

Technical Note - Discharge of Surface Water Management Planning Conditions



The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
BN41 1RA
01273 424424
reception@civil.co.uk
www.civil.co.uk

Project	The Laurels, Dappers Lane, Angmering
Project Number	23260

By Martin Kempshall CEng MICE

Date 1 June 2020

1 Introduction

- 1.1 This Technical Note has been produced in support of the Reserved Matters / Discharge of Condition Application for discharging of Conditions 14, 15, 16 and 18 of Outline Planning Permission A/74/18/OUT comprising 9 two-storey dwellings at The Laurels, Dappers Lane, Angmering, BN16 4EN.
- 1.2 This Technical Note is to be read in conjunction with all planning, architectural and other reports that accompany the Planning Application for the proposed development.
- 1.3 The proposed development will incorporate a sustainable drainage system which will discharge all surface water via infiltration to ground using permeable paving with subbase attenuation.

2 Condition 14

- 2.1 Condition 14 of Outline Planning Application A/74/18/OUT states:

Development shall not commence, other than works of site survey and investigation, until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, and the recommendations of the SuDs Manual produced by CIRIA. Winter groundwater monitoring to establish highest annual ground water levels and Percolation testing to BRE 365, or similar approved, will be required to support the design of any Infiltration drainage. No building shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be adhered to and maintained in good working order in perpetuity.



ISO
9001 : 2008
REGISTERED
Cert No. 14127180

Reason: To ensure that the proposed development is satisfactory drained in accordance with policies WSP1, WDM1, WDM2 and WDM3 of the Arun Local Plan. It is considered necessary for this to be a pre-commencement condition to ensure that the surface water disposal scheme is agreed before construction commences.

3 Summary of Surface Water Management and Design for Discharge of Condition 14

- 3.1 The design is in compliance with the principles of the design and will be based upon Arun District Council Supplementary Requirements for Surface Water Drainage Proposals and West Sussex County Council LLFA Policy for the Management of Surface Water and recognised best practice.
- 3.2 Infiltration to ground is proposed in accordance with the Drainage Hierarchy preference and CIRIA SuDS C753.
- 3.3 The system is designed to attenuate all storm water events up to and including the critical 1 in 100 year storm with a 40% allowance for climate change. The design-for exceedance events has been accommodated within the attenuation system to ensure that all surface water is retained on site.
- 3.4 Requirements of Table 26.2 of CIRIA SuDS Manual have been achieved to ensure water quality requirements are met across the site.
- 3.5 The design has been based upon tested infiltration rates completed by Tweedie Evans Consulting. Infiltration rates have been used based on the lowest recorded rates or on specific location of the test results.

4 Site Investigation

4.1 General Site Ground Conditions

- 4.1.1 The Tweedie Evans Consulting Geotechnical Assessment identifies made ground generally comprising gravelly clay, which was encountered at depths between 0.2m and 0.8 below ground level.
- 4.1.2 The gravel fraction of the made ground comprised variable quantities of flint, brick, concrete, plastic and asphalt.
- 4.1.3 Beneath the made ground, the investigation encountered predominantly gravelly silty clay underlain by clayey sandy gravels.
- 4.1.4 Ground conditions have been demonstrated within the Tweedie Evans Consulting Geotechnical Assessment to be consistent across the site.

4.2 Winter Groundwater Monitoring

- 4.2.1 Groundwater monitoring was undertaken throughout the Winter of 2018/2019 and identified a maximum groundwater level of approximately 2 metres below existing ground levels.
- 4.2.2 Groundwater levels were also recorded during the winter infiltration testing in January 2020 and were identified as being 3.9mbgl.
- 4.2.3 A full copy of the winter groundwater monitoring data is located at the rear of this Technical Note.

4.3 Soakage Testing

- 4.3.1 Winter infiltration testing was completed on 24 January 2020 demonstrating infiltration rates of between 6.4×10^{-3} m/s in the clayey sandy gravels and 1.5×10^{-5} m/s in the gravelly silty clays beneath the made ground.

Table 5.2: Soakage Test Results

Soakage Test Location	Infiltration Rate (m/s)	Comments
TP01/SA01	2.6×10^{-5}	Single fill achieved (access restrictions following the first filling)
TP02/SA02	2.7×10^{-5} to 3.6×10^{-5}	Two fillings achieved within available time (access restrictions following the second filling)
TP03/SA03	1.5×10^{-5}	Infiltration rate based on first filling only. Drop in water level during second filling: ~14cm in 53min
TP04/SA04	6.4×10^{-3}	Single fill achieved due to fast drainage.
TP05/SA05	2.5×10^{-3}	Single fill achieved due to fast drainage.

Table 1 Summary of Infiltration Test Results

- 4.3.2 A copy of Drawing 101 showing the proposed drainage layout is located at the rear of this Technical Note.
- 4.3.3 Extracts from the Tweedie Evans Consulting Geotechnical Assessment are located at the rear of this Technical Note.

5 Detailed Surface Water Drainage Design

- 5.1 All surface water is to be collected and discharged via an infiltration blanket beneath a permeable paved surface.
- 5.2 Groundwater was recorded at its highest level during the Winter of 2018/2019 at 2mbgl.
- 5.3 All surface water is to be discharged by infiltration to ground via voided subbase attenuation beneath permeable paving situated in the highway and driveways.
- 5.4 Water from impermeable areas will discharge to the voided subbase via rainwater diffuser units. All rainwater diffuser units will have upstream catchment pits to reduce the potential for siltation of the units.
- 5.5 The minimum voided subbase thickness of 450mm will be provided in all areas based on assumed CBR values of 2%-5%.
- 5.6 The drainage has been separated into six catchments. The infiltration rates used in the design are based on the nearest infiltration test from the soakage testing with the lowest test rates from each location used, which are as follows:

Catchment	Test Location Used	Design Infiltration Rate
A	TP03	1.5×10^{-5} m/s
B	TP03	1.5×10^{-5} m/s
C	TP03	1.5×10^{-5} m/s
D	TP02	2.7×10^{-5} m/s
E	TP01	2.6×10^{-5} m/s
F	TP01	2.6×10^{-5} m/s

Table 2 Design Infiltration rates

- 5.7 Surface water storage requirements for each catchment is as follows:
- **Catchment A** (No Dig Construction area) is limited to 100mm of voided subbase, 93mm of voided subbase is required meet the necessary surface water attenuation requirements for this area.
 - **Catchment B** comprises 289m² of impermeable area discharging to 159m² of voided subbase. A minimum subbase thickness of 200mm is required equating to 9.4m³ of storage, a minimum 21.5m³ is to be provided.
 - **Catchment C** (Highway and adjacent footway only) requires 130mm of voided subbase to achieve the necessary surface water attenuation requirements for this area.

- **Catchment D** comprises 512m² of impermeable area discharging to 171m² of voided subbase. A minimum subbase thickness of 310mm is required equating to 15.4m³ of storage, a minimum 23.2m³ is to be provided.
- **Catchment E** comprises 821m² of impermeable area discharging to 360m² of voided subbase. A minimum subbase thickness of 210mm is required equating to 22.5m³ of storage, a minimum 48.6m³ is to be provided.
- **Catchment F** comprises 450m² of impermeable area discharging to 229m² of voided subbase. A minimum subbase thickness of 170mm is required equating to 11.7m³ of storage, a minimum 30.9m³ is to be provided.

5.8 A copy of Drawing 103 showing the impermeable areas and drainage catchments for the site are located at the rear of this report.

5.9 A copy of Drawing 201 showing the proposed drainage layout is located at the rear of this Technical Note.

5.10 A copy of the microdrainage calculations for each of the surface water catchments is located at the rear of this Technical Note.

6 Surface Water Quality and Treatment

6.1.1 In accordance with CIRIA SuDS Manual 2015 (Report C753) the pollution hazard level for the proposed residential development is very low to low.

6.1.2 The surface water scheme will include mitigation to ensure that surface water is suitably treated, and any pollution risk adequately managed prior to discharge.

6.1.3 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types and those determined as most relevant to the development proposals are as follows:

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very Low	0.2	0.2	0.05
Commercial / Industrial roofs	Low	0.3	0.2	0.05
Individual property driveways, residential car park, low-traffic roads	Low	0.5	0.4	0.4

Table 3: Pollution Hazard Indices

6.1.4 Where multiple drainage components are used in series the individual mitigation index of secondary and tertiary components is lowered by 50% due to reduced performance associated with primary treatment.

SuDS Type	Total suspended solids (TSS)	Metals	Hydro-carbons
Permeable pavement	0.7	0.6	0.7

Table 4: Pollution Mitigation Indices

6.1.5 The proposed use of permeable paving will meet the target treatment level required for runoff with very low to low risk of pollution hazard thus demonstrating that the surface water drainage system for the site can be designed to adequately mitigate against the risk of pollution.

7 Condition 15

7.1 Condition 15 of Outline Planning Application A/74/18/OUT states:

The development shall not proceed until formal consent has been approved in writing from the Lead Local Flood Authority (WSCC) or its agent (ADC) for the discharge of any flows to watercourses, or the culverting, diversion, infilling or obstruction of any watercourse on the site. Any discharge to a watercourse must be at a rate no greater than the predevelopment run off values.

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies WSP1, WDM1, WDM2 and WDM3 of the Arun Local Plan. This is required to be a pre-commencement condition because it is necessary to implement the surface water drainage system prior to commencing any building works.

8 Statement on Ordinary Watercourse / Culvert

- 8.1 All surface water is to be discharged to ground in accordance with the Drainage Hierarchy. The watercourse will not be culverted, diverted, infilled or obstructed in any way as a result of the development.
- 8.2 The CCTV survey identified the culvert as being 450mm in diameter with the depth to the top of the pipe being 1.6m below ground level. The CCTV survey information is located at the rear of this Technical Note.
- 8.3 The highway access is proposed in the same location as the existing highway access to the site which currently crosses the culvert.
- 8.4 The culvert is located within the boundary of the public highway with the entrance of the site subject to a Minor Works S278. The details of any protection that is required for the culvert will be agreed with West Sussex County Council Highways as part of the S278 works for the site entrance.
- 8.5 A copy of the highway boundary plan is located at the rear of this Technical Note.

9 Condition 16

9.1 Condition 16 of Outline Planning Application A/74/18/OUT states:

Development shall not commence until full details of the maintenance and management of the SuDS system is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the Local Planning Authority. The manual is to include (a) details of financial management of the site including arrangements made in the event that the management company (or any subsequent management company) is no longer able to fulfil its duties; and (b) arrangements for the replacement of major components at the end of the manufacturers recommended design life.

Reason: To ensure the efficient maintenance and on-going operation of the SuDS system and to ensure the best practice in line with guidance set out in 'The SuDS Manual' CIRIA publication ref: C753 Chapter 32. This is required to be a pre-commencement condition because it is necessary to implement the surface water drainage system prior to commencing any building works in accordance with policies WSP1, WDM1, WDM2 and WDM3 of Arun Local Plan.

10 Management and Maintenance of Proposed SuDS Drainage System

- 10.1 Upon completion, management of the shared drainage facilities will be passed on to a private Estates Management Company appointed by the Developer on behalf of the new Residents.
- 10.2 The regular and corrective maintenance of all shared elements of the drainage system beneath the road, including all parts of the infiltration blanket will be managed and funded through the Management Company on behalf of the Residents.
- 10.3 In the event that the Estates Management Company becomes unable to discharge its duties within 2 years of first appointment the developer will endeavour to appoint an alternative on behalf of the Residents.
- 10.4 The proposed permeable paving system with subbase attenuation is low maintenance and does not contain any control devices requiring replacement.
- 10.5 The design life of permeable paving is approximately 25 years with adequate maintenance as outlined within the Drainage Maintenance Manual. The system will be fully serviced after 25 years as set out in the Drainage Maintenance Manual.
- 10.6 Upon completion of the development specific details of the elements of the drainage system shall be provided to the Local Planning Authority and provided as part of Condition 17 of the approved Outline Planning Permission.
- 10.7 A copy of Drawing 102 showing the proposed drainage maintenance requirements and ownership responsibilities is located at the rear of this Technical Note.

11 Maintenance during construction

- 11.1 Once appointed the Contractor will prepare a site specific method statement for the control of silt and other pollutants during construction. CIRIA Report C532 'Control of Water Pollution from Construction Sites' provides further guidance on this.
- 11.2 During the construction phase, should hardstanding areas be constructed prior to the completion of the proposed surface water scheme surface, water flow will be temporarily channelled into localised soakaways wherever viable. Appropriate water quality mitigation in accordance with CIRIA Report C532 will be provided. This approach allows for surface water to be attenuated and sediments captured during the construction phase.
- 11.3 During the construction phase, the permeable subbase layer will be constructed and then covered with a sacrificial layer of geotextile overlaid by 100mm thick compacted voided stone or similarly approved hardcore for use as a temporary road surface. The sacrificial layer will be removed at the end of the main construction period with the laying course and paver surface laid with the sacrificial stone and geotextile discarded.
- 11.4 The Contractor will maintain the proposed drainage system during construction and until the site is handed over to the private Management Company.

12 Condition 18

- 12.1 Condition 18 of Outline Planning Application A/74/18/OUT states:

The development layout shall not be agreed until such time that arrangements for the future access and maintenance of any watercourse or culvert (piped watercourse) crossing or abutting the site has been submitted and approved in writing by the Local Planning Authority. The details thereby agreed shall be adhered to at all times thereafter.

No construction is permitted, which will restrict current and future landowners from undertaking their riparian maintenance responsibilities of any watercourse on or adjacent to the site.

Reason: To ensure that the duties and responsibilities, as required under the Land Drainage Act 1991, and amended by the Flood and Water Management Act 2010, can be fulfilled without additional impediment following the development completion and in accordance with policy WDM1 of the Arun Local Plan.

13 Statement on Ordinary Watercourse / Culvert

- 13.1 The culvert will not be impeded or modified as part of the works. The CCTV survey identified the culvert as being 450mm in diameter with the depth to the top of the pipe being 1.6m below ground level at the upstream manhole 35m north of the proposed site entrance.

- 13.2 The depth of the culvert indicates that no additional works will be required to protect the culvert at the site entrance, which is currently used as the existing access for the site. Should any further works be required to provide a betterment to the current site entrance then these will be agreed under the Minor Works S278.
- 13.3 The CCTV survey for the length of culvert adjacent to the site demonstrates that there are no defects in this section of the culvert. Minor defects were identified on the culvert downstream of the site on land not under the ownership of the applicant.
- 13.4 Riparian Ownership responsibilities will be maintained with the Landowner continuing to fulfil these duties as Riparian Owner under the Land Drainage Act. The responsibility for maintaining the section of culvert located beneath the entrance to the site will be undertaken by the site's private Estates Management Company.

