October 2021 09:48
To: Burton, Roger <Roger.Burton@easthants.gov.uk>
Subject: RE: Eddeys Lane, Bordon, Hants (8241)

Hi Roger and thanks for confirming.

We are producing foul and surface water drainage designs to discharge drainage planning condition 2 applied to this approved development. The proposals comprise demolition of an existing shop and 2 semi detached houses, and the construction of 6 detached houses with parking and landscaping (Sketch Site Plan attached).

The site is underlain by contaminated made ground which will be removed and or capped with clean material (Site Investigation report attached).

Groundwater monitoring confirms that the water table may reach within 200mm of the surface in the lower lying south western corner of the site. Elsewhere within the site the groundwater depth is up to 2.5m below ground level.

There is no watercourse or surface water sewer in the vicinity of the site, only foul sewers (sewer records attached). We therefore wish to drain as much of the development as possible by infiltration (subject to BRE 365 test results), and minimise discharge to foul sewer. The principle of the proposed surface water drainage design is outlined below. We would be grateful for your feedback on this before we begin the design work.

Plots 1 &2
These are the highest plots, and will be drained to soakaway/infiltration permeable paving.

Plots 3 & 4
These plots are constrained by the 5m buffer required between a soakaway and a building. It may be possible to drain them partially or entirely back towards the gardens of plots 1 & 2 where a buffer is achievable, however the soakaway here would then be located within 1m of the highest recorded groundwater level. Would this be acceptable in this case, considering the only alternative for these plots is discharge to foul sewer?

Plot 5
Could be drained by infiltration but a 1m buffer to groundwater could not be provided. Would this be acceptable in this case, considering the only alternative is discharge to foul sewer?

Plot 6

The lowest ground levels within this plot are close to the groundwater table, therefore it is assumed that infiltration based drainage is not feasible for this plot, and attenuated discharge to foul sewer is the only solution.

Regards

Stuart

Stuart Starr
Senior Engineer

Cole Easdon

e-mail: sstarr@ColeEasdon.com | web: www.ColeEasdon.com **Take a look at our new website!**
Swindon Office:

Tel: +44 (0) 1793 619 965
York House, Edison Park, Dorcan Way, Swindon SN3 3RB

From: Burton, Roger <Roger.Burton@easthants.gov.uk>
Sent: 26 October 2021 16:39
To: Stuart Starr <SStarr@ColeEasdon.com>
Subject: Re: Eddeys Lane, Bordon, Hants (8241)

Hi Stuart,

Yes, Bordon is within East Hants area.

regards, Roger

From: Stuart Starr <SStarr@ColeEasdon.com>
Sent: 19 October 2021 13:29
To: Burton, Roger <Roger.Burton@easthants.gov.uk>
Subject: Eddeys Lane, Bordon, Hants (8241)

Dear Roger

We are involved with a redevelopment scheme at the above site. Is this within your area?

Many thanks

Stuart

Stuart Starr
Senior Engineer

Cole Easdon

e-mail: name@ColeEasdon.com | web: www.ColeEasdon.com **Take a look at our new website!**
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York House, Edison Park, Dorcan Way, Swindon SN3 3RB

Stuart Starr

From: DEVELOPER.SERVICES@THAMESWATER.CO.U
Sent: 17 November 2021 13:59
To: sstarr@coleeasdon.com
Subject: DS6088938:PDEV:GU35 8BH LAND AT EDDEYS (8241)

Hi Stuart,

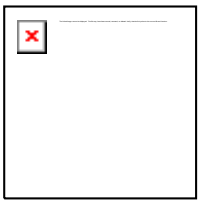
Thanks for your email. Yes the 5l/s/ha should apply to the whole site. You could provide the existing surface water flow rates (if they discharge to the sewer network) to help demonstrate any betterment being achieved.

Kind Regards

Andrew John

Andrew John
Developer Services – Sewer Adoptions Engineer
Office: 0203 5779018
Developer Services developer.services@thameswater.co.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk



From: Stuart Starr <SStarr@ColeEasdon.com>
To: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
CC:
Sent: 11.11.21 16:35:26
Subject: RE: DS6088938:PDEV:GU35 8BH LAND AT EDDEYS (8241)

Hi Andrew

I am calculating the proposed discharge rates as requested.

