

Appendix 6

Surface Water Flood Map from Arun District Council

and

Correspondence from West Sussex County Council



John

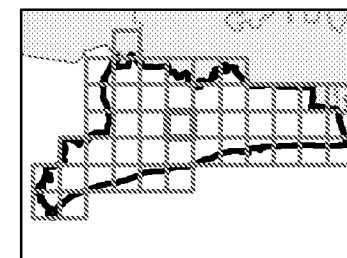
The updated Flood Map for Surface Water (FIRM), shows the flooding that takes place from the "surface runoff" generated by rainwater (including snow and other precipitation) when:

- (a) is on the surface of the ground (whether or not it is melting), and
- (b) has not yet entered a watercourse, drainage system or public sewer.

The USACE will pick out natural drainage channels, dyers, low areas in the floodplain and flow paths between buildings but it will only indicate flooding caused by local rainfall.

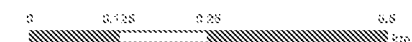
Note: The *oFMSW* shows predictions of flooded areas but does not show whether individual properties will be affected by surface water flooding or have been affected in the past. The *oFMSW* should not be used to predict if individual properties will flood.

Key Point



Legend

-  Arun District SPHA boundary
 uFMSW 50-year extent
 uFMSW 100-year extent
 uFMSW 1,000-year extent



REF	Date	Comments
A	Aug 2016	
B		
C		

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ARUN DISTRICT COUNCIL

LEVEL 1 SFRA: APPENDIX E
SURFACE WATER FLOOD RISK

Page No: 25 of 48

Index Number: A01_28

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**WEST SUSSEX COUNTY COUNCIL
FLOOD RISK MANAGEMENT**

DATE: 30th March 2017

FROM: Kevin Brook

**TO: The Civil Engineering Practice
FAO: Bava Sathan**

SUBJECT: LLFA Flood Risk information: Stakers Farm, Yapton

Current surface water flood risk based on uFMfSW for 30year and 100year events:	Low risk
Comments: Current uFMfSW mapping generally shows the majority of the site to be at low risk from surface water flooding. This risk is based on modelled data only and should not be taken as meaning that the site will/will not definitely flood in these events. Any existing surface water flow paths across the site must be maintained. Reason: NPPF paragraph 103 states – ‘When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere..’ Therefore, a wholesale site level rise via the spreading of excavated material should be avoided.	

Current ground water flood risk based on ESI groundwater mapping:	Low risk
Comments: The proposed development is shown to be at low risk from groundwater flooding based on the ESI maps. This risk is based on modelled data only and should not be taken as meaning that the site will/will not suffer groundwater flooding. Where the intention is to dispose of surface water via infiltration / soakaway, these should be shown to work through an appropriate assessment carried out under BRE Digest 365.	

Records of any ordinary watercourses or culverted watercourses within or in close vicinity to the site:	Yes
Comments: Current Ordnance Survey mapping shows an ordinary watercourse running approximately 170m meters from the south western boundary of proposed development site. Local or field boundary ditches, not shown on Ordnance Survey mapping, may exists around and	

across the site. If present these should be maintained and highlighted on future development plans.

No development should take place within 5m of any watercourse. If works are undertaken within, under, over or up to an Ordinary Watercourse, even if this is temporary, an Ordinary Watercourse Consent (OWC) may need to be applied for from the District Council. Future maintenance and access of a watercourse must be considered during the design and planning process.

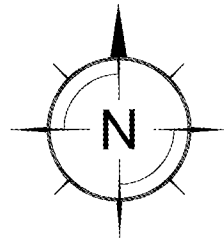
Records of any historic flooding within the confines of the proposed site:	No
Comments: We do not have any records of historic flooding within the confines of the proposed site. This should not be taken that this site has never suffered from flooding, only that it has never been reported to the LLFA.	

Existing highway drainage in the vicinity to the site:	Yes.
Comments: The adjacent road, North End Road, has a positive highway drainage system.	