14 Documents appended

Drawing 01 - Site Location Plan

Drawing 102 - Proposed Maintenance Plan

Drawing 103 – Proposed Impermeable Areas Plan

Drawing 105 - Culvert location and West County Council Highway Boundaries Plan

Drawing 106 - Existing Site Layout Plan

Drawing 201 - Proposed Drainage Layout and Levels Plan

Drawing 401 - Proposed Levels Plan

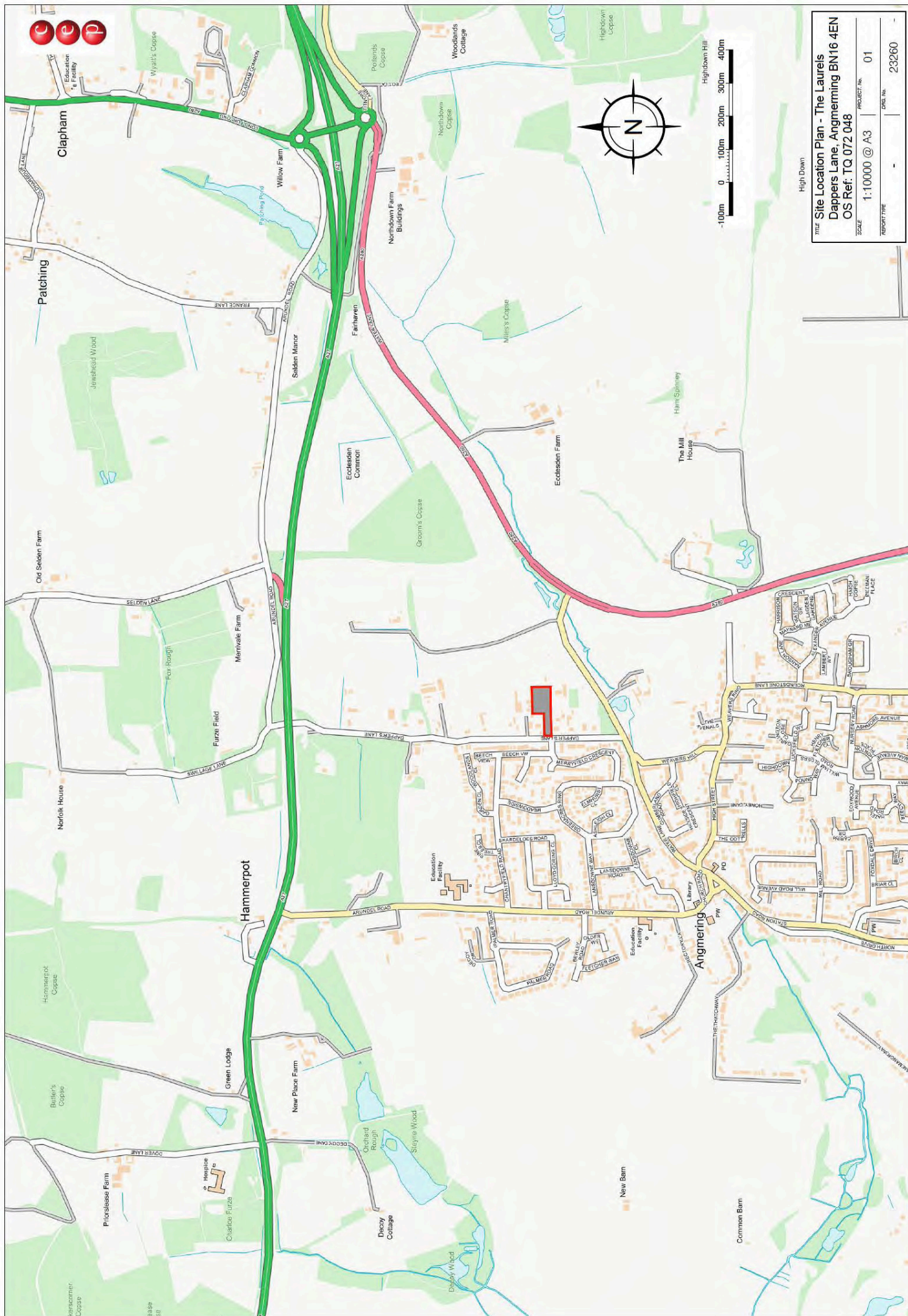
Drawing 501 - Construction Details

Microdrainage Calculations for Climate Change adjusted 1 in 100 year event

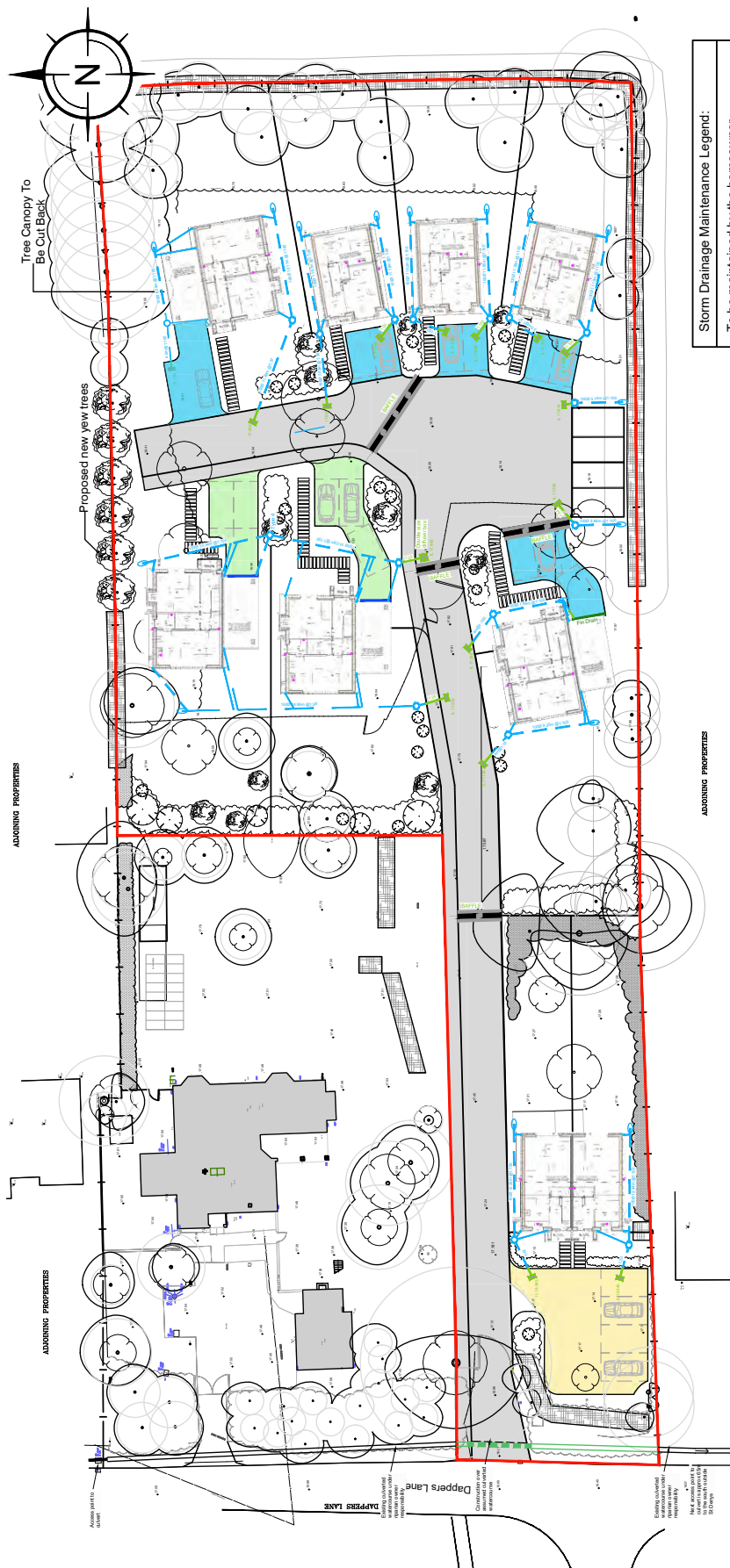
Extracts from Tweedie Evans Consulting Geotechnical Assessment dated March 2020

Ashdown Site Investigation Groundwater Monitoring Results 2018-2019

Drain Boss CCTV Survey of Culvert



THE Site Location Plan - The Laurels Dappers Lane, Angmering BN16 4EN OS Ref: TQ 072 048			
SCALE	1:10000 @ A3	PROJECT No.	01
REPORT TYPE	-	DWG No.	23260



Storm Drainage Maintenance Legend:	
To be maintained by the homeowner	
Type 4 	Private Type 4 Storm Water Inspection Chamber
	Private Storm Water Catchpit
	Private Storm Water Rodding Eye
	Fin Drain to Subbase
	Permeable Drives under private ownership. Subject to legal covenant
	Impermeable Drives under private ownership
<u>To be maintained by Management Company</u>	
	Property boundary
	Distribution Tanks to Subbase
	Baffle to subbase
	Permeable Drive under management company ownership
	Other hard paved areas including no-dig area at site boundary
	Culverted watercourse within the red line boundary

The main Contractor is responsible for ensuring the safety of the structure whilst the works are in progress.

DATE	TEST	TEST DESCRIPTION	CHK
01.06.2020	MJP	Invert levels to diffuser tanks	AKK
22.05.2020	MJP	Drainage Layout updated	AKK
26.03.2020	MJP	Diffuser tanks to subbase	AKK

FOR PLANNING

The Civil Engineering Practice
11 Tungsten Building
George Street
Fishergate
Sussex
BN41 1RA

01273 424424
reception@civil.co.uk
www.civil.co.uk

CLIENT _____

Oceanview Developments
The Laurels
Dappers Lane
Angmering

DATE	PROPOSED OWNERSHIP PLAN
11/1/2011	1. [REDACTED] 2. [REDACTED] 3. [REDACTED] 4. [REDACTED] 5. [REDACTED] 6. [REDACTED] 7. [REDACTED] 8. [REDACTED] 9. [REDACTED] 10. [REDACTED] 11. [REDACTED] 12. [REDACTED] 13. [REDACTED] 14. [REDACTED] 15. [REDACTED] 16. [REDACTED] 17. [REDACTED] 18. [REDACTED] 19. [REDACTED] 20. [REDACTED] 21. [REDACTED] 22. [REDACTED] 23. [REDACTED] 24. [REDACTED] 25. [REDACTED] 26. [REDACTED] 27. [REDACTED] 28. [REDACTED] 29. [REDACTED] 30. [REDACTED] 31. [REDACTED] 32. [REDACTED] 33. [REDACTED] 34. [REDACTED] 35. [REDACTED] 36. [REDACTED] 37. [REDACTED] 38. [REDACTED] 39. [REDACTED] 40. [REDACTED] 41. [REDACTED] 42. [REDACTED] 43. [REDACTED] 44. [REDACTED] 45. [REDACTED] 46. [REDACTED] 47. [REDACTED] 48. [REDACTED] 49. [REDACTED] 50. [REDACTED] 51. [REDACTED] 52. [REDACTED] 53. [REDACTED] 54. [REDACTED] 55. [REDACTED] 56. [REDACTED] 57. [REDACTED] 58. [REDACTED] 59. [REDACTED] 60. [REDACTED] 61. [REDACTED] 62. [REDACTED] 63. [REDACTED] 64. [REDACTED] 65. [REDACTED] 66. [REDACTED] 67. [REDACTED] 68. [REDACTED] 69. [REDACTED] 70. [REDACTED] 71. [REDACTED] 72. [REDACTED] 73. [REDACTED] 74. [REDACTED] 75. [REDACTED] 76. [REDACTED] 77. [REDACTED] 78. [REDACTED] 79. [REDACTED] 80. [REDACTED] 81. [REDACTED] 82. [REDACTED] 83. [REDACTED] 84. [REDACTED] 85. [REDACTED] 86. [REDACTED] 87. [REDACTED] 88. [REDACTED] 89. [REDACTED] 90. [REDACTED] 91. [REDACTED] 92. [REDACTED] 93. [REDACTED] 94. [REDACTED] 95. [REDACTED] 96. [REDACTED] 97. [REDACTED] 98. [REDACTED] 99. [REDACTED] 100. [REDACTED]

OWNER	DATE	PROJECT NO.
M Pacifico	Oct 2019	23260
PREPARED BY	CHECKED	REV.
M Kempshall	SRM	102 C
SCALE	1:500 @ A3	



GENERAL NOTES

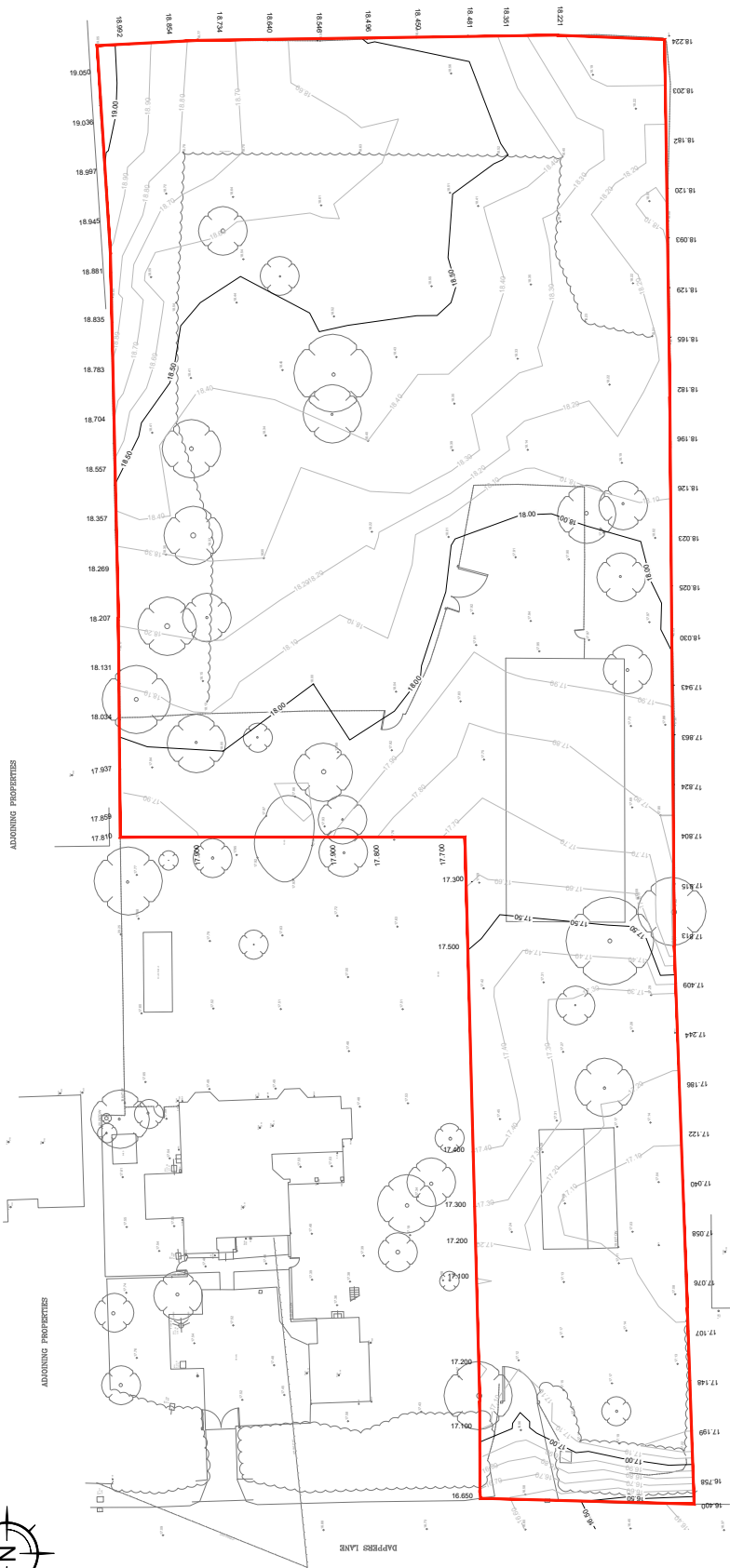
1. All dimensions to be checked on site. All dates and dimensions relating to this Contract work must be checked and agreed between the Main Contractor and the project manager.
2. The drawing is to be used as a guide only.
3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given as a guide only and should not be relied upon. The Main Contractor is responsible for obtaining and checking all information and taking due care and attention when excavating the works.

Scale	1:500
North Arrow	
Revision	
Drawn	
Checked	
Approved	

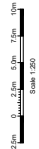
INFORMATION

The Civil Engineering Practice
11 Turgate Building
George Street
Bristol
BS1 1RA
01273 424124
respon@cep.co.uk
www.cep.co.uk

Project	Occurrence Developments
Location	The Laurels Dappes Lane, Angmering
Notes	Culvert and Highway Overlay
Scale	1:500 @ A3
Drawn	23260
Check	105
Approved	-



EXISTING SITE LAYOUT PLAN
(Scale 1:500)



NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the project Contractor.
2. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specifications.
3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given for information only. The main Contractor is responsible for the location, depth and checking of all information and taking due care and attention when undertaking the works.