Does the 5l/s/ha apply to the site area as a whole, or just the proposed impermeable area?

Many thanks

Stuart

Stuart Starr
Senior Engineer

Cole Easdon

e-mail: sstarr@ColeEasdon.com | web: www.ColeEasdon.com**Take a look at our new website!**

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York House, Edison Park, Dorcan Way, Swindon SN3 3RB

From: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 11 November 2021 13:31
To: Stuart Starr <SStarr@ColeEasdon.com>
Subject: DS6088938:PDEV:GU35 8BH LAND AT EDDEYS (8241)

Hi Stuart,

Thanks for your email. I am afraid Natalya is away from the office so I will try to assist with your pre-planning application. With regard to the proposal to connect surface water into the foul sewer all possible options to utilise other methods of discharge or to reduce the surface water flows must be taken first. Below Natalya has provided the surface water hierarchy.

Please provide the proposed surface water flow rates for a 1:30 and 1:100 year storm events which will connect to the foul sewer and details of all measures taken (e.g. number and size of rainwater harvesting tanks) used to restrict the flow. To assist the application provide details of the current un attenuated flow rate and details if any element of the surface water from the site currently discharges into the foul sewer.

Kind Regards

Andrew John

Andrew John
Developer Services – Sewer Adoptions Engineer
Office: 0203 5779018
Developer Servicesdeveloper.services@thameswater.co.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk

From: Stuart Starr <SStarr@ColeEasdon.com>

To: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>

CC:

Sent: 05.11.21 10:31:35

Subject: RE: DS6088938:PDEV:GU35 8BH LAND AT EDDEYS (8241)

Hi Natalya

The LLFA (Hampshire Council) confirm that they will not be involved with this site due to its small scale. The email below is from the East Hampshire Council Drainage Engineer (Roger Burton) who will be assessing our design.

In view of Rogers comments we therefore propose to drain plots 1 & 2 by infiltration, where a 1m buffer to groundwater is feasible. The remaining plots will be drained to foul sewer, as we have no alternative which would be acceptable to the Council.

We would restrict discharge to the QBar greenfield runoff rate.

We would be grateful if you could confirm if this is acceptable.

Regards

Stuart

Hi Stuart,

Thanks for the various attachments and note your comments.

My view is, unless you can demonstrate that there will be at least 1m unsaturated zone between the base of any infiltration feature, then run-off will need to drain to a sealed attenuation tank. You will obviously need to agree the discharge rate to the public foul sewer with Thames Water.

regards, Roger

Stuart Starr
Senior Engineer

Cole Easdon

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York House, Edison Park, Dorcan Way, Swindon SN3 3RB

From:DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 18 October 2021 10:34
To: sstarr@coleeasdon.com
Subject: DS6088938:PDEV:GU35 8BH LAND AT EDDEYS

Dear Stuart,

Thanks for your Pre-Planning application. To enable us to progress your application, we need further information from you so that we can properly assess the impact of your proposals on our sewerage network.
Please email the following details about your proposals to developer.services@thameswater.co.uk, quoting the above reference number in the subject line:

• Please provide the existing and proposed surface water runoff rates for the range of storms (1 year, 30 year and 100 year)
• Proposed attenuation or other SUDS details

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water 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. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.

The disposal hierarchy being:

1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2) rainwater infiltration to ground at or close to source
3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4) rainwater discharge direct to a watercourse (unless not appropriate)
5) controlled rainwater discharge to a surface water sewer or drain
6) controlled rainwater discharge to a combined sewer (5l/s/ha). Please note this is not a 5l/s, its is 5l/s/ha. So if your site is less than 1ha, the flowrate should be applied accordingly.

Where connection to the public sewerage network is required to manage surface water flows we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

Please let me know if you have any further questions.

Kind regards,

Natalya Collins
Developer Services – Adoptions Engineer
Mobile: 07747 641 932
developer.services@thameswater.co.uk
Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk

Visit us online www.thameswater.co.uk , follow us on twitter www.twitter.com/thameswater or find us on www.facebook.com/thameswater. We're happy to help you 24/7.