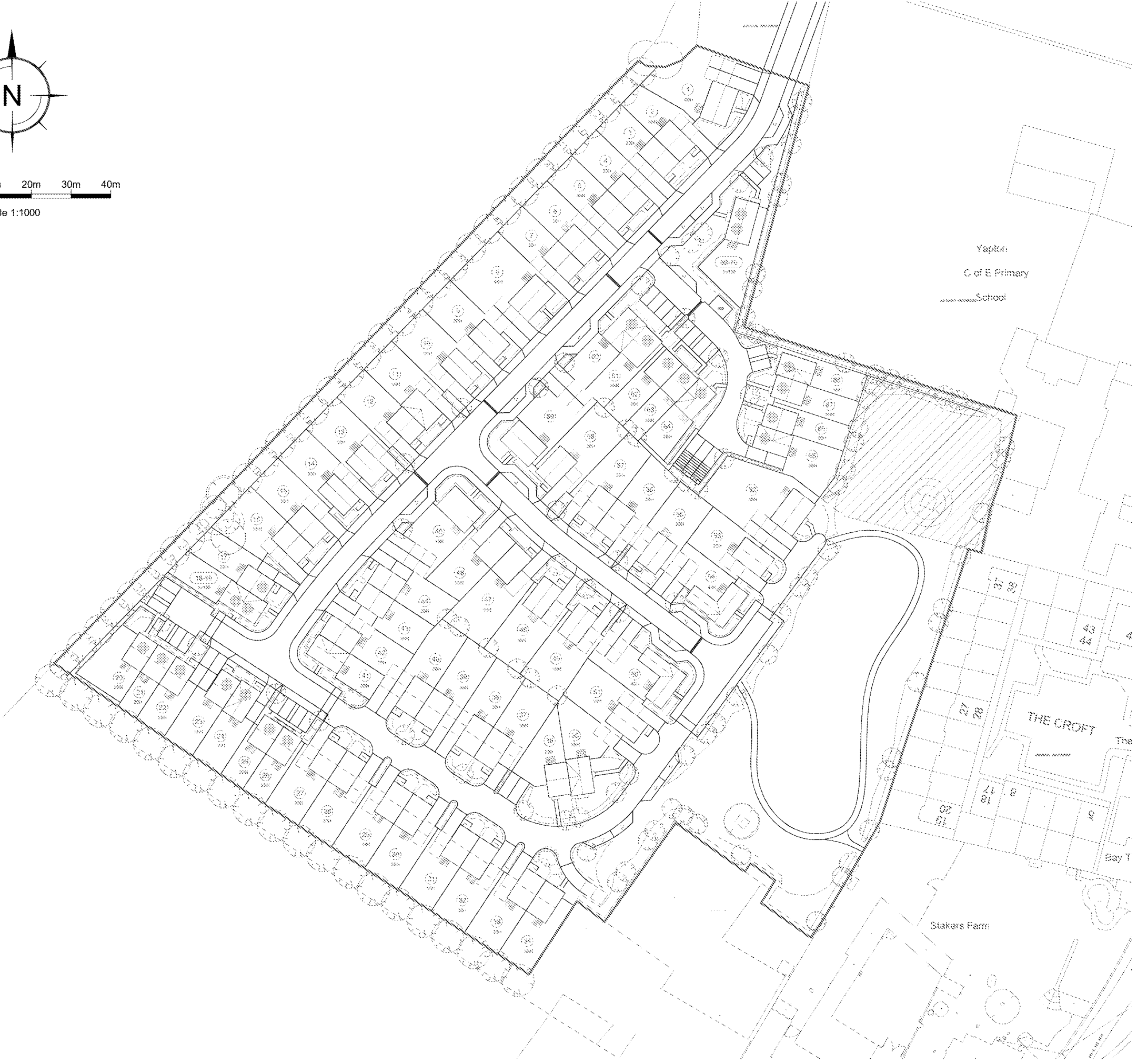
Kevin Brook
Flood Risk Management Team

Appendix 7

Proposed Site Layout



-10m 0 10m 20m 30m 40m
Scale 1:1000



TITLE	
Proposed Site Layout	
SCALE	DWG NO.
1:1000 @ A3	3

Appendix 8

Southern Water Correspondence



The Civil Engineering Practice
Unit 11
Tungsten Building
George Street
Fishersgate
West Sussex
BN41 1RA

THE CIVIL ENGINEERING PRACTICE

10 APR 2017

RECEIVED

P	PM	SS
Project No:	22816	
Engineer:		
Action By:		
Action Date:		

Developer Services
Southern Water
Sparrowgrove House
Sparrowgrove
Otterbourne
Hampshire
SO21 2SW

Your Ref:

Our Ref:

CC/003332

Date:

07 April 2017

F.A.O: Mr. Jones,

Site: North End Road, Yapton, Arundel, West Sussex