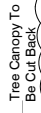
Issue Status Date of Issue

FOR CONSTRUCTION

The Civil Engineering Practice
11 Turgate Building
George Street
Faversham
Sussex
BN11 1RA
01273 424424
rec@cep.co.uk
www.civileng.co.uk

Oceanview Developments Ltd
The Laurels
Daffers Lane
Ayrington
Existing Site Layout Plan

Project No:	23260
Client:	M Kimball
Scale:	1:250 @ A1, 1:500 @ A3
Date:	May 2020
Drawn by:	M Kimball
Checked by:	
Page:	106

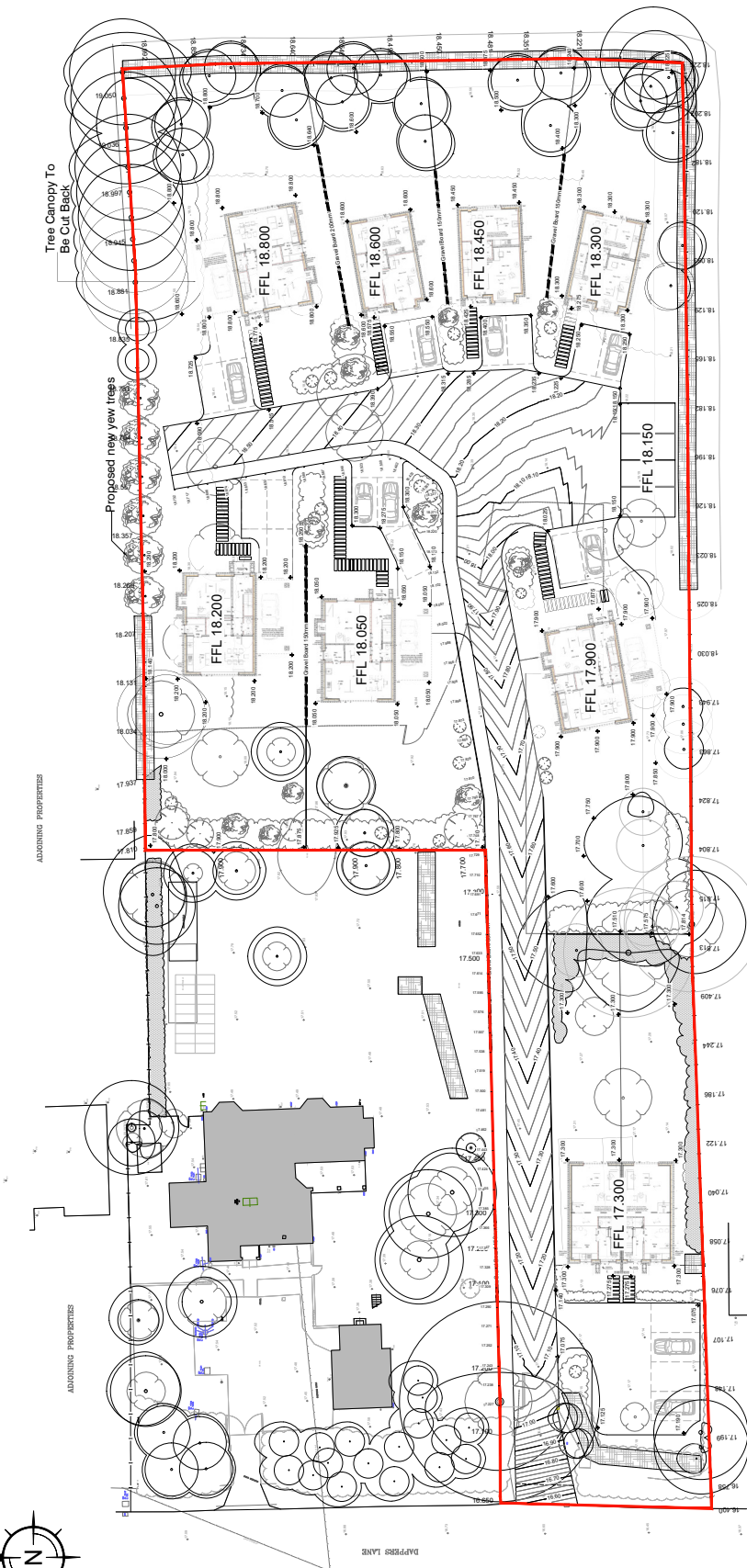


Drainage Legend:

The legend includes the following items:

- Type 4**: Vertical riser for storm water storage and attenuation.
- Private Type 1 Storm Water Inspection Chamber**: Private Storm Water.
- Control**: Private Storm Water.
- Private Storm Water Ridding Eye**: Private Storm Water Ridding Eye.
- Property boundary**: Distribution network to Substation.
- Flow Direction**: Flow Direction to Substation.
- SWALE**: Swale to substation.
- Private Storm Water Gutter**: Private Storm Water Gutter.
- Type 2 Inverts**: Private Storm Water Inverts.
- Type 4 Inspection Chamber**: Type 4 Inspection Chamber.

[illegible][illegible]



- NOTES:
1. All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the project Contractor.
 2. This drawing is to be used in conjunction with all relevant Architects and Engineers drawings.
 3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
 4. Any information given regarding existing underground services is given for information only. The main Contractor is responsible for the location, depth and condition of all services. The main Contractor is responsible for observing and checking all information and taking due care and attention whilst undertaking the works.

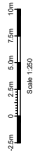
A1 01.00.20 (MJP) Road contours and boundary levels added

FOR CONSTRUCTION

The Civil Engineering Practice
11 Turgate Building
George Street
Faversham
Sussex
BN41 1RA
01273 424424
rec@cep.co.uk
www.cep.co.uk

Oceanview Developments Ltd
The Laurels
Dappers Lane
Ayrington
Proposed Levels Plan

Project No:	23260
Client:	401 A
Drawn by:	M Kimball
Checked by:	M Kimball
Date:	May 2020
Scale:	1:250 @ A1, 1:500 @ A3



GENERAL NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-Construction work must be checked and agreed between the sub-Contractor and the main Contractor.

2. The drawing is to be read in conjunction with all relevant Architect's and Engineer's specifications.

3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.

4. Any information given regarding existing underground services is given for information only. The main Contractor is responsible for identifying, locating, observing and checking all information and taking due care and attention whilst carrying out the work.

DRAINAGE NOTES:

1. All adaptable pipes, joints and junctions shall be visited daily to BS EN 12285.
2. All adaptable access shafts to be installed in accordance with the The effect of the access shafts shall be considered in relation to the stability of the surrounding ground. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
3. All joints shall be sealed with a suitable sealant. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given for information only. The main Contractor is responsible for identifying, locating, observing and checking all information and taking due care and attention whilst carrying out the work.
5. Where pipes, adjacent to the structure, have a depth to soil from the base of the pipe of less than 100mm, the pipes shall be bedded and surrounded with 100mm thick granular bedding.
6. Where pipes, adjacent to the structure, have a depth to soil from the base of the pipe of less than 100mm, the pipes shall be bedded and surrounded with 100mm thick granular bedding.
7. All pipes shall have nodding access plates fitted at their base (ground floor level).
8. Where existing pipes are to be abandoned they shall be dug out and removed from the site.
9. Any alterations to the design between the drawing and the site should be reported immediately to the Engineer.
10. All materials and chamber sizes are given as a minimum to meet the requirements of the specification.

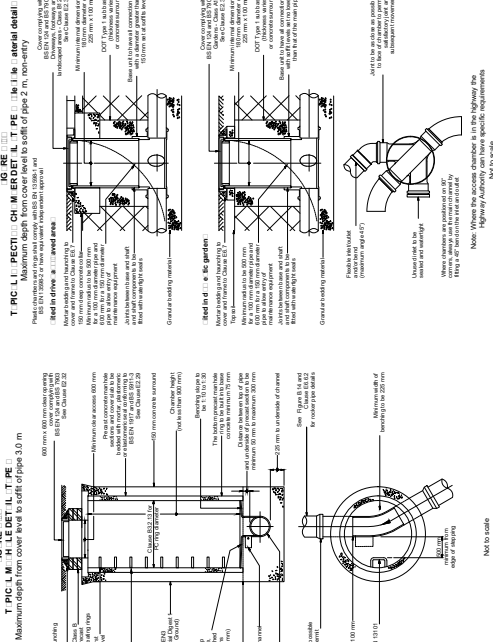
AN/1 (01/2020) (MJP) Carriageway construction continued

REVISION	DATE	BY	DESCRIPTION
1			

FOR PLANNING

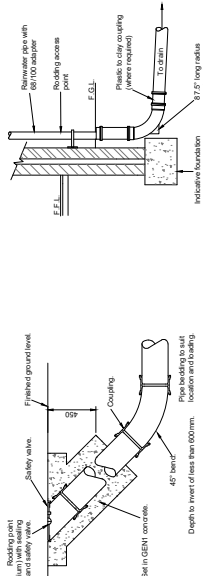
The Civil Engineering Practice
11 Tongland Building
George Street
Farnham
Surrey
BN41 1RA
01273 424424
res@civileng.co.uk
www.civileng.co.uk

PROJECT NO:	23260
DATE:	15/01/2019
PROJECT NAME:	501
PROJECT LOCATION:	SRM
PROJECT DESCRIPTION:	CONSTRUCTION DETAILS
PROJECT DRAWN BY:	THELAWSON
PROJECT CHECKED BY:	DAFFERS
PROJECT APPROVED BY:	ANGLING
PROJECT REVIEWED BY:	CONSTRUCTION DETAILS



PV3 - NO DIG CONSTRUCTION

(Scale 1:20)



TYPICAL RAINWATER PIPE DETAIL

(Scale 1:20)

DETAIL OF ROPPING EYE

(Scale 1:20)

PIPE BEDDING CLASS	MIN	MAX	MIN	MAX
D/N	0.4	0.7	4.1	3.7
B	0.3	0.4	0.4	0.7

PIPE BEDDING CLASS	MIN	MAX	MIN	MAX
D/N	0.6	0.7	1.1	2.5
B	0.6	0.7	3.8	0.7

PIPE BEDDING CLASS	MIN	MAX	MIN	MAX
D/N	0.6	0.7	3.8	0.7
B	0.6	0.7	5.0	0.6

PIPE BEDDING CLASS	MIN	MAX	MIN	MAX
D/N	0.6	0.7	3.8	0.7
B	0.6	0.7	5.0	0.6

PIPE BEDDING CLASS	MIN	MAX	MIN	MAX
D/N	0.6	0.7	3.8	0.7
B	0.6	0.7	5.0	0.6

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PIPE BEDDING CLASS	MIN	MAX	MIN	MAX
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PIPE BEDDING

The Civil Engineering Practice				Page 1																																																																																																																																																																																																																			
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<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 29 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>16.714</td><td>0.064</td><td>0.9</td><td>1.7</td><td>Flood Risk</td></tr><tr><td>30 min Summer</td><td>16.727</td><td>0.077</td><td>0.9</td><td>2.0</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>16.733</td><td>0.083</td><td>0.9</td><td>2.2</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>16.728</td><td>0.078</td><td>0.9</td><td>2.0</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>16.718</td><td>0.068</td><td>0.9</td><td>1.8</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>16.709</td><td>0.059</td><td>0.9</td><td>1.5</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>16.697</td><td>0.047</td><td>0.8</td><td>1.2</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>16.691</td><td>0.041</td><td>0.7</td><td>1.1</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>16.686</td><td>0.036</td><td>0.6</td><td>0.9</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>16.683</td><td>0.033</td><td>0.6</td><td>0.8</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>16.677</td><td>0.027</td><td>0.5</td><td>0.7</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>16.671</td><td>0.021</td><td>0.4</td><td>0.5</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>16.666</td><td>0.016</td><td>0.3</td><td>0.4</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>16.663</td><td>0.013</td><td>0.2</td><td>0.3</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>16.659</td><td>0.009</td><td>0.2</td><td>0.2</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>16.658</td><td>0.008</td><td>0.1</td><td>0.2</td><td>Flood Risk</td></tr><tr><td>7200 min Summer</td><td>16.656</td><td>0.006</td><td>0.1</td><td>0.2</td><td>Flood Risk</td></tr><tr><td>8640 min Summer</td><td>16.656</td><td>0.006</td><td>0.1</td><td>0.1</td><td>Flood Risk</td></tr><tr><td>10080 min Summer</td><td>16.655</td><td>0.005</td><td>0.1</td><td>0.1</td><td>Flood Risk</td></tr><tr><td>15 min Winter</td><td>16.723</td><td>0.073</td><td>0.9</td><td>1.9</td><td>Flood Risk</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>129.682</td><td>0.0</td><td>18</td></tr><tr><td>30 min Summer</td><td>87.133</td><td>0.0</td><td>28</td></tr><tr><td>60 min Summer</td><td>55.837</td><td>0.0</td><td>46</td></tr><tr><td>120 min Summer</td><td>34.509</td><td>0.0</td><td>78</td></tr><tr><td>180 min Summer</td><td>25.637</td><td>0.0</td><td>110</td></tr><tr><td>240 min Summer</td><td>20.604</td><td>0.0</td><td>140</td></tr><tr><td>360 min Summer</td><td>15.169</td><td>0.0</td><td>198</td></tr><tr><td>480 min Summer</td><td>12.185</td><td>0.0</td><td>260</td></tr><tr><td>600 min Summer</td><td>10.272</td><td>0.0</td><td>320</td></tr><tr><td>720 min Summer</td><td>8.930</td><td>0.0</td><td>380</td></tr><tr><td>960 min Summer</td><td>7.152</td><td>0.0</td><td>502</td></tr><tr><td>1440 min Summer</td><td>5.221</td><td>0.0</td><td>740</td></tr><tr><td>2160 min Summer</td><td>3.803</td><td>0.0</td><td>1104</td></tr><tr><td>2880 min Summer</td><td>3.033</td><td>0.0</td><td>1468</td></tr><tr><td>4320 min Summer</td><td>2.201</td><td>0.0</td><td>2204</td></tr><tr><td>5760 min Summer</td><td>1.751</td><td>0.0</td><td>2896</td></tr><tr><td>7200 min Summer</td><td>1.466</td><td>0.0</td><td>3560</td></tr><tr><td>8640 min Summer</td><td>1.270</td><td>0.0</td><td>4360</td></tr><tr><td>10080 min Summer</td><td>1.124</td><td>0.0</td><td>5136</td></tr><tr><td>15 min 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Risk	10080 min Summer	16.655	0.005	0.1	0.1	Flood Risk	15 min Winter	16.723	0.073	0.9	1.9	Flood Risk	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	129.682	0.0	18	30 min Summer	87.133	0.0	28	60 min Summer	55.837	0.0	46	120 min Summer	34.509	0.0	78	180 min Summer	25.637	0.0	110	240 min Summer	20.604	0.0	140	360 min Summer	15.169	0.0	198	480 min Summer	12.185	0.0	260	600 min Summer	10.272	0.0	320	720 min Summer	8.930	0.0	380	960 min Summer	7.152	0.0	502	1440 min Summer	5.221	0.0	740	2160 min Summer	3.803	0.0	1104	2880 min Summer	3.033	0.0	1468	4320 min Summer	2.201	0.0	2204	5760 min Summer	1.751	0.0	2896	7200 min Summer	1.466	0.0	3560	8640 min Summer	1.270	0.0	4360	10080 min Summer	1.124	0.0	5136	15 min Winter	129.682	0.0	18
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120 min Summer	34.509	0.0	78																																																																																																																																																																																																																				
180 min Summer	25.637	0.0	110																																																																																																																																																																																																																				
240 min Summer	20.604	0.0	140																																																																																																																																																																																																																				
360 min Summer	15.169	0.0	198																																																																																																																																																																																																																				
480 min Summer	12.185	0.0	260																																																																																																																																																																																																																				
600 min Summer	10.272	0.0	320																																																																																																																																																																																																																				
720 min Summer	8.930	0.0	380																																																																																																																																																																																																																				
960 min Summer	7.152	0.0	502																																																																																																																																																																																																																				
1440 min Summer	5.221	0.0	740																																																																																																																																																																																																																				
2160 min Summer	3.803	0.0	1104																																																																																																																																																																																																																				
2880 min Summer	3.033	0.0	1468																																																																																																																																																																																																																				
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5760 min Summer	1.751	0.0	2896																																																																																																																																																																																																																				
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11 Tungsten Building George Street Fishersgate BN41 1RA		The Laurels Dappers Lane, Angmering Catchment A			
Date 22/05/2020 File CATCHMENT A.SRCX		Designed by SRD Checked by			
Innovyze		Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	16.738	0.088		0.9	2.3 Flood Risk
60 min Winter	16.743	0.093		0.9	2.4 Flood Risk
120 min Winter	16.732	0.082		0.9	2.1 Flood Risk
180 min Winter	16.716	0.066		0.9	1.7 Flood Risk
240 min Winter	16.703	0.053		0.9	1.4 Flood Risk
360 min Winter	16.692	0.042		0.7	1.1 Flood Risk
480 min Winter	16.685	0.035		0.6	0.9 Flood Risk
600 min Winter	16.680	0.030		0.5	0.8 Flood Risk
720 min Winter	16.676	0.026		0.5	0.7 Flood Risk
960 min Winter	16.671	0.021		0.4	0.6 Flood Risk
1440 min Winter	16.666	0.016		0.3	0.4 Flood Risk
2160 min Winter	16.662	0.012		0.2	0.3 Flood Risk
2880 min Winter	16.659	0.009		0.2	0.2 Flood Risk
4320 min Winter	16.657	0.007		0.1	0.2 Flood Risk
5760 min Winter	16.656	0.006		0.1	0.1 Flood Risk
7200 min Winter	16.655	0.005		0.1	0.1 Flood Risk
8640 min Winter	16.654	0.004		0.1	0.1 Flood Risk
10080 min Winter	16.654	0.004		0.1	0.1 Flood Risk
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	
30 min Winter		87.133	0.0	30	
60 min Winter		55.837	0.0	48	
120 min Winter		34.509	0.0	84	
180 min Winter		25.637	0.0	116	
240 min Winter		20.604	0.0	144	
360 min Winter		15.169	0.0	204	
480 min Winter		12.185	0.0	264	
600 min Winter		10.272	0.0	326	
720 min Winter		8.930	0.0	386	
960 min Winter		7.152	0.0	508	
1440 min Winter		5.221	0.0	750	
2160 min Winter		3.803	0.0	1104	
2880 min Winter		3.033	0.0	1472	
4320 min Winter		2.201	0.0	2204	
5760 min Winter		1.751	0.0	2904	
7200 min Winter		1.466	0.0	3760	
8640 min Winter		1.270	0.0	4504	
10080 min Winter		1.124	0.0	5120	
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11 Tungsten Building George Street Fishersgate BN41 1RA	The Laurels Dappers Lane, Angmering Catchment A	
Date 22/05/2020 File CATCHMENT A.SRCX	Designed by SRD Checked by	
Innovyze Source Control 2020.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.009