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	9.600	0.120	80.0	0.002	1.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	1.700	0.110	15.5	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	9.800	0.123	80.0	0.000	1.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	1.300	0.108	12.0	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	1.000	0.010	100.0	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	1.19	133.130	0.002	0.0	0.0	0.0	0.86	6.8	0.3
S1.001	50.00	1.20	133.010	0.007	0.0	0.0	0.0	1.98	15.5	0.9
S2.000	50.00	1.19	133.130	0.000	0.0	0.0	0.0	0.86	6.8	0.0
S2.001	50.00	1.20	133.008	0.005	0.0	0.0	0.0	2.24	17.6	0.7
S1.002	50.00	1.22	132.900	0.019	0.0	0.0	0.0	0.77	6.0	2.6
S1.003	50.00	1.24	132.890	0.019	0.0	0.0	0.0	0.77	6.0	2.6

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS1	133.730	0.600	Open Manhole	600	S1.000	133.130	100				
SS2	133.730	0.720	Open Manhole	600	S1.001	133.010	100	S1.000	133.010	100	
SS3	133.730	0.600	Open Manhole	600	S2.000	133.130	100				
SS4	133.730	0.722	Open Manhole	600	S2.001	133.008	100	S2.000	133.008	100	
SS5	133.730	0.830	Open Manhole	600	S1.002	132.900	100	S1.001	132.900	100	
								S2.001	132.900	100	
SDummy	133.730	0.840	Open Manhole	600	S1.003	132.890	100	S1.002	132.890	100	
S	133.730	0.850	Open Manhole	0		OUTFALL		S1.003	132.880	100	

No coordinates have been specified, layout information cannot be produced.

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	133.730	132.880	0.000	0	0

Online Controls for Storm

Pump Manhole: SDummy, DS/PN: S1.003, Volume (m³): 0.2

Invert Level (m) 132.890

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0000	0.900	0.0000	1.700	0.0000	2.500	0.0000
0.200	0.0000	1.000	0.0000	1.800	0.0000	2.600	0.0000
0.300	0.0000	1.100	0.0000	1.900	0.0000	2.700	0.0000
0.400	0.0000	1.200	0.0000	2.000	0.0000	2.800	0.0000
0.500	0.0000	1.300	0.0000	2.100	0.0000	2.900	0.0000
0.600	0.0000	1.400	0.0000	2.200	0.0000	3.000	0.0000
0.700	0.0000	1.500	0.0000	2.300	0.0000		
0.800	0.0000	1.600	0.0000	2.400	0.0000		

Storage Structures for Storm

Porous Car Park Manhole: SS5, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.02236	Width (m)	8.7
Membrane Percolation (mm/hr)	1000	Length (m)	6.2
Max Percolation (l/s)	15.0	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	132.900	Cap Volume Depth (m)	0.620

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SS1	480 Winter	100	+40%	100/30 Winter				133.550
S1.001	SS2	480 Winter	100	+40%	100/15 Summer				133.550
S2.000	SS3	480 Winter	100	+40%	100/30 Winter				133.550
S2.001	SS4	480 Winter	100	+40%	100/15 Summer				133.550
S1.002	SS5	480 Winter	100	+40%	100/15 Summer				133.550
S1.003	SDummy	480 Winter	100	+40%	100/15 Summer				133.550

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS1	0.320	0.000	0.02			0.1	FLOOD RISK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	SS2	0.440	0.000	0.05			0.5	FLOOD RISK	
S2.000	SS3	0.320	0.000	0.00			0.0	FLOOD RISK	
S2.001	SS4	0.442	0.000	0.03			0.3	FLOOD RISK	
S1.002	SS5	0.550	0.000	0.11		592	0.4	FLOOD RISK	
S1.003	SDummy	0.560	0.000	0.00			0.0	FLOOD RISK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	9.300	0.116	80.2	0.000	1.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	3.400	0.214	15.9	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	9.800	0.123	79.7	0.002	1.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	1.300	0.207	6.3	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	1.000	0.010	100.0	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	1.18	133.130	0.000	0.0	0.0	0.0	0.86	6.8	0.0
S1.001	50.00	1.21	133.014	0.005	0.0	0.0	0.0	1.95	15.3	0.7
S2.000	50.00	1.19	133.130	0.002	0.0	0.0	0.0	0.86	6.8	0.3
S2.001	50.00	1.20	133.007	0.007	0.0	0.0	0.0	3.11	24.4	0.9
S1.002	50.00	1.23	132.800	0.019	0.0	0.0	0.0	0.77	6.0	2.6
S1.003	50.00	1.25	132.790	0.019	0.0	0.0	0.0	0.77	6.0	2.6

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS6	133.730	0.600	Open Manhole	600	S1.000	133.130	100				
SS7	133.730	0.716	Open Manhole	600	S1.001	133.014	100	S1.000	133.014	100	
SS8	133.730	0.600	Open Manhole	600	S2.000	133.130	100				
SS9	133.730	0.723	Open Manhole	600	S2.001	133.007	100	S2.000	133.007	100	
SS10	133.730	0.930	Open Manhole	600	S1.002	132.800	100	S1.001	132.800	100	
								S2.001	132.800	100	
SDummy	133.730	0.940	Open Manhole	600	S1.003	132.790	100	S1.002	132.790	100	
S	133.730	0.950	Open Manhole	0		OUTFALL		S1.003	132.780	100	

No coordinates have been specified, layout information cannot be produced.

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	133.730	132.780	0.000	0	0

Online Controls for Storm

Pump Manhole: SDummy, DS/PN: S1.003, Volume (m³): 0.3

Invert Level (m) 132.790

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0000	0.900	0.0000	1.700	0.0000	2.500	0.0000
0.200	0.0000	1.000	0.0000	1.800	0.0000	2.600	0.0000
0.300	0.0000	1.100	0.0000	1.900	0.0000	2.700	0.0000
0.400	0.0000	1.200	0.0000	2.000	0.0000	2.800	0.0000
0.500	0.0000	1.300	0.0000	2.100	0.0000	2.900	0.0000
0.600	0.0000	1.400	0.0000	2.200	0.0000	3.000	0.0000
0.700	0.0000	1.500	0.0000	2.300	0.0000		
0.800	0.0000	1.600	0.0000	2.400	0.0000		

Storage Structures for Storm

Porous Car Park Manhole: SS10, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.02236	Width (m)	9.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.4
Max Percolation (l/s)	13.5	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	132.800	Cap Volume Depth (m)	0.720

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SS6	600 Winter	100	+40%	100/60 Summer				133.518
S1.001	SS7	600 Winter	100	+40%	100/30 Summer				133.518
S2.000	SS8	600 Winter	100	+40%	100/60 Summer				133.518
S2.001	SS9	600 Winter	100	+40%	100/15 Winter				133.518
S1.002	SS10	600 Winter	100	+40%	100/15 Summer				133.518
S1.003	SDummy	600 Winter	100	+40%	100/15 Summer				133.531

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS6	0.288	0.000	0.00			0.0	FLOOD RISK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	SS7	0.404	0.000	0.02			0.3	FLOOD RISK	
S2.000	SS8	0.288	0.000	0.02			0.1	FLOOD RISK	
S2.001	SS9	0.411	0.000	0.03			0.4	FLOOD RISK	
S1.002	SS10	0.618	0.000	0.05		690	0.2	FLOOD RISK	
S1.003	SDummy	0.641	0.000	0.00			0.0	FLOOD RISK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	1.000	0.010	100.0	0.011	1.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	1.000	0.010	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	1.02	132.500	0.011	0.0	0.0	0.0	1.00	17.8	1.5
S1.001	50.00	1.03	132.490	0.011	0.0	0.0	0.0	1.00	17.8	1.5

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS11	133.100	0.600	Open Manhole	600	S1.000	132.500	150				
SDummy	133.100	0.610	Open Manhole	600	S1.001	132.490	150	S1.000	132.490	150	
S	133.730	1.250	Open Manhole	0		OUTFALL		S1.001	132.480	150	

No coordinates have been specified, layout information cannot be produced.