Time (mins)	Area (ha)	Time (mins)	Area (ha)
From: 0	To: 4 0.004	From: 4	To: 8 0.005

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11 Tungsten Building George Street Fishersgate BN41 1RA	The Laurels Dappers Lane, Angmering Catchment A																	
Date 22/05/2020 File CATCHMENT A.SRCX	Designed by SRD Checked by																	
Innovyze Source Control 2020.1																		
<u>Model Details</u> Storage is Online Cover Level (m) 16.900 <u>Infiltration Blanket Structure</u> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.05400</td> <td>Diameter/Width (m)</td> <td>9.3</td> </tr> <tr> <td>Safety Factor</td> <td>1.5</td> <td>Length (m)</td> <td>9.3</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Cap Volume Depth (m)</td> <td>0.150</td> </tr> <tr> <td>Invert Level (m)</td> <td>16.650</td> <td></td> <td></td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.05400	Diameter/Width (m)	9.3	Safety Factor	1.5	Length (m)	9.3	Porosity	0.30	Cap Volume Depth (m)	0.150	Invert Level (m)	16.650		
Infiltration Coefficient Base (m/hr)	0.05400	Diameter/Width (m)	9.3															
Safety Factor	1.5	Length (m)	9.3															
Porosity	0.30	Cap Volume Depth (m)	0.150															
Invert Level (m)	16.650																	
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11 Tungsten Building George Street Fishersgate BN41 1RA		The Laurels Dappers Lane, Angmering Catchment B																																																																																																																																																																																																																					
Date 22/05/2020 File CATCHMENT B.SRCX		Designed by SRD Checked by																																																																																																																																																																																																																					
Innovyze		Source Control 2020.1																																																																																																																																																																																																																					
<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 52 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>16.972</td><td>0.122</td><td>1.6</td><td>5.8</td><td>Flood Risk</td></tr><tr><td>30 min Summer</td><td>17.003</td><td>0.153</td><td>1.6</td><td>7.3</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>17.021</td><td>0.171</td><td>1.6</td><td>8.1</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>17.021</td><td>0.171</td><td>1.6</td><td>8.1</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>17.009</td><td>0.159</td><td>1.6</td><td>7.6</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>16.995</td><td>0.145</td><td>1.6</td><td>6.9</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>16.968</td><td>0.118</td><td>1.6</td><td>5.6</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>16.945</td><td>0.095</td><td>1.6</td><td>4.5</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>16.927</td><td>0.077</td><td>1.6</td><td>3.7</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>16.913</td><td>0.063</td><td>1.6</td><td>3.0</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>16.898</td><td>0.048</td><td>1.5</td><td>2.3</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>16.887</td><td>0.037</td><td>1.2</td><td>1.7</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>16.878</td><td>0.028</td><td>0.9</td><td>1.3</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>16.872</td><td>0.022</td><td>0.7</td><td>1.1</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>16.866</td><td>0.016</td><td>0.5</td><td>0.8</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>16.863</td><td>0.013</td><td>0.4</td><td>0.6</td><td>Flood Risk</td></tr><tr><td>7200 min Summer</td><td>16.861</td><td>0.011</td><td>0.4</td><td>0.5</td><td>Flood Risk</td></tr><tr><td>8640 min Summer</td><td>16.860</td><td>0.010</td><td>0.3</td><td>0.5</td><td>Flood Risk</td></tr><tr><td>10080 min Summer</td><td>16.859</td><td>0.009</td><td>0.3</td><td>0.4</td><td>Flood Risk</td></tr><tr><td>15 min Winter</td><td>16.989</td><td>0.139</td><td>1.6</td><td>6.6</td><td>Flood Risk</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>129.682</td><td>0.0</td><td>19</td></tr><tr><td>30 min Summer</td><td>87.133</td><td>0.0</td><td>32</td></tr><tr><td>60 min Summer</td><td>55.837</td><td>0.0</td><td>52</td></tr><tr><td>120 min Summer</td><td>34.509</td><td>0.0</td><td>86</td></tr><tr><td>180 min Summer</td><td>25.637</td><td>0.0</td><td>120</td></tr><tr><td>240 min Summer</td><td>20.604</td><td>0.0</td><td>154</td></tr><tr><td>360 min Summer</td><td>15.169</td><td>0.0</td><td>218</td></tr><tr><td>480 min Summer</td><td>12.185</td><td>0.0</td><td>278</td></tr><tr><td>600 min Summer</td><td>10.272</td><td>0.0</td><td>336</td></tr><tr><td>720 min Summer</td><td>8.930</td><td>0.0</td><td>390</td></tr><tr><td>960 min Summer</td><td>7.152</td><td>0.0</td><td>502</td></tr><tr><td>1440 min Summer</td><td>5.221</td><td>0.0</td><td>740</td></tr><tr><td>2160 min Summer</td><td>3.803</td><td>0.0</td><td>1104</td></tr><tr><td>2880 min Summer</td><td>3.033</td><td>0.0</td><td>1468</td></tr><tr><td>4320 min Summer</td><td>2.201</td><td>0.0</td><td>2204</td></tr><tr><td>5760 min Summer</td><td>1.751</td><td>0.0</td><td>2928</td></tr><tr><td>7200 min Summer</td><td>1.466</td><td>0.0</td><td>3640</td></tr><tr><td>8640 min Summer</td><td>1.270</td><td>0.0</td><td>4352</td></tr><tr><td>10080 min Summer</td><td>1.124</td><td>0.0</td><td>5096</td></tr><tr><td>15 min Winter</td><td>129.682</td><td>0.0</td><td>20</td></tr></tbody></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	16.972	0.122	1.6	5.8	Flood Risk	30 min Summer	17.003	0.153	1.6	7.3	Flood Risk	60 min Summer	17.021	0.171	1.6	8.1	Flood Risk	120 min Summer	17.021	0.171	1.6	8.1	Flood Risk	180 min Summer	17.009	0.159	1.6	7.6	Flood Risk	240 min Summer	16.995	0.145	1.6	6.9	Flood Risk	360 min Summer	16.968	0.118	1.6	5.6	Flood Risk	480 min Summer	16.945	0.095	1.6	4.5	Flood Risk	600 min Summer	16.927	0.077	1.6	3.7	Flood Risk	720 min Summer	16.913	0.063	1.6	3.0	Flood Risk	960 min Summer	16.898	0.048	1.5	2.3	Flood Risk	1440 min Summer	16.887	0.037	1.2	1.7	Flood Risk	2160 min Summer	16.878	0.028	0.9	1.3	Flood Risk	2880 min Summer	16.872	0.022	0.7	1.1	Flood Risk	4320 min Summer	16.866	0.016	0.5	0.8	Flood Risk	5760 min Summer	16.863	0.013	0.4	0.6	Flood Risk	7200 min Summer	16.861	0.011	0.4	0.5	Flood Risk	8640 min Summer	16.860	0.010	0.3	0.5	Flood Risk	10080 min Summer	16.859	0.009	0.3	0.4	Flood Risk	15 min Winter	16.989	0.139	1.6	6.6	Flood Risk	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	129.682	0.0	19	30 min Summer	87.133	0.0	32	60 min Summer	55.837	0.0	52	120 min Summer	34.509	0.0	86	180 min Summer	25.637	0.0	120	240 min Summer	20.604	0.0	154	360 min Summer	15.169	0.0	218	480 min Summer	12.185	0.0	278	600 min Summer	10.272	0.0	336	720 min Summer	8.930	0.0	390	960 min Summer	7.152	0.0	502	1440 min Summer	5.221	0.0	740	2160 min Summer	3.803	0.0	1104	2880 min Summer	3.033	0.0	1468	4320 min Summer	2.201	0.0	2204	5760 min Summer	1.751	0.0	2928	7200 min Summer	1.466	0.0	3640	8640 min Summer	1.270	0.0	4352	10080 min Summer	1.124	0.0	5096	15 min Winter	129.682	0.0	20
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Date 22/05/2020 File CATCHMENT B.SRCX		Designed by SRD Checked by			
Innovyze		Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	17.026	0.176		1.6	8.4 Flood Risk
60 min Winter	17.047	0.197		1.6	9.4 Flood Risk
120 min Winter	17.043	0.193		1.6	9.2 Flood Risk
180 min Winter	17.024	0.174		1.6	8.3 Flood Risk
240 min Winter	17.002	0.152		1.6	7.2 Flood Risk
360 min Winter	16.960	0.110		1.6	5.2 Flood Risk
480 min Winter	16.927	0.077		1.6	3.6 Flood Risk
600 min Winter	16.904	0.054		1.6	2.6 Flood Risk
720 min Winter	16.896	0.046		1.5	2.2 Flood Risk
960 min Winter	16.888	0.038		1.2	1.8 Flood Risk
1440 min Winter	16.878	0.028		0.9	1.3 Flood Risk
2160 min Winter	16.870	0.020		0.6	1.0 Flood Risk
2880 min Winter	16.866	0.016		0.5	0.8 Flood Risk
4320 min Winter	16.862	0.012		0.4	0.6 Flood Risk
5760 min Winter	16.860	0.010		0.3	0.5 Flood Risk
7200 min Winter	16.858	0.008		0.3	0.4 Flood Risk
8640 min Winter	16.857	0.007		0.2	0.3 Flood Risk
10080 min Winter	16.856	0.006		0.2	0.3 Flood Risk
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	
30 min Winter		87.133	0.0	32	
60 min Winter		55.837	0.0	58	
120 min Winter		34.509	0.0	92	
180 min Winter		25.637	0.0	130	
240 min Winter		20.604	0.0	166	
360 min Winter		15.169	0.0	230	
480 min Winter		12.185	0.0	288	
600 min Winter		10.272	0.0	334	
720 min Winter		8.930	0.0	384	
960 min Winter		7.152	0.0	502	
1440 min Winter		5.221	0.0	748	
2160 min Winter		3.803	0.0	1108	
2880 min Winter		3.033	0.0	1472	
4320 min Winter		2.201	0.0	2208	
5760 min Winter		1.751	0.0	2976	
7200 min Winter		1.466	0.0	3656	
8640 min Winter		1.270	0.0	4384	
10080 min Winter		1.124	0.0	5136	
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11 Tungsten Building George Street Fishersgate BN41 1RA	The Laurels Dappers Lane, Angmering Catchment B		
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11 Tungsten Building George Street Fishersgate BN41 1RA	The Laurels Dappers Lane, Angmering Catchment B																	
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Innovyze Source Control 2020.1																		
<u>Model Details</u> Storage is Online Cover Level (m) 17.150 <u>Infiltration Blanket Structure</u> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.05400</td> <td>Diameter/Width (m)</td> <td>12.6</td> </tr> <tr> <td>Safety Factor</td> <td>1.5</td> <td>Length (m)</td> <td>12.6</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Cap Volume Depth (m)</td> <td>0.200</td> </tr> <tr> <td>Invert Level (m)</td> <td>16.850</td> <td></td> <td></td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.05400	Diameter/Width (m)	12.6	Safety Factor	1.5	Length (m)	12.6	Porosity	0.30	Cap Volume Depth (m)	0.200	Invert Level (m)	16.850		
Infiltration Coefficient Base (m/hr)	0.05400	Diameter/Width (m)	12.6															
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Porosity	0.30	Cap Volume Depth (m)	0.200															
Invert Level (m)	16.850																	
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<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 32 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>16.934</td><td>0.084</td><td>1.7</td><td>4.4</td><td>Flood Risk</td></tr><tr><td>30 min Summer</td><td>16.953</td><td>0.103</td><td>1.7</td><td>5.4</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>16.963</td><td>0.113</td><td>1.7</td><td>5.9</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>16.959</td><td>0.109</td><td>1.7</td><td>5.7</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>16.948</td><td>0.098</td><td>1.7</td><td>5.1</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>16.936</td><td>0.086</td><td>1.7</td><td>4.5</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>16.916</td><td>0.066</td><td>1.7</td><td>3.4</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>16.903</td><td>0.053</td><td>1.7</td><td>2.7</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>16.896</td><td>0.046</td><td>1.6</td><td>2.4</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>16.891</td><td>0.041</td><td>1.4</td><td>2.2</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>16.885</td><td>0.035</td><td>1.2</td><td>1.8</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>16.876</td><td>0.026</td><td>0.9</td><td>1.4</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>16.870</td><td>0.020</td><td>0.7</td><td>1.0</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>16.866</td><td>0.016</td><td>0.6</td><td>0.8</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>16.862</td><td>0.012</td><td>0.4</td><td>0.6</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>16.860</td><td>0.010</td><td>0.3</td><td>0.5</td><td>Flood Risk</td></tr><tr><td>7200 min 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Summer</td><td>15.169</td><td>0.0</td><td>206</td></tr><tr><td>480 min Summer</td><td>12.185</td><td>0.0</td><td>262</td></tr><tr><td>600 min Summer</td><td>10.272</td><td>0.0</td><td>320</td></tr><tr><td>720 min Summer</td><td>8.930</td><td>0.0</td><td>380</td></tr><tr><td>960 min Summer</td><td>7.152</td><td>0.0</td><td>500</td></tr><tr><td>1440 min Summer</td><td>5.221</td><td>0.0</td><td>740</td></tr><tr><td>2160 min Summer</td><td>3.803</td><td>0.0</td><td>1104</td></tr><tr><td>2880 min Summer</td><td>3.033</td><td>0.0</td><td>1468</td></tr><tr><td>4320 min Summer</td><td>2.201</td><td>0.0</td><td>2204</td></tr><tr><td>5760 min Summer</td><td>1.751</td><td>0.0</td><td>2928</td></tr><tr><td>7200 min Summer</td><td>1.466</td><td>0.0</td><td>3640</td></tr><tr><td>8640 min Summer</td><td>1.270</td><td>0.0</td><td>4392</td></tr><tr><td>10080 min Summer</td><td>1.124</td><td>0.0</td><td>5136</td></tr><tr><td>15 min 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Innovyze		Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	16.969	0.119	1.7	6.2	Flood Risk
60 min Winter	16.978	0.128	1.7	6.7	Flood Risk
120 min Winter	16.969	0.119	1.7	6.2	Flood Risk
180 min Winter	16.950	0.100	1.7	5.2	Flood Risk
240 min Winter	16.931	0.081	1.7	4.2	Flood Risk
360 min Winter	16.904	0.054	1.7	2.8	Flood Risk
480 min Winter	16.894	0.044	1.5	2.3	Flood Risk
600 min Winter	16.888	0.038	1.3	2.0	Flood Risk
720 min Winter	16.883	0.033	1.2	1.7	Flood Risk
960 min Winter	16.877	0.027	0.9	1.4	Flood Risk
1440 min Winter	16.870	0.020	0.7	1.0	Flood Risk
2160 min Winter	16.865	0.015	0.5	0.8	Flood Risk
2880 min Winter	16.862	0.012	0.4	0.6	Flood Risk
4320 min Winter	16.859	0.009	0.3	0.4	Flood Risk
5760 min Winter	16.857	0.007	0.2	0.4	Flood Risk
7200 min Winter	16.856	0.006	0.2	0.3	Flood Risk
8640 min Winter	16.855	0.005	0.2	0.3	Flood Risk
10080 min Winter	16.855	0.005	0.2	0.2	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
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60 min Winter	55.837	0.0	50		
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180 min Winter	25.637	0.0	122		
240 min Winter	20.604	0.0	154		
360 min Winter	15.169	0.0	208		
480 min Winter	12.185	0.0	264		
600 min Winter	10.272	0.0	326		
720 min Winter	8.930	0.0	386		
960 min Winter	7.152	0.0	502		
1440 min Winter	5.221	0.0	744		
2160 min Winter	3.803	0.0	1104		
2880 min Winter	3.033	0.0	1472		
4320 min Winter	2.201	0.0	2164		
5760 min Winter	1.751	0.0	2944		
7200 min Winter	1.466	0.0	3672		
8640 min Winter	1.270	0.0	4280		
10080 min Winter	1.124	0.0	5248		
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Innovyze	Source Control 2020.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.023