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.001	S	133.730	132.480	0.000	0	0

Online Controls for Storm

Pump Manhole: SDummy, DS/PN: S1.001, Volume (m³): 0.2

Invert Level (m) 132.490

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0000	0.900	0.0000	1.700	0.0000	2.500	0.0000
0.200	0.0000	1.000	0.0000	1.800	0.0000	2.600	0.0000
0.300	0.0000	1.100	0.0000	1.900	0.0000	2.700	0.0000
0.400	0.0000	1.200	0.0000	2.000	0.0000	2.800	0.0000
0.500	0.0000	1.300	0.0000	2.100	0.0000	2.900	0.0000
0.600	0.0000	1.400	0.0000	2.200	0.0000	3.000	0.0000
0.700	0.0000	1.500	0.0000	2.300	0.0000		
0.800	0.0000	1.600	0.0000	2.400	0.0000		

Storage Structures for Storm

Porous Car Park Manhole: SS11, DS/PN: S1.000

Infiltration Coefficient Base (m/hr)	0.02236	Width (m)	8.7
Membrane Percolation (mm/hr)	1000	Length (m)	5.5
Max Percolation (l/s)	13.3	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	132.500	Cap Volume Depth (m)	0.390

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SS11	240 Winter	100	+40%	100/15 Summer				132.883
S1.001	SDummy	240 Winter	100	+40%	100/15 Summer				132.961

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS11	0.233	0.000	0.05		332	0.6	FLOOD RISK	
S1.001	SDummy	0.321	0.000	0.00			0.0	FLOOD RISK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	21.200	0.265	80.0	0.002	1.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	5.600	1.020	5.5	0.012	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	7.200	0.090	80.0	0.002	1.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	1.500	0.930	1.6	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	1.200	0.015	80.0	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	3.800	1.235	3.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	1.41	132.920	0.002	0.0	0.0	0.0	0.86	6.8	0.3
S1.001	50.00	1.44	132.420	0.014	0.0	0.0	0.0	3.32	26.1	1.9
S2.000	50.00	1.14	132.420	0.002	0.0	0.0	0.0	0.86	6.8	0.3
S2.001	50.00	1.14	132.330	0.006	0.0	0.0	0.0	6.14	48.2	0.8
S1.002	50.00	1.46	131.400	0.024	0.0	0.0	0.0	0.86	6.8	3.2
S1.003	50.00	1.48	131.385	0.024	0.0	0.0	0.0	4.44	34.9	3.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS12	133.520	0.600	Open Manhole	600	S1.000	132.920	100				
SS13	133.020	0.600	Open Manhole	600	S1.001	132.420	100	S1.000	132.655	100	235
SS14	133.020	0.600	Open Manhole	600	S2.000	132.420	100				
SS15	133.020	0.690	Open Manhole	600	S2.001	132.330	100	S2.000	132.330	100	
SS15	132.500	1.100	Open Manhole	600	S1.002	131.400	100	S1.001	131.400	100	
								S2.001	131.400	100	
SS16	132.500	1.115	Open Manhole	900	S1.003	131.385	100	S1.002	131.385	100	
S	132.500	2.350	Open Manhole	0		OUTFALL		S1.003	130.150	100	

No coordinates have been specified, layout information cannot be produced.

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	132.500	130.150	0.000	0	0

Online Controls for Storm

Orifice Manhole: SS16, DS/PN: S1.003, Volume (m³): 0.7

Diameter (m) 0.019 Discharge Coefficient 0.600 Invert Level (m) 131.385

Storage Structures for Storm

Porous Car Park Manhole: SS15, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.9
Max Percolation (l/s)	11.5	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	131.400	Cap Volume Depth (m)	0.890

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SS12	15 Summer	100	+40%					132.957
S1.001	SS13	15 Winter	100	+40%					132.463
S2.000	SS14	15 Summer	100	+40%					132.458
S2.001	SS15	15 Summer	100	+40%					132.356
S1.002	SS15	180 Winter	100	+40%	100/15 Summer				132.217
S1.003	SS16	180 Winter	100	+40%	100/15 Summer				132.219

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS12	-0.063	0.000	0.25			1.6	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	SS13	-0.057	0.000	0.38			8.9	OK	
S2.000	SS14	-0.062	0.000	0.29			1.8	OK	
S2.001	SS15	-0.074	0.000	0.15			4.0	OK	
S1.002	SS15	0.717	0.000	0.25		179	1.0	FLOOD RISK	
S1.003	SS16	0.734	0.000	0.02			0.7	FLOOD RISK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	10.000	0.125	80.0	0.003	1.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	3.800	1.825	2.1	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	6.300	0.079	79.7	0.001	1.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	16.600	0.208	79.8	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.002	4.000	1.663	2.4	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
S3.000	8.100	0.101	80.2	0.006	1.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	1.19	132.250	0.003	0.0	0.0	0.0	0.86	6.8	0.4
S1.001	50.00	1.21	132.125	0.007	0.0	0.0	0.0	5.40	42.4	0.9
S2.000	50.00	1.12	132.250	0.001	0.0	0.0	0.0	0.86	6.8	0.1
S2.001	50.00	1.44	132.171	0.008	0.0	0.0	0.0	0.86	6.8	1.1
S2.002	50.00	1.46	131.963	0.014	0.0	0.0	0.0	5.03	39.5	1.9
S3.000	50.00	1.16	132.050	0.006	0.0	0.0	0.0	0.86	6.8	0.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.001	14.500	0.181	80.1	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S3.002	3.700	1.468	2.5	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
S4.000	2.600	1.750	1.5	0.003	1.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	1.000	0.013	76.9	0.019	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	4.700	0.688	6.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.001	50.00	1.44	131.949	0.010	0.0	0.0	0.0	0.86	6.8	1.4
S3.002	50.00	1.45	131.768	0.016	0.0	0.0	0.0	4.91	38.6	2.2
S4.000	50.00	1.01	132.050	0.003	0.0	0.0	0.0	6.40	50.3	0.4
S1.002	50.00	1.47	130.300	0.059	0.0	0.0	0.0	0.88	6.9«	8.0
S1.003	50.00	1.50	130.288	0.059	0.0	0.0	0.0	2.98	23.4	8.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS17	132.850	0.600	Open Manhole	600	S1.000	132.250	100				
SS18	132.850	0.725	Open Manhole	1200	S1.001	132.125	100	S1.000	132.125	100	
SS19	132.850	0.600	Open Manhole	1200	S2.000	132.250	100				
SS20	132.850	0.679	Open Manhole	1200	S2.001	132.171	100	S2.000	132.171	100	
SS21	132.850	0.887	Open Manhole	1200	S2.002	131.963	100	S2.001	131.963	100	
SS22	132.650	0.600	Open Manhole	1200	S3.000	132.050	100				
SS23	132.650	0.701	Open Manhole	1200	S3.001	131.949	100	S3.000	131.949	100	
SS24	132.650	0.882	Open Manhole	1200	S3.002	131.768	100	S3.001	131.768	100	
SS25	132.650	0.600	Open Manhole	1200	S4.000	132.050	100				
SS26	131.700	1.400	Open Manhole	1200	S1.002	130.300	100	S1.001	130.300	100	
								S2.002	130.300	100	
								S3.002	130.300	100	
								S4.000	130.300	100	
SS27	131.700	1.413	Open Manhole	1200	S1.003	130.288	100	S1.002	130.287	100	
S	131.700	2.100	Open Manhole	0		OUTFALL		S1.003	129.600	100	

No coordinates have been specified, layout information cannot be produced.

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	131.700	129.600	0.000	0	0

Online Controls for Storm

Orifice Manhole: SS27, DS/PN: S1.003, Volume (m³): 1.6

Diameter (m) 0.018 Discharge Coefficient 0.600 Invert Level (m) 130.288

Storage Structures for Storm

Porous Car Park Manhole: SS26, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.8
Membrane Percolation (mm/hr)	1000	Length (m)	16.9
Max Percolation (l/s)	27.2	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	130.300	Cap Volume Depth (m)	1.190

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SS17	15 Summer	100	+40%					132.298
S1.001	SS18	15 Summer	100	+40%					132.150
S2.000	SS19	15 Summer	100	+40%					132.277
S2.001	SS20	15 Summer	100	+40%					132.238
S2.002	SS21	15 Summer	100	+40%					131.998
S3.000	SS22	15 Summer	100	+40%					132.131
S3.001	SS23	15 Summer	100	+40%	100/15 Summer				132.066
S3.002	SS24	15 Summer	100	+40%					131.807
S4.000	SS25	15 Summer	100	+40%					132.069
S1.002	SS26	480 Winter	100	+40%	100/15 Summer				131.442
S1.003	SS27	480 Winter	100	+40%	100/15 Summer				131.447