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.011	4	8	0.012

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<u>Model Details</u> Storage is Online Cover Level (m) 17.100 <u>Infiltration Blanket Structure</u> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.05400</td> <td>Diameter/Width (m)</td> <td>13.2</td> </tr> <tr> <td>Safety Factor</td> <td>1.5</td> <td>Length (m)</td> <td>13.2</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Cap Volume Depth (m)</td> <td>0.150</td> </tr> <tr> <td>Invert Level (m)</td> <td>16.850</td> <td></td> <td></td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.05400	Diameter/Width (m)	13.2	Safety Factor	1.5	Length (m)	13.2	Porosity	0.30	Cap Volume Depth (m)	0.150	Invert Level (m)	16.850		
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Summer</td><td>12.185</td><td>0.0</td><td>274</td></tr><tr><td>600 min Summer</td><td>10.272</td><td>0.0</td><td>330</td></tr><tr><td>720 min Summer</td><td>8.930</td><td>0.0</td><td>384</td></tr><tr><td>960 min Summer</td><td>7.152</td><td>0.0</td><td>494</td></tr><tr><td>1440 min Summer</td><td>5.221</td><td>0.0</td><td>736</td></tr><tr><td>2160 min Summer</td><td>3.803</td><td>0.0</td><td>1100</td></tr><tr><td>2880 min Summer</td><td>3.033</td><td>0.0</td><td>1468</td></tr><tr><td>4320 min Summer</td><td>2.201</td><td>0.0</td><td>2176</td></tr><tr><td>5760 min Summer</td><td>1.751</td><td>0.0</td><td>2872</td></tr><tr><td>7200 min Summer</td><td>1.466</td><td>0.0</td><td>3600</td></tr><tr><td>8640 min Summer</td><td>1.270</td><td>0.0</td><td>4352</td></tr><tr><td>10080 min Summer</td><td>1.124</td><td>0.0</td><td>5008</td></tr><tr><td>15 min Winter</td><td>129.682</td><td>0.0</td><td>19</td></tr></tbody></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max 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Summer	87.133	0.0	31	60 min Summer	55.837	0.0	50	120 min Summer	34.509	0.0	84	180 min Summer	25.637	0.0	118	240 min Summer	20.604	0.0	152	360 min Summer	15.169	0.0	214	480 min Summer	12.185	0.0	274	600 min Summer	10.272	0.0	330	720 min Summer	8.930	0.0	384	960 min Summer	7.152	0.0	494	1440 min Summer	5.221	0.0	736	2160 min Summer	3.803	0.0	1100	2880 min Summer	3.033	0.0	1468	4320 min Summer	2.201	0.0	2176	5760 min Summer	1.751	0.0	2872	7200 min Summer	1.466	0.0	3600	8640 min Summer	1.270	0.0	4352	10080 min Summer	1.124	0.0	5008	15 min Winter	129.682	0.0	19
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11 Tungsten Building George Street Fishersgate BN41 1RA		The Laurels Dappers Lane, Angmering Catchment D			
Date 22/05/2020 File CATCHMENT D.SRCX		Designed by SRD Checked by			
Innovyze		Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	17.268	0.278		3.0	14.1 Flood Risk
60 min Winter	17.293	0.303		3.0	15.4 Flood Risk
120 min Winter	17.277	0.287		3.0	14.5 Flood Risk
180 min Winter	17.238	0.248		3.0	12.6 Flood Risk
240 min Winter	17.196	0.206		3.0	10.5 Flood Risk
360 min Winter	17.123	0.133		3.0	6.7 Flood Risk
480 min Winter	17.068	0.078		3.0	3.9 O K
600 min Winter	17.040	0.050		3.0	2.5 O K
720 min Winter	17.033	0.043		2.6	2.2 O K
960 min Winter	17.025	0.035		2.1	1.8 O K
1440 min Winter	17.016	0.026		1.6	1.3 O K
2160 min Winter	17.009	0.019		1.1	0.9 O K
2880 min Winter	17.005	0.015		0.9	0.8 O K
4320 min Winter	17.001	0.011		0.7	0.6 O K
5760 min Winter	16.999	0.009		0.5	0.4 O K
7200 min Winter	16.997	0.007		0.4	0.4 O K
8640 min Winter	16.996	0.006		0.4	0.3 O K
10080 min Winter	16.996	0.006		0.3	0.3 O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	
30 min Winter		87.133	0.0	32	
60 min Winter		55.837	0.0	54	
120 min Winter		34.509	0.0	92	
180 min Winter		25.637	0.0	128	
240 min Winter		20.604	0.0	162	
360 min Winter		15.169	0.0	226	
480 min Winter		12.185	0.0	278	
600 min Winter		10.272	0.0	316	
720 min Winter		8.930	0.0	378	
960 min Winter		7.152	0.0	492	
1440 min Winter		5.221	0.0	736	
2160 min Winter		3.803	0.0	1104	
2880 min Winter		3.033	0.0	1500	
4320 min Winter		2.201	0.0	2176	
5760 min Winter		1.751	0.0	2912	
7200 min Winter		1.466	0.0	3736	
8640 min Winter		1.270	0.0	4408	
10080 min Winter		1.124	0.0	5064	
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Innovyze Source Control 2020.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.051

Time (mins)	Area (ha)	Time (mins)	Area (ha)
From: 0	To: 4 0.025	From: 4	To: 8 0.026

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Innovyze Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 17.400

Infiltration Blanket Structure

Infiltration Coefficient Base (m/hr)	0.09720	Diameter/Width (m)	13.0
Safety Factor	1.5	Length (m)	13.0
Porosity	0.30	Cap Volume Depth (m)	0.310
Invert Level (m)	16.990		

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Risk</td></tr><tr><td>480 min Summer</td><td>17.843</td><td>0.063</td><td>6.3</td><td>6.9</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>17.830</td><td>0.050</td><td>6.2</td><td>5.4</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>17.824</td><td>0.044</td><td>5.5</td><td>4.8</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>17.816</td><td>0.036</td><td>4.5</td><td>3.9</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>17.807</td><td>0.027</td><td>3.4</td><td>3.0</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>17.800</td><td>0.020</td><td>2.5</td><td>2.2</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>17.796</td><td>0.016</td><td>2.0</td><td>1.7</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>17.792</td><td>0.012</td><td>1.5</td><td>1.3</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>17.790</td><td>0.010</td><td>1.2</td><td>1.0</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>17.788</td><td>0.008</td><td>1.0</td><td>0.9</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>17.787</td><td>0.007</td><td>0.9</td><td>0.8</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>17.786</td><td>0.006</td><td>0.8</td><td>0.7</td><td>O K</td></tr><tr><td>15 min Winter</td><td>17.940</td><td>0.160</td><td>6.3</td><td>17.3</td><td>Flood Risk</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>129.682</td><td>0.0</td><td>18</td></tr><tr><td>30 min Summer</td><td>87.133</td><td>0.0</td><td>30</td></tr><tr><td>60 min Summer</td><td>55.837</td><td>0.0</td><td>46</td></tr><tr><td>120 min Summer</td><td>34.509</td><td>0.0</td><td>82</td></tr><tr><td>180 min Summer</td><td>25.637</td><td>0.0</td><td>114</td></tr><tr><td>240 min Summer</td><td>20.604</td><td>0.0</td><td>146</td></tr><tr><td>360 min Summer</td><td>15.169</td><td>0.0</td><td>206</td></tr><tr><td>480 min Summer</td><td>12.185</td><td>0.0</td><td>260</td></tr><tr><td>600 min Summer</td><td>10.272</td><td>0.0</td><td>314</td></tr><tr><td>720 min Summer</td><td>8.930</td><td>0.0</td><td>374</td></tr><tr><td>960 min Summer</td><td>7.152</td><td>0.0</td><td>494</td></tr><tr><td>1440 min Summer</td><td>5.221</td><td>0.0</td><td>736</td></tr><tr><td>2160 min Summer</td><td>3.803</td><td>0.0</td><td>1100</td></tr><tr><td>2880 min Summer</td><td>3.033</td><td>0.0</td><td>1444</td></tr><tr><td>4320 min Summer</td><td>2.201</td><td>0.0</td><td>2200</td></tr><tr><td>5760 min Summer</td><td>1.751</td><td>0.0</td><td>2904</td></tr><tr><td>7200 min Summer</td><td>1.466</td><td>0.0</td><td>3624</td></tr><tr><td>8640 min Summer</td><td>1.270</td><td>0.0</td><td>4392</td></tr><tr><td>10080 min Summer</td><td>1.124</td><td>0.0</td><td>5048</td></tr><tr><td>15 min Winter</td><td>129.682</td><td>0.0</td><td>19</td></tr></tbody></table>							Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	17.919	0.139	6.3	15.1	Flood Risk	30 min Summer	17.951	0.171	6.3	18.5	Flood Risk	60 min Summer	17.962	0.182	6.3	19.7	Flood Risk	120 min Summer	17.950	0.170	6.3	18.4	Flood Risk	180 min Summer	17.928	0.148	6.3	16.0	Flood Risk	240 min Summer	17.905	0.125	6.3	13.5	Flood Risk	360 min Summer	17.868	0.088	6.3	9.6	Flood Risk	480 min Summer	17.843	0.063	6.3	6.9	Flood Risk	600 min Summer	17.830	0.050	6.2	5.4	Flood Risk	720 min Summer	17.824	0.044	5.5	4.8	Flood Risk	960 min Summer	17.816	0.036	4.5	3.9	Flood Risk	1440 min Summer	17.807	0.027	3.4	3.0	Flood Risk	2160 min Summer	17.800	0.020	2.5	2.2	Flood Risk	2880 min Summer	17.796	0.016	2.0	1.7	O K	4320 min Summer	17.792	0.012	1.5	1.3	O K	5760 min Summer	17.790	0.010	1.2	1.0	O K	7200 min Summer	17.788	0.008	1.0	0.9	O K	8640 min Summer	17.787	0.007	0.9	0.8	O K	10080 min Summer	17.786	0.006	0.8	0.7	O K	15 min Winter	17.940	0.160	6.3	17.3	Flood Risk	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	129.682	0.0	18	30 min Summer	87.133	0.0	30	60 min Summer	55.837	0.0	46	120 min Summer	34.509	0.0	82	180 min Summer	25.637	0.0	114	240 min Summer	20.604	0.0	146	360 min Summer	15.169	0.0	206	480 min Summer	12.185	0.0	260	600 min Summer	10.272	0.0	314	720 min Summer	8.930	0.0	374	960 min Summer	7.152	0.0	494	1440 min Summer	5.221	0.0	736	2160 min Summer	3.803	0.0	1100	2880 min Summer	3.033	0.0	1444	4320 min Summer	2.201	0.0	2200	5760 min Summer	1.751	0.0	2904	7200 min Summer	1.466	0.0	3624	8640 min Summer	1.270	0.0	4392	10080 min Summer	1.124	0.0	5048	15 min Winter	129.682	0.0	19
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11 Tungsten Building George Street Fishersgate BN41 1RA		The Laurels Dappers Lane, Angmering Catchment E			
Date 22/05/2020 File CATCHMENT E.SRCX		Designed by SRD Checked by			
Innovyze		Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	17.977	0.197	6.3	21.3	Flood Risk
60 min Winter	17.988	0.208	6.3	22.5	Flood Risk
120 min Winter	17.965	0.185	6.3	20.1	Flood Risk
180 min Winter	17.929	0.149	6.3	16.2	Flood Risk
240 min Winter	17.894	0.114	6.3	12.4	Flood Risk
360 min Winter	17.843	0.063	6.3	6.8	Flood Risk
480 min Winter	17.826	0.046	5.7	4.9	Flood Risk
600 min Winter	17.819	0.039	4.8	4.2	Flood Risk
720 min Winter	17.814	0.034	4.3	3.7	Flood Risk
960 min Winter	17.807	0.027	3.4	3.0	Flood Risk
1440 min Winter	17.800	0.020	2.5	2.2	Flood Risk
2160 min Winter	17.795	0.015	1.8	1.6	O K
2880 min Winter	17.792	0.012	1.5	1.3	O K
4320 min Winter	17.789	0.009	1.1	0.9	O K
5760 min Winter	17.787	0.007	0.8	0.7	O K
7200 min Winter	17.786	0.006	0.7	0.6	O K
8640 min Winter	17.785	0.005	0.7	0.5	O K
10080 min Winter	17.785	0.005	0.6	0.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	87.133	0.0	31		
60 min Winter	55.837	0.0	50		
120 min Winter	34.509	0.0	88		
180 min Winter	25.637	0.0	122		
240 min Winter	20.604	0.0	154		
360 min Winter	15.169	0.0	208		
480 min Winter	12.185	0.0	256		
600 min Winter	10.272	0.0	316		
720 min Winter	8.930	0.0	376		
960 min Winter	7.152	0.0	500		
1440 min Winter	5.221	0.0	738		
2160 min Winter	3.803	0.0	1096		
2880 min Winter	3.033	0.0	1420		
4320 min Winter	2.201	0.0	2220		
5760 min Winter	1.751	0.0	2992		
7200 min Winter	1.466	0.0	3632		
8640 min Winter	1.270	0.0	4432		
10080 min Winter	1.124	0.0	5032		
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Date 22/05/2020 File CATCHMENT E.SRCX	Designed by SRD Checked by	
Innovyze	Source Control 2020.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.082

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.041	4	8	0.041

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Date 22/05/2020 File CATCHMENT E.SRCX	Designed by SRD Checked by	
Innovyze Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 18.100

Infiltration Blanket Structure

Infiltration Coefficient Base (m/hr)	0.09360	Diameter/Width (m)	19.0
Safety Factor	1.5	Length (m)	19.0
Porosity	0.30	Cap Volume Depth (m)	0.220
Invert Level (m)	17.780		

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<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 25 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>18.138</td><td>0.118</td><td>4.0</td><td>8.0</td><td>Flood Risk</td></tr><tr><td>30 min Summer</td><td>18.162</td><td>0.142</td><td>4.0</td><td>9.7</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>18.171</td><td>0.151</td><td>4.0</td><td>10.3</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>18.157</td><td>0.137</td><td>4.0</td><td>9.4</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>18.136</td><td>0.116</td><td>4.0</td><td>7.9</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>18.116</td><td>0.096</td><td>4.0</td><td>6.5</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>18.086</td><td>0.066</td><td>4.0</td><td>4.5</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>18.070</td><td>0.050</td><td>3.9</td><td>3.4</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>18.063</td><td>0.043</td><td>3.4</td><td>3.0</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>18.058</td><td>0.038</td><td>3.0</td><td>2.6</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>18.052</td><td>0.032</td><td>2.5</td><td>2.2</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>18.044</td><td>0.024</td><td>1.9</td><td>1.6</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>18.038</td><td>0.018</td><td>1.4</td><td>1.2</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>18.034</td><td>0.014</td><td>1.1</td><td>1.0</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>18.030</td><td>0.010</td><td>0.8</td><td>0.7</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>18.028</td><td>0.008</td><td>0.7</td><td>0.6</td><td>Flood Risk</td></tr><tr><td>7200 min 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Summer</td><td>15.169</td><td>0.0</td><td>200</td></tr><tr><td>480 min Summer</td><td>12.185</td><td>0.0</td><td>254</td></tr><tr><td>600 min Summer</td><td>10.272</td><td>0.0</td><td>314</td></tr><tr><td>720 min Summer</td><td>8.930</td><td>0.0</td><td>374</td></tr><tr><td>960 min Summer</td><td>7.152</td><td>0.0</td><td>494</td></tr><tr><td>1440 min Summer</td><td>5.221</td><td>0.0</td><td>736</td></tr><tr><td>2160 min Summer</td><td>3.803</td><td>0.0</td><td>1100</td></tr><tr><td>2880 min Summer</td><td>3.033</td><td>0.0</td><td>1460</td></tr><tr><td>4320 min Summer</td><td>2.201</td><td>0.0</td><td>2160</td></tr><tr><td>5760 min Summer</td><td>1.751</td><td>0.0</td><td>2880</td></tr><tr><td>7200 min Summer</td><td>1.466</td><td>0.0</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.270</td><td>0.0</td><td>4288</td></tr><tr><td>10080 min Summer</td><td>1.124</td><td>0.0</td><td>5032</td></tr><tr><td>15 min 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11 Tungsten Building George Street Fishersgate BN41 1RA		The Laurels Dappers Lane, Angmering Catchment F			
Date 22/05/2020 File CATCHMENT F.SRCX		Designed by SRD Checked by			
Innovyze		Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	18.184	0.164	4.0	11.2	Flood Risk
60 min Winter	18.190	0.170	4.0	11.7	Flood Risk
120 min Winter	18.165	0.145	4.0	9.9	Flood Risk
180 min Winter	18.131	0.111	4.0	7.6	Flood Risk
240 min Winter	18.101	0.081	4.0	5.5	Flood Risk
360 min Winter	18.068	0.048	3.8	3.3	Flood Risk
480 min Winter	18.060	0.040	3.1	2.7	Flood Risk
600 min Winter	18.054	0.034	2.7	2.3	Flood Risk
720 min Winter	18.050	0.030	2.4	2.0	Flood Risk
960 min Winter	18.044	0.024	1.9	1.6	Flood Risk
1440 min Winter	18.038	0.018	1.4	1.2	Flood Risk
2160 min Winter	18.033	0.013	1.0	0.9	Flood Risk
2880 min Winter	18.030	0.010	0.8	0.7	Flood Risk
4320 min Winter	18.028	0.008	0.6	0.5	Flood Risk
5760 min Winter	18.026	0.006	0.5	0.4	Flood Risk
7200 min Winter	18.025	0.005	0.4	0.3	Flood Risk
8640 min Winter	18.024	0.004	0.3	0.3	Flood Risk
10080 min Winter	18.024	0.004	0.3	0.3	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	87.133	0.0	30		
60 min Winter	55.837	0.0	50		
120 min Winter	34.509	0.0	86		
180 min Winter	25.637	0.0	118		
240 min Winter	20.604	0.0	148		
360 min Winter	15.169	0.0	196		
480 min Winter	12.185	0.0	256		
600 min Winter	10.272	0.0	316		
720 min Winter	8.930	0.0	376		
960 min Winter	7.152	0.0	496		
1440 min Winter	5.221	0.0	736		
2160 min Winter	3.803	0.0	1100		
2880 min Winter	3.033	0.0	1456		
4320 min Winter	2.201	0.0	2236		
5760 min Winter	1.751	0.0	2848		
7200 min Winter	1.466	0.0	3576		
8640 min Winter	1.270	0.0	4408		
10080 min Winter	1.124	0.0	5144		
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11 Tungsten Building George Street Fishersgate BN41 1RA	The Laurels Dappers Lane, Angmering Catchment F	
Date 22/05/2020 File CATCHMENT F.SRCX	Designed by SRD Checked by	
Innovyze Source Control 2020.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.045