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS17	-0.052	0.000	0.43			2.7	OK	
S1.001	SS18	-0.075	0.000	0.13			4.8	OK	
S2.000	SS19	-0.073	0.000	0.13			0.8	OK	
S2.001	SS20	-0.033	0.000	0.78			5.1	OK	
S2.002	SS21	-0.065	0.000	0.27			8.9	OK	
S3.000	SS22	-0.019	0.000	0.81			5.0	OK	
S3.001	SS23	0.017	0.000	1.04			6.7	SURCHARGED	
S3.002	SS24	-0.061	0.000	0.33			10.5	OK	
S4.000	SS25	-0.081	0.000	0.07			2.7	OK	
S1.002	SS26	1.042	0.000	0.26		496	1.0	FLOOD RISK	
S1.003	SS27	1.059	0.000	0.04			0.7	FLOOD RISK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	21.200	0.265	80.0	0.002	1.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	5.600	1.020	5.5	0.012	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	7.200	0.090	80.0	0.002	1.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	1.500	0.930	1.6	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	1.200	0.015	80.0	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	3.800	1.235	3.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	1.41	132.920	0.002	0.0	0.0	0.0	0.86	6.8	0.3
S1.001	50.00	1.44	132.420	0.014	0.0	0.0	0.0	3.32	26.1	1.9
S2.000	50.00	1.14	132.420	0.002	0.0	0.0	0.0	0.86	6.8	0.3
S2.001	50.00	1.14	132.330	0.006	0.0	0.0	0.0	6.14	48.2	0.8
S1.002	50.00	1.46	131.400	0.024	0.0	0.0	0.0	0.86	6.8	3.2
S1.003	50.00	1.48	131.385	0.024	0.0	0.0	0.0	4.44	34.9	3.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS12	133.520	0.600	Open Manhole	600	S1.000	132.920	100				
SS13	133.020	0.600	Open Manhole	600	S1.001	132.420	100	S1.000	132.655	100	235
SS14	133.020	0.600	Open Manhole	600	S2.000	132.420	100				
SS15	133.020	0.690	Open Manhole	600	S2.001	132.330	100	S2.000	132.330	100	
SS15	132.500	1.100	Open Manhole	600	S1.002	131.400	100	S1.001	131.400	100	
								S2.001	131.400	100	
SS16	132.500	1.115	Open Manhole	900	S1.003	131.385	100	S1.002	131.385	100	
S	132.500	2.350	Open Manhole	0		OUTFALL		S1.003	130.150	100	

No coordinates have been specified, layout information cannot be produced.

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	132.500	130.150	0.000	0	0

Online Controls for Storm

Orifice Manhole: SS16, DS/PN: S1.003, Volume (m³): 0.7

Diameter (m) 0.019 Discharge Coefficient 0.600 Invert Level (m) 131.385

Storage Structures for Storm

Porous Car Park Manhole: SS15, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.9
Max Percolation (l/s)	11.5	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	131.400	Cap Volume Depth (m)	0.890

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SS12	15 Summer	100	+40%					132.957
S1.001	SS13	15 Winter	100	+40%					132.463
S2.000	SS14	15 Summer	100	+40%					132.458
S2.001	SS15	15 Summer	100	+40%					132.356
S1.002	SS15	180 Winter	100	+40%	100/15 Summer				132.217
S1.003	SS16	180 Winter	100	+40%	100/15 Summer				132.219

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SS12	-0.063	0.000	0.25			1.6	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	SS13	-0.057	0.000	0.38			8.9	OK	
S2.000	SS14	-0.062	0.000	0.29			1.8	OK	
S2.001	SS15	-0.074	0.000	0.15			4.0	OK	
S1.002	SS15	0.717	0.000	0.25		179	1.0	FLOOD RISK	
S1.003	SS16	0.734	0.000	0.02			0.7	FLOOD RISK	