Time (mins)	Area (ha)	Time (mins)	Area (ha)
From: 0	To: 4 0.022	From: 4	To: 8 0.023

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The Civil Engineering Practice		Page 4																
11 Tungsten Building George Street Fishersgate BN41 1RA	The Laurels Dappers Lane, Angmering Catchment F																	
Date 22/05/2020 File CATCHMENT F.SRCX	Designed by SRD Checked by																	
Innovyze Source Control 2020.1																		
<u>Model Details</u> Storage is Online Cover Level (m) 18.300 <u>Infiltration Blanket Structure</u> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.09360</td> <td>Diameter/Width (m)</td> <td>15.1</td> </tr> <tr> <td>Safety Factor</td> <td>1.5</td> <td>Length (m)</td> <td>15.1</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Cap Volume Depth (m)</td> <td>0.180</td> </tr> <tr> <td>Invert Level (m)</td> <td>18.020</td> <td></td> <td></td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.09360	Diameter/Width (m)	15.1	Safety Factor	1.5	Length (m)	15.1	Porosity	0.30	Cap Volume Depth (m)	0.180	Invert Level (m)	18.020		
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Invert Level (m)	18.020																	
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Table 4.1: Generalised Ground Profile

Depth (mbgl)	Encountered Material
0.0 – 0.2 / >0.8	Made Ground: Black clayey gravelly sand / brown and dark brown clayey slightly gravelly to gravelly sand with low to medium cobble content / dark brown slightly sandy slightly gravelly clayey silt (eastern site area). Dark brown slightly clayey sandy gravelly cobbles and boulders (TP02) and black clayey gravelly sand over brown sandy gravel and cobble (TP04). The gravel, cobble and boulder comprised brick, concrete, flint, chalk tarmac. Locally rare tile, plastic, wood, clay pipe, metal, textile and black carbonaceous fragments.
0.0 – 0.15/0.2	Topsoil (WS01, TP03 and TP05): Black slightly sandy silty clay with many roots.
0.2 / 0.8 – >3.0 / 4.2 (0.15/0.7 – >0.65/1.2)	Superficial Head Deposits: Firm medium strength (however locally soft to firm low to medium strength) brown slightly gravelly to gravelly slightly sandy silty clay.
(0.7/1.2 – >3.0/4.2)	Medium dense to dense brown slightly clayey to clayey sandy gravel of flint.
3.2/4.2 – >5.0	London Clay Formation: Firm to stiff medium to high strength brown, becoming grey with depth, slightly silty clay

4.3 Groundwater and Perched Water

- 4.3.1 Groundwater entries were recorded at WS05 at 2.95mbgl and WS01 at approximately 4.0mbgl, rising to 3.1mbgl upon completion.

5.7 Drainage

- 5.7.1 5No. soakage tests were undertaken in general accordance with the methodology outlined in BRE 365 across the site with testing undertaken in both the cohesive and granular superficial deposits.
- 5.7.2 The results are presented in full within Appendix C and summarised below in Table 5.2.

Table 5.2: Soakage Test Results

Soakage Test Location	Infiltration Rate (m/s)	Comments
TP01/SA01	2.6×10^{-5}	Single fill achieved (access restrictions following the first filling)
TP02/SA02	2.7×10^{-5} to 3.6×10^{-5}	Two fillings achieved within available time (access restrictions following the second filling)
TP03/SA03	1.5×10^{-5}	Infiltration rate based on first filling only. Drop in water level during second filling: ~14cm in 53min
TP04/SA04	6.4×10^{-3}	Single fill achieved due to fast drainage.
TP05/SA05	2.5×10^{-3}	Single fill achieved due to fast drainage.

- 5.7.3 Based on the test data, infiltration rates of 1.5×10^{-5} m/s and 6.4×10^{-3} m/s were recorded within the superficial deposits at the test locations. However, it is noted that only a single fill was completed within the more cohesive superficial deposits at TP01/SA01 and two fillings at TP02 due to the access restrictions following these tests. It is also noted that insufficient time was available to complete a second filling at TP03/SA03, where no drop in water level was recorded after 16 minutes to the recorded 53 minutes.
- 5.7.4 A single fill was completed within the granular superficial deposits at TP04/SA04 and TP05/SA05 due to the fast infiltration of water. At these test locations water was added to the excavations over 7minute and 18minute periods, but failed to raise the water level significantly. Based on these test locations, infiltration rates in excess of 2.5×10^{-3} and 6.4×10^{-3} m/s were recorded.
- 5.7.5 Therefore, based on the testing undertaken to-date, the superficial deposits, particularly the more granular ground materials encountered at the site are considered likely to provide a suitable drainage medium. However, it is recommended that a drainage engineer be consulted to determine whether suitable and sufficient attenuation can be provided within the proposed scheme such that a sustainable drainage system can be confirmed to be viable.
- 5.7.6 The requirements of the Environment Agency would need to be incorporated into any design which drains into an aquifer.
- 5.7.7 It should be noted that CIRIA Report 156 (1996) "*Infiltration drainage – Manual of good practice*" suggests that infiltration systems should normally be built at least 6m away from the nearest foundation of any buildings; however, CIRIA C697 (2007) "*SUDS Manual*", while referring to Report 156 for geotechnical issues relating to the siting of soakaways, indicates a minimum distance of 5m from foundations.

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TP04/SA04	6.4×10^{-3}	Single fill achieved due to fast drainage.
TP05/SA05	2.5×10^{-3}	Single fill achieved due to fast drainage.

- 5.7.3 Based on the test data, infiltration rates of 1.5×10^{-5} m/s and 6.4×10^{-3} m/s were recorded within the superficial deposits at the test locations. However, it is noted that only a single fill was completed within the more cohesive superficial deposits at TP01/SA01 and two fillings at TP02 due to the access restrictions following these tests. It is also noted that insufficient time was available to complete a second filling at TP03/SA03, where no drop in water level was recorded after 16 minutes to the recorded 53 minutes.
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- 5.7.6 The requirements of the Environment Agency would need to be incorporated into any design which drains into an aquifer.
- 5.7.7 It should be noted that CIRIA Report 156 (1996) "*Infiltration drainage – Manual of good practice*" suggests that infiltration systems should normally be built at least 6m away from the nearest foundation of any buildings; however, CIRIA C697 (2007) "*SUDS Manual*", while referring to Report 156 for geotechnical issues relating to the siting of soakaways, indicates a minimum distance of 5m from foundations.

6.3 Ground EngineeringPreliminary Foundation Design Recommendations

- 6.3.1 It is considered that conventional foundations may be suitable for the proposed residential properties, founding within the competent (medium dense to dense) granular deposits, encountered from depths of between 0.7mbgl and 1.2mbgl.
- 6.3.2 The more cohesive, shallow Head Deposits have been recorded to be non-shrinkable soils. Therefore, a minimum founding depth of 0.75mbgl would be recommended following the NHBC (2020) guidance.
- 6.3.3 An allowable bearing resistance of 125kN/m² is considered appropriate when founding within the medium dense to dense granular materials. Care should be taken to ensure foundations are formed within similar materials to minimise the potential for differential settlement.
- 6.3.4 Given that the natural superficial deposits encountered were recorded to be non-plastic, the provision of voids below ground beams and against the side of foundations / ground beams is not considered to be required.

Ground Floor Slabs

- 6.3.5 Given the recorded depth of made ground on site (i.e. >600mm), a suspended floor would likely be required within the design.
- 6.3.6 Where made ground is less than 600mm depth and founding depths are less than 1.5m, a ground bearing slab may be utilised in accordance with NHBC (2020) recommendations.

Excavations

- 6.3.7 Excavation of the materials immediately beneath the site should be achievable using conventional excavation plant.
- 6.3.8 Based upon site observations, significant dewatering works are unlikely to be required during excavation and formation works.

Drainage

- 6.3.9 Infiltration rates of 1.5 x 10⁻⁵ m/s and 6.4 x 10⁻³ m/s were recorded within the superficial deposits, with higher infiltration rates (in the order of 10⁻³ m/s) being recorded for the granular superficial deposits encountered at depth and lower rates (in the order of 10⁻⁵ m/s) for the near surface, more cohesive superficial deposits.
- 6.3.10 It is also noted that ASI recorded infiltration rates between 4.2 x 10⁻⁶ m/s and 2.9 x 10⁻³ m/s.
- 6.3.11 Therefore, based on the testing undertaken to-date, the superficial deposits, particularly the more granular ground materials encountered at the site are considered likely to provide a suitable drainage medium. However, it is recommended that a drainage engineer be consulted to determine whether suitable and sufficient attenuation can be provided within the proposed scheme such that a sustainable drainage system can be confirmed to be viable.
- 6.3.12 It should be noted that CIRIA Report 156 (1996) "*Infiltration drainage – Manual of good practice*" suggests that infiltration systems should normally be built at least 6m away from the nearest foundation of any buildings; however, CIRIA C697 (2007)

"*SUDS Manual*", while referring to Report 156 for geotechnical issues relating to the siting of soakaways, indicates a minimum distance of 5m from foundations.

- 6.3.13 In addition, the requirements of the Environment Agency and Building Regulations would need to be incorporated into any design which drains into an aquifer.

Pavement Design

- 6.3.14 Based upon the data obtained to-date, a CBR value of 3% is recommended for preliminary design purposes where road formation is proven to be within natural ground deposits.

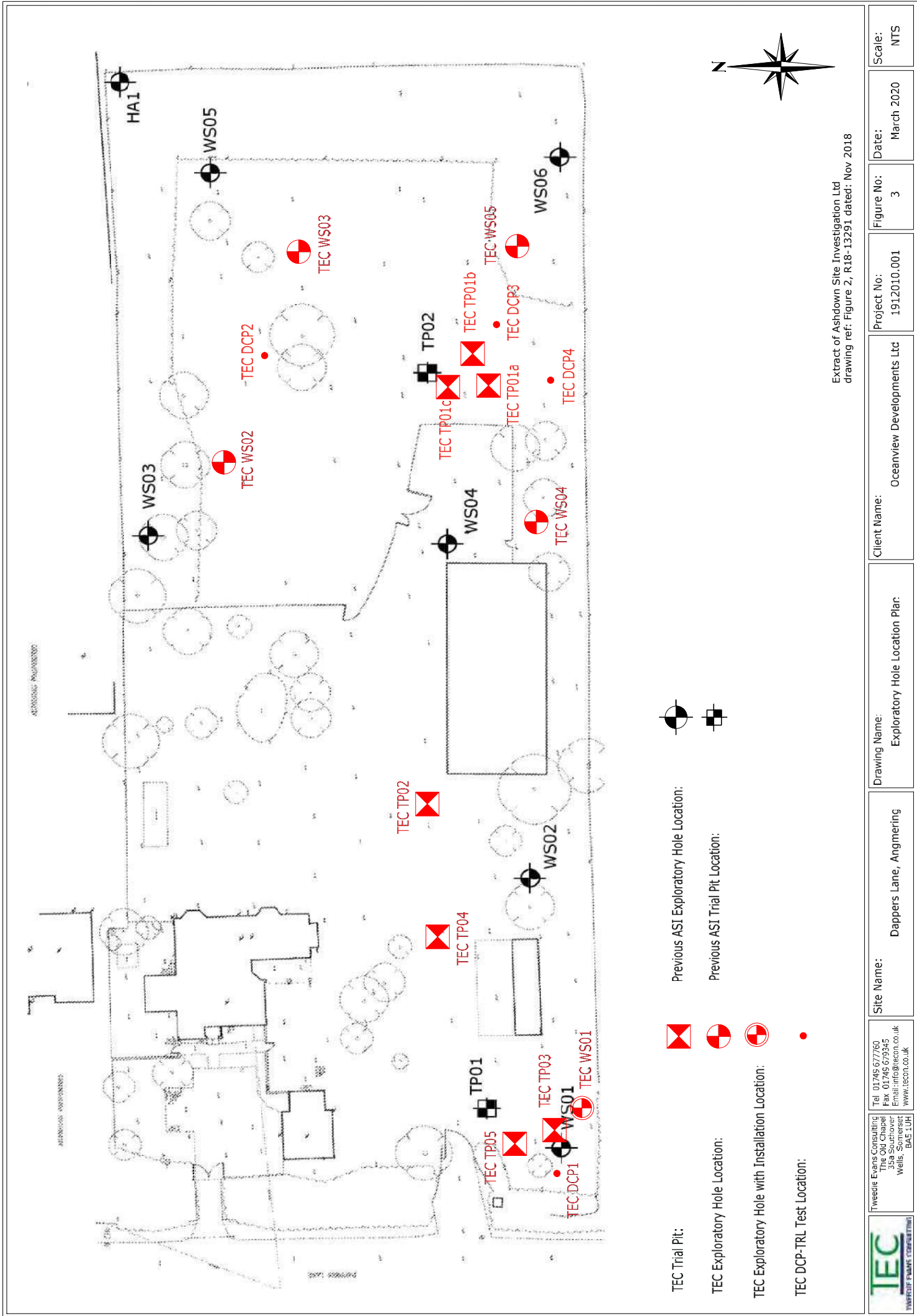
- 6.3.15 Notwithstanding this, where significant made ground is encountered, primarily in the eastern site area (greater than 600mm), a CBR value of <2.5% would be recommended for preliminary design purposes where road formation is proven to be within potential made ground deposits owing to the inherent variability of this material.

- 6.3.16 It should be noted that all road formations should be proof rolled and soft spots removed and replaced with selected granular fill and, where adoptable, a pavement of sufficient thickness to prevent the penetration of frost should be employed.

Protection of Buried Concrete

- 6.3.17 The results of the water soluble sulphate and pH testing carried out for the natural ground materials indicate that the materials encountered on site generally yield an ACEC of AC-1 requiring a Design Sulphate Class of DS-1.

TEC



 TWEEDIE EVANS CONSULTING				Borehole Log				Borehole No. WS01	
Project Name: Dappers Lane, Angmering				Project No. 1912010.001		Co-ords: -		Sheet 1 of 1 Hole Type WS	
Location: Angmering				Level: mbgl		Scale 1:33			
Client: Oceanview Developments Ltd				Dates: 24/01/2020 - 24/01/2020		Logged By			

Well	Water Strikes	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results	Information					
									TOPSOIL - Black slightly sandy silty CLAY with many roots.	
		1.00	GT						Firm medium strength brown slightly gravelly slightly sandy silty CLAY. Gravel of angular to sub-angular medium to coarse flint. Rare roots noted.	1
		1.20		N=48 (19 for 0mm/48 for 0mm)		1.20			HSV - 75, 60, 75 kPa	
		2.00	GT						Dense brown slightly clayey sandy GRAVEL of rounded to angular flint.	2
		2.00		N=34 (14 for 0mm/34 for 0mm)					...Clay content decreasing with depth.	
		3.00		N=31 (18 for 0mm/31 for 0mm)						3
		4.00		N=28 (11 for 0mm/28 for 0mm)		4.10			Water entry at approx. 4mbgl. Stiff high strength brown slightly gravelly slightly silty CLAY. Gravel of fine chert.	4
		5.00		N=12 (4 for 0mm/12 for 0mm)		5.00			HSV - 90, 85, 90 kPa	
									End of borehole at 5.0 m	5
										6

Remarks
 Hand dug to 1.2mbgl. Standing water at 3.1mbgl upon completion. Borehole collapsed to 4.06mbgl prior to installation. Terminated at depth.



 TWEEDIE EVANS CONSULTING				Borehole Log				Borehole No. WS02	
Project Name: Dappers Lane, Angmering				Project No. 1912010.001		Co-ords: -		Sheet 1 of 1 Hole Type WS	
Location: Angmering				Level: mbgl		Scale 1:33		Logged By	
Client: Oceanview Developments Ltd				Dates: 24/01/2020 - 24/01/2020					

Well	Water Strikes	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results	Information					
									MADE GROUND - Dark brown slightly sandy slightly gravelly clayey silt. Fragments of flint, chalk and plastic.	
		0.70	GT			0.50			Firm slightly sandy gravelly silty CLAY. Gravel of sub-rounded to angular flint.	
		1.00 1.00	GT	N=36 (12 for 0mm/36 for 0mm)		1.00			Dense brown slightly clayey sandy GRAVEL of rounded to angular flint.	1
		2.00		N=32 (12 for 0mm/32 for 0mm)					...Becoming clayey sandy gravel at 1.9mbgl.	2
		3.00		N=27 (9 for 0mm/27 for 0mm)		3.20			Stiff high strength brown slightly silty CLAY.	3
		4.00		N=18 (5 for 0mm/18 for 0mm)					...Becoming grey at 4.5mbgl.	4
		5.00		N=16 (4 for 0mm/16 for 0mm)		5.00			HSV - 87.5, 100, 87.5 kPa	5
									End of borehole at 5.0 m	6

Remarks
 No groundwater encountered.
 Terminated at depth.



 TWEEDIE EVANS CONSULTING				Borehole Log				Borehole No. WS03	
Project Name: Dappers Lane, Angmering				Project No. 1912010.001		Co-ords: -		Sheet 1 of 1 Hole Type WS	
Location: Angmering				Level: mbgl		Scale 1:33			
Client: Oceanview Developments Ltd				Dates: 24/01/2020 - 24/01/2020		Logged By			

Well	Water Strikes	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results	Information					
		1.00	GT	N=42 (9 for 0mm/42 for 0mm)		0.40		 MADE GROUND - Dark brown slightly sandy slightly gravelly clayey silt. Fragments of flint, chalk and plastic.		
		1.00				0.70	 Firm slightly sandy gravelly silty CLAY. Gravel of sub-angular to sub-rounded flint.			
		2.00		N=40 (15 for 0mm/40 for 0mm)			 Dense brown clayey sandy GRAVEL of sub-angular to angular flint.	1		
		3.00		N=17 (11 for 0mm/17 for 0mm)			 ...Recovered as slightly clayey 1.3-2.0mbgl.	2		
						3.20	 Stiff brown slightly gravelly slightly sandy silty CLAY.	3		
						3.40	End of borehole at 3.0 m	4		
								5		
								6		

Remarks
 No groundwater encountered.
 Terminated at depth.



						Borehole Log				Borehole No. WS04	
Project Name: Dappers Lane, Angmering						Project No. 1912010.001		Co-ords: -		Sheet 1 of 1	
Location: Angmering						Level: mbgl		Scale 1:33		Hole Type WS	
Client: Oceanview Developments Ltd						Dates: 24/01/2020 - 24/01/2020		Logged By			
Well	Water Strikes	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results	Information						
									MADE GROUND - Dark brown clayey sandy silt. Many wood fragments and rare flint gravel.		
		0.40							Firm medium strength slightly gravelly slightly sandy silty CLAY. Gravel of flint.		
		0.80	GT						HSV - 55, 45, 55 kPa		
		1.00		N=39 (9 for 0mm/39 for 0mm)		1.00			Medium dense to dense brown clayey sandy GRAVEL of rounded to angular flint. ...slightly clayey between 1.2-2.1mbgl.	1	
		2.00		N=38 (10 for 0mm/38 for 0mm)						2	
		3.00		N=24 (8 for 0mm/24 for 0mm)						3	
		4.00		N=28 (9 for 0mm/28 for 0mm)		4.20			Water entry at approx. 4.1mbgl.	4	
		5.00		N=13 (4 for 0mm/13 for 0mm)		5.00			Firm to stiff medium strength brown slightly silty CLAY. HSV - 80, 70, 80 kPa	5	
									End of borehole at 5.0 m	6	

Remarks
 Standing water at 3.7mbgl upon completion.
 Terminated at depth.

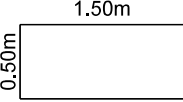
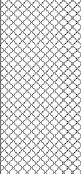


 TWEEDIE EVANS CONSULTING				Borehole Log				Borehole No. WS05	
Project Name: Dappers Lane, Angmering				Project No. 1912010.001		Co-ords: -		Sheet 1 of 1 Hole Type WS	
Location: Angmering				Level: mbgl		Scale 1:33			
Client: Oceanview Developments Ltd				Dates: 24/01/2020 - 24/01/2020		Logged By			

Well	Water Strikes	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results	Information					
									TOPSOIL - Black slightly sandy silty CLAY with many roots. Soft to firm low to medium strength brown slightly silty CLAY.	
		0.70	GT			0.20				
		1.00		N=60 (19 for 0mm/60 for 0mm)		0.80			Medium dense to dense brown clayey sandy GRAVEL of rounded to angular flint. <i>...Recovered as slightly clayey 1.1-1.5mbgl.</i>	1
		2.00		N=30 (11 for 0mm/30 for 0mm)						2
		3.00		N=21 (8 for 0mm/21 for 0mm)		3.00			Water entry at 2.95mbgl. End of borehole at 3.0 m	3
										4
										5
										6

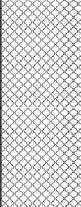
Remarks
 Wet at base.
 Terminated at depth.



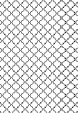
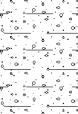
 TWEEDIE EVANS CONSULTING					Trial Pit Log					Trialpit No TP01a	
Project Name: Dappers Lane, Angmering					Project No. 1912010.001		Co-ords: - Level: mbgl			Sheet 1 of 1 Date 24/01/2020	
Location: Angmering					Dimensions: Inclination: ° Orientation: ° Depth: 0.8m					Scale 1:25	
Client: Oceanview Developments Ltd										Logged ML	
Water Strike	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results	Information							
					0.20			MADE GROUND - Black clayey gravelly sand. Gravel of brick, flint and chalk. Many roots noted.			
					0.80			MADE GROUND - Brown cobbly locally clayey sand. Gravel and cobble of brick, flint and chalk. Rare metal fragments noted.			
								End of pit at 0.8 m 1 2 3 4 5			
Remarks: Terminated due to presence of made ground at 0.8mbgl (TEC instructed to undertake soakage testing at 0.6mbgl).											
Stability: Good											

 TWEEDIE EVANS CONSULTING					Trial Pit Log			Trialpit No TP01c	
Project Name: Dappers Lane, Angmering					Project No. 1912010.001		Co-ords: - Level: mbgl		Sheet 1 of 1 Date 24/01/2020
Location: Angmering					Dimensions: Inclination: °		1.55m 		Scale 1:25
Client: Oceanview Developments Ltd					Orientation: ° Depth: 1.2m		Logged ML		
Water Strike	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results	Information					
					0.20			MADE GROUND - Dark brown clayey slightly gravelly sand. Gravel of brick and flint, Locally black organic fragments.	
					0.80			MADE GROUND - Dark brown locally light brown clayey gravelly sand with low cobble content. Gravel and cobble of brick, flint and tile. Rare plastic fragments and many roots noted.	
					1.20			(Medium dense) brown clayey slightly sandy GRAVEL of sub-angular to angular flint.	
							End of pit at 1.2 m		
1 2 3 4 5									
Remarks: Densities based on visual observations only. Terminated to allow for soakage testing to be undertaken.									
Stability: Good									



 TWEEDIE EVANS CONSULTING					Trial Pit Log					Trialpit No TP02	
Project Name: Dappers Lane, Angmering					Project No. 1912010.001		Co-ords: - Level: mbgl			Date 24/01/2020	
Location: Angmering					Dimensions: Inclination: °			1.40m		Scale 1:25	
Client: Oceanview Developments Ltd					Orientation: °			0.50m		Logged ML	
Water Strike	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results	Information							
					0.70			MADE GROUND - Dark brown slightly clayey sandy gravelly cobbles and boulders of concrete. Gravel and cobble of brick and flint. Rare fragments of clay pipe noted.			
					0.94						
								End of pit at 0.9 m			
								1			
								2			
								3			
								4			
								5			
Remarks: Terminated to allow for soakage testing to be undertaken.											
Stability: Good											

 TWEEDIE EVANS CONSULTING					Trial Pit Log					Trialpit No TP04 Sheet 1 of 1	
Project Name: Dappers Lane, Angmering					Project No. 1912010.001		Co-ords: - Level: mbgl			Date 24/01/2020	
Location: Angmering					0.50m 1.30m			Dimensions: Inclination: °		Scale 1:25	
Client: Oceanview Developments Ltd								Orientation: ° Depth: 1.2m			Logged ML

Water Strike	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results	Information					
					0.20			MADE GROUND - Black clayey gravelly sand. Gravel of brick, flint and chalk. Many roots noted.	1
					0.60			MADE GROUND - Brown sandy gravel and cobble of flint, brick, tarmac and tile. Rare concrete boulders noted.	
					0.80			Firm brown slightly sandy gravelly CLAY. Gravel of flint.	
					1.20			(Medium dense) brown slightly clayey sandy GRAVEL of sub-angular to angular flint.	
							----- End of pit at 1.2 m -----		2
									3
									4
									5

Remarks: Densities based on visual observations only. Terminated to allow for soakage testing to be undertaken.	
Stability: Good	

BRE Digest 365 (2016) Soakaway Design

Site:	Dappers Lane, Angmering
Test Pit Reference:	TP01/SA01
Site Reference:	1912010
Client:	Oceanview Developments Ltd
Operator:	ML
Test Date:	24th January 2020

Time (min)	Depth (mm bgl)
0	842
1	854
2	855
3	861
4	865
5	868
6	872
7	874
8	876
9	879
10	882
15	902
23	929
34	956
55	1032
73	1075
90	1130

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Pit reference	TP01/SA01
Pit depth (m)	1.17
Pit width (m)	0.50
Pit length (m)	1.55
Depth to standing water (m)	-

	Test 1	Test 2	Test 3
Max. depth (mm)	1170		
Effective depth (mm bgl)	842		
Effective drop (mm)	328		
25% effective depth (mm bgl)	924		
50% effective depth (mm bgl)	1006		
75% effective depth (mm bgl)	1088		

t_{25} (min)	22.0		
t_{75} (min)	78.0		

V_{R75-25} (m ³)	0.13		
a_{p50} (m ²)	1.45		
t_{075-25} (min)	56		

Soil Infiltration Rate (m/sec)	2.61E-05		
Soil Infiltration Rate (mm/hr)	9.41E+01		



BRE Digest 365 (2016) Soakaway Design



Site:	Dappers Lane, Angmering
Test Pit Reference:	TP02/SA02
Site Reference:	1912010
Client:	Oceanview Developments Ltd
Operator:	ML
Test Date:	24th January 2020

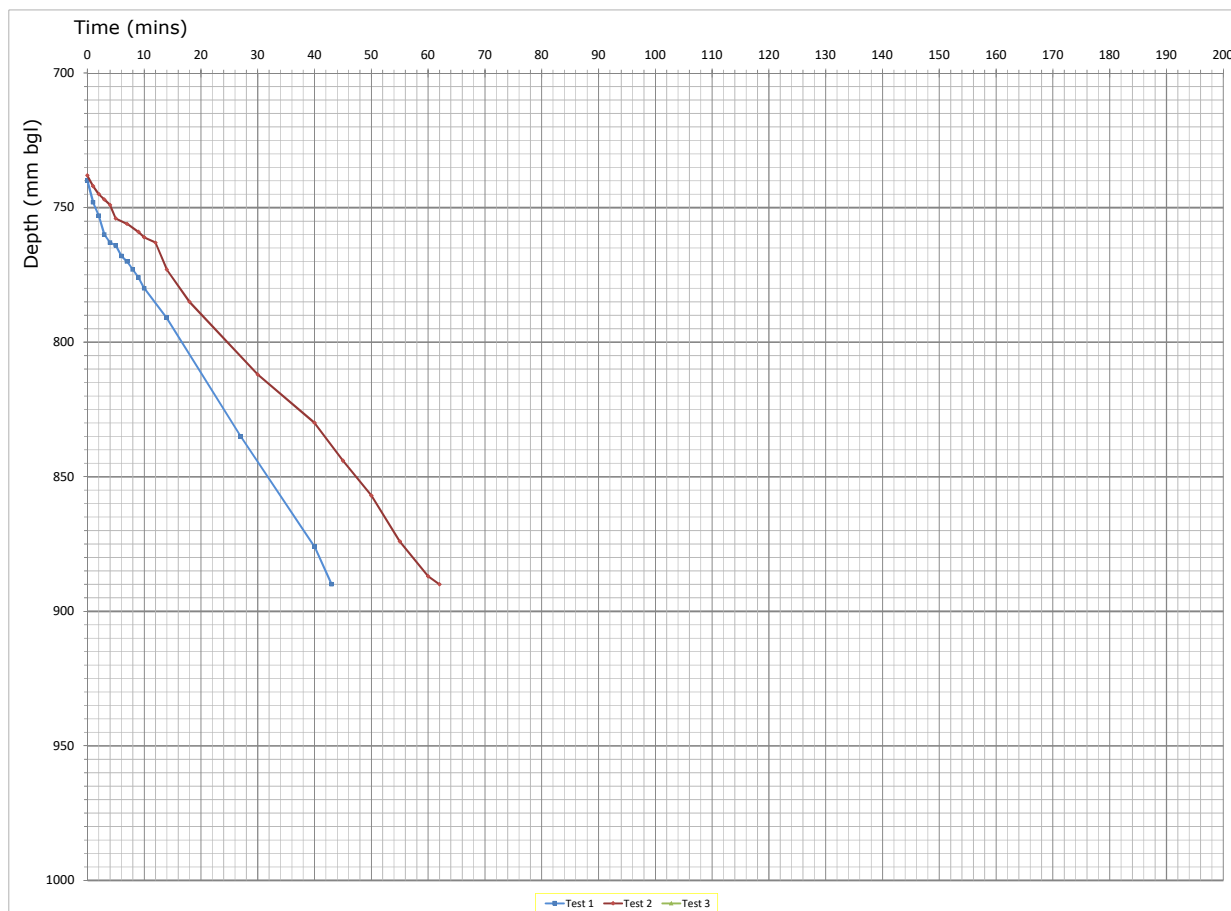
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	Test 1	Test 2	Test 3
Max. depth (mm)	940	940	
Effective depth (mm bgl)	740	738	
Effective drop (mm)	200	202	
25% effective depth (mm bgl)	790	789	
50% effective depth (mm bgl)	840	839	
75% effective depth (mm bgl)	890	890	

t_{25} (min)	13.0	22.0	
t_{75} (min)	43.0	62.0	

$V_{0.75-25}$ (m ³)	0.07	0.07	
$a_{0.98}$ (m ²)	1.08	1.08	
$t_{0.75-25}$ (min)	30	40.0	

Soil Infiltration Rate (m/sec)	3.60E-05	2.72E-05	
Soil Infiltration Rate (mm/hr)	1.30E+02	9.79E+01	



BRE Digest 365 (2016) Soakaway Design

Site:	Dappers Lane, Angmering
Test Pit Reference:	TP03/SA03
Site Reference:	1912010
Client:	Oceanview Developments Ltd
Operator:	ML
Test Date:	24th January 2020

Time (min)	Depth (mm bgl)
0	352
1	353
2	355
3	359
4	368
5	385
6	390
8	395
11	408
12	413
15	422
25	453
32	472
42	500
57	532
80	553
108	577

Time (min)	Depth (mm bgl)
0	354
1	362
2	364
3	364
16	368
53	368

Time (min)	Depth (mm bgl)
------------	----------------

Ground Conditions / Comments

Slightly gravelly slightly sandy silty clay.

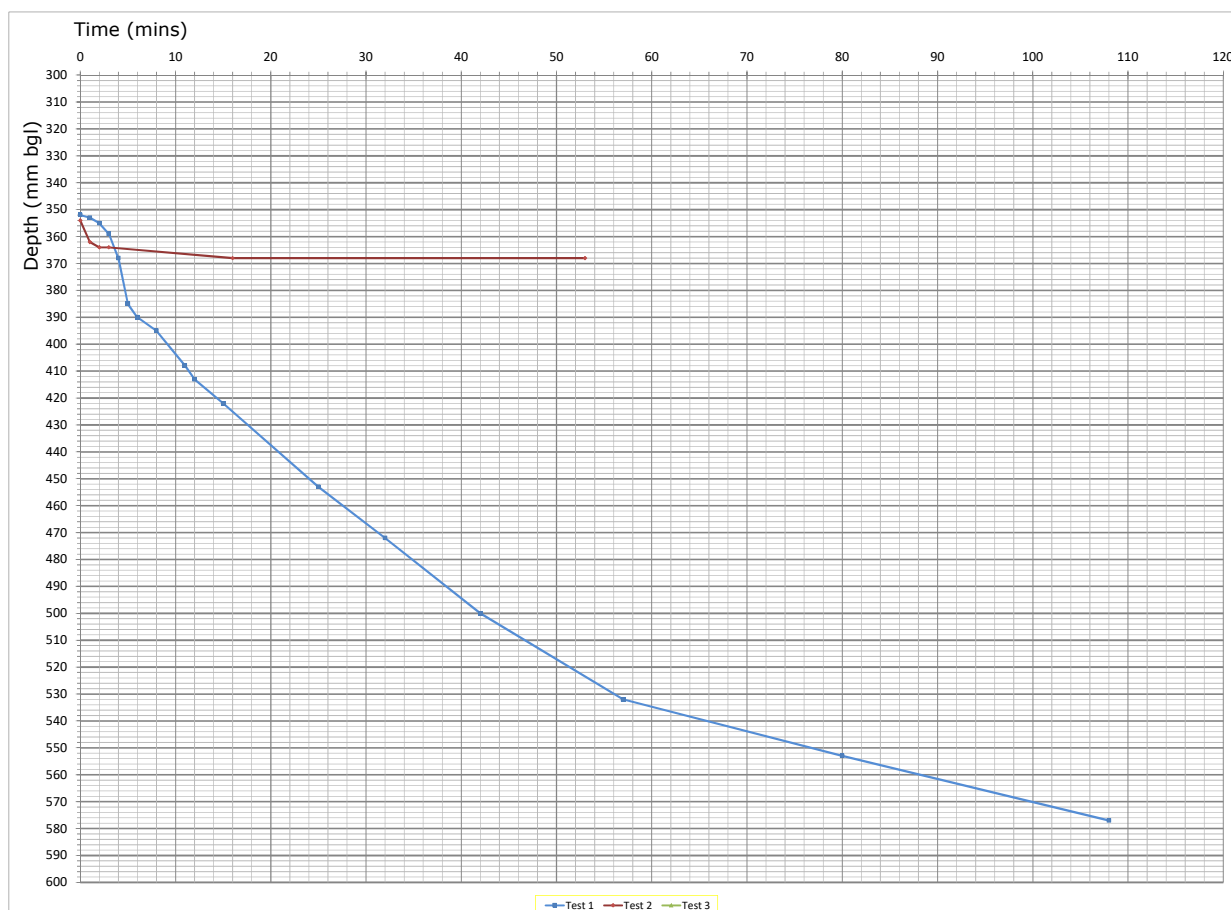
Pit reference	TP03/SA03
Pit depth (m)	0.65
Pit width (m)	0.50
Pit length (m)	1.10
Depth to standing water (m)	-

	Test 1	Test 2	Test 3
Max. depth (mm)	650	650	
Effective depth (mm bgl)	352	354	
Effective drop (mm)	298	296	
25% effective depth (mm bgl)	427	428	
50% effective depth (mm bgl)	501	502	
75% effective depth (mm bgl)	576	576	

t_{25} (min)	17.5		
t_{75} (min)	106.0		

$V_{0.75-25} \text{ (m}^3\text{)}$	0.08		
$a_{0.98} \text{ (m}^2\text{)}$	1.03		
$t_{0.75-25} \text{ (min)}$	89		

Soil Infiltration Rate (m/sec)	1.50E-05		
Soil Infiltration Rate (mm/hr)	5.41E+01		



BRE Digest 365 (2016) Soakaway Design

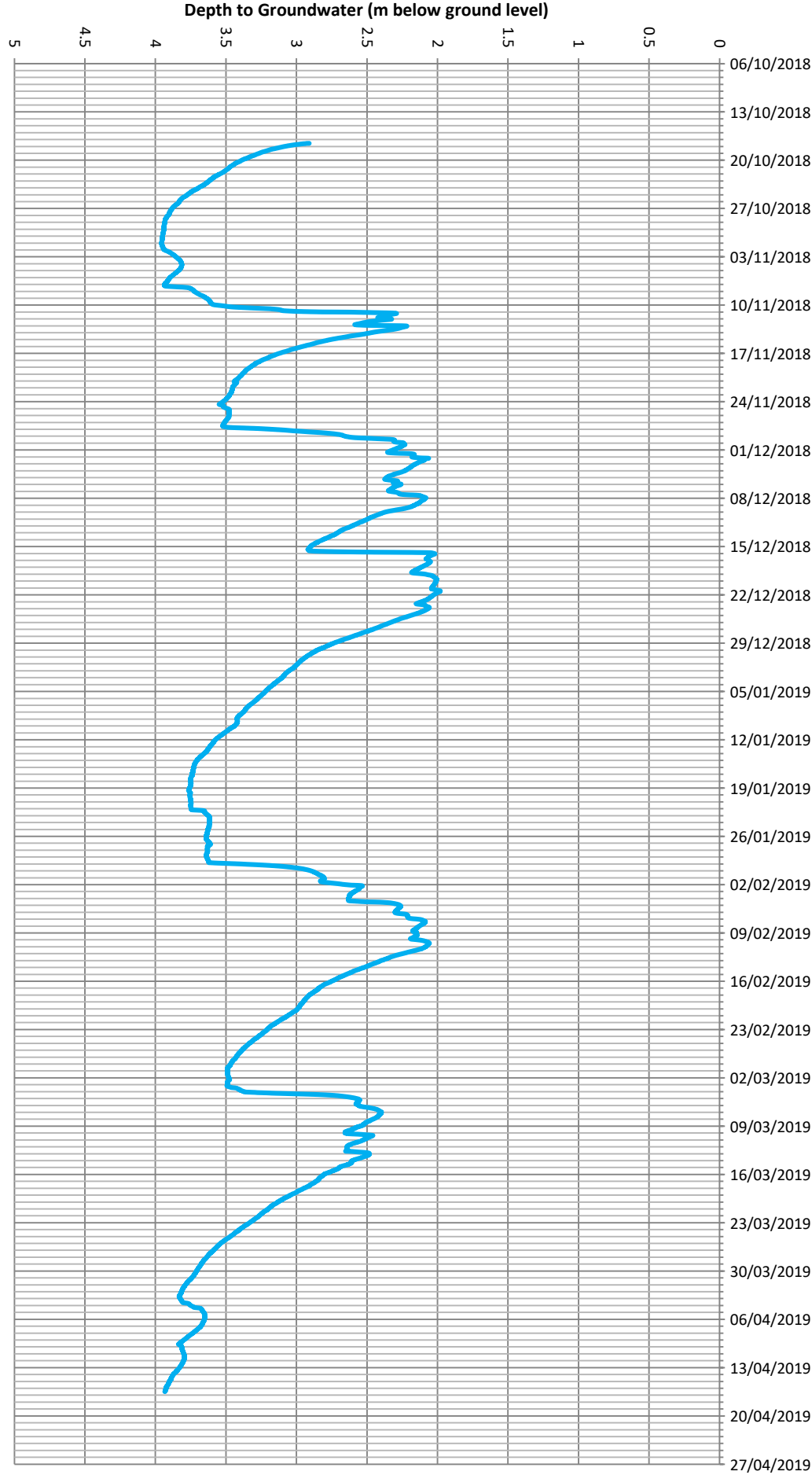
BRE Digest 365 (2016) Soakaway Design

Ashdown Site Investigation Limited

Site: The Laurels, Dappers Lane, Angmering, West Sussex

Report No. R18-13291

Groundwater Monitoring Results - WS04



Drainage Report



Prepared For

**Sam Wiggins
Old Milton Road
New Milton
Hampshire
BH25 6EB**

Site

**The Laurels, Dappers Lane
Angmering
West Sussex
BN16 4EN**



DRAIN BOSS

Chris Powell

service@drainboss.co.uk

07772535248

Total Defects for Project

Total DRB Grades for Project

0

0

6

0

0

0

1

0

The Laurels - CCTV Survey Report : 10/03/20

Name : DRAIN BOSS
 Contact : Gordon Brown
 Location : Ley Spring
 Town : Bolney Road, Ansty
 Region : West Sussex
 Postcode : RH17 5AW
 Email : service@drainboss.co.uk
 Contact Number : 07772535248
 Surveyor : Chris Powell
 Valid Certification No : 0352478

Client Information

Name : Sam Wiggins
 Contact : Oceanview Developments
 Location : Old Milton Road
 Town : New Milton
 Region : Hampshire
 Postcode : BH25 6EB
 Tel : 07977584805
 Mobile :
 Email : info@oceanviewdevelopments.co.uk
 Fax :

Site Information

Name :
 Contact : Sam Wiggins
 Location : The Laurels, Dappers Lane
 Town : Angmering
 Region : West Sussex
 Postcode : BN16 4EN
 Tel :
 Mobile :
 Email :
 Fax :

Total Defects for Project

0

0

6

0

0

Total DRB Grades for Project

0

1

0

Report interpretation.

Overview:

Each section of the drainage system is allocated a score indicating areas that require attention. These areas are detailed in the Overview section on the following page and also at the bottom right of the first few pages. We use colour coding as an indicator of severity. Additional information concerning rehabilitation options/recomendations is included in the Overview page, which can also be used as an, "at a glance" indication of system condition. More in depth information for each section, Including images can be found later in the report. Grade indicators are as follows:

- Grade A: Drain is serviceable no recommendations required
- Grade B: There is an issue that might require remedial works
- Grade C: There is a defect that requires remedial works, the drain is not serviceable.

Observations:

Each section of drainage reported on (manhole to manhole for example), contains detailed information about that drain and any observations made concerning condition are detailed below the header section. The observations are colour coded and given a severity score, with more significant defects being given a higher score, using a scale from 1 to 5 as detailed below:

- Severity 1 to 2: These defects may require remedial monitoring
- Severity 3: These defects probably require some form of remedial works
- Severity 4 to 5: Defects that will require remedial repair or replacement

General:

The information provided is relevant at the time of survey. The coding system in this report is based on the Manual of Sewer Condition Classification, 5th edition (MSCC5) domestic codes (BS EN 13508-1:2003). This is the official standard for the water industry.

The severity system is based on significant experience in general practice and the 1 -5 grades represent the severity of individual defects: 5 representing a more serious defect.

Please feel free to contact us for further explanation or pricing for remedial works required.



Overview

Section: 1 From: CP1 To: CP2	Grade B	DRB Grade: B Pipe Size: 450 Material: Concrete Use: Combined
---	---------	---

Total Defects for Project



Total DRB Grades for Project



Site: The Laurels, Dappers Lane, Angmering

Section 1

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
Sam Wiggins	The Laurels, Dappers Lane	Angmering		Chris Powell	10/03/2020

Start Node Ref:	CP1	Finish Node Ref:	CP2	Direction:	D	Height/Dia:	450
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	C	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	CO	Cleaned	N

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	89.4	

Position	Code	Description	CD	Pic	Video Ref	
00.00m	MH	Start node type, manhole		0_0		
00.00m	WL	Water level 0%			0:00:00	
00.80m	CN	Connection other than junction 03 : 150mm		0_2	0:00:23	
41.60m	WL	Water level 15%		0_3	0:04:26	
43.70m	CN	Connection other than junction 01 : 150mm		0_4	0:04:37	
43.70m	REM	General remark		0_5	0:05:25	
53.20m	REM	General remark		0_6	0:06:20	
60.20m	R	Roots		0_7	0:06:54	
60.40m	R	Roots		0_8	0:07:31	
62.50m	R	Roots		0_9	0:07:37	
63.70m	R	Roots		0_10	0:07:46	
65.80m	R	Roots		0_11	0:07:59	
72.10m	WL	Water level 20%		0_12	0:08:28	
73.80m	R	Roots		0_13	0:08:39	
89.40m	CPF	Finish node type, catch pit		0_99		



Total Defects for section

DRB Grade for Section

0

0

6

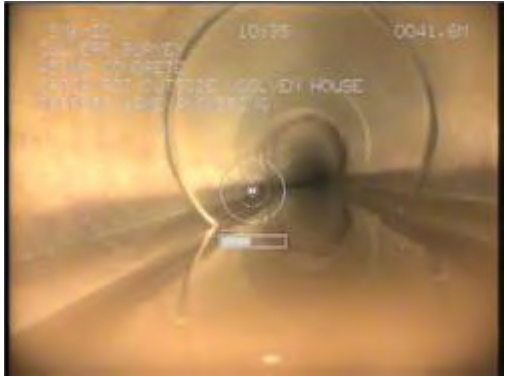
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B

Descriptive Report with Remarks and Observation Images

Section 1

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole CP1	Image Provided - Ref: 0_0 
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.80m	0:00:23	CN	Connection other than junction at 03 o'clock: 150mm x 450mm Diameter	Image Provided - Ref: 0_2 
41.60m	0:04:26	WL	Water level: 15% Height/Diameter	Image Provided - Ref: 0_3 

Total Defects for section

DRB Grade for Section

0

0

6

0

0



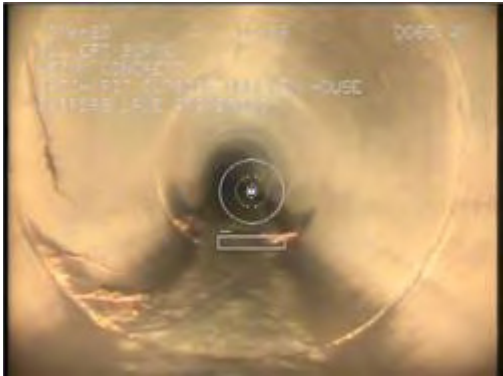
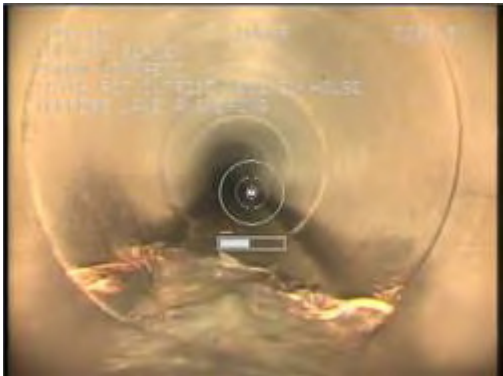
B

Total Defects for section

0 0 6 0 0

DRB Grade for Section

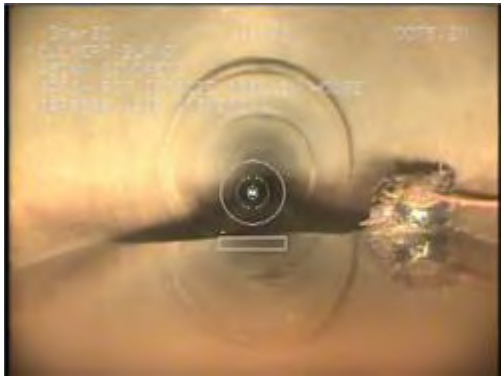
B

Pos	Video Ref	Code	Description	Image
60.40m	0:07:31	R	Roots - Severity 3	Image Provided - Ref: 0_8 
62.50m	0:07:37	R	Roots - Severity 3	Image Provided - Ref: 0_9 
63.70m	0:07:46	R	Roots - Severity 3	Image Provided - Ref: 0_10 
65.80m	0:07:59	R	Roots - Severity 3	Image Provided - Ref: 0_11 

Total Defects for section

DRB Grade for Section



Pos	Video Ref	Code	Description	Image
72.10m	0:08:28	WL	Water level: 20% Height/Diameter	Image Provided - Ref: 0_12 
73.80m	0:08:39	R	Roots - Severity 3	Image Provided - Ref: 0_13 
89.40m		CPF	Finish node type, catch pit CP2	Image Provided - Ref: 0_9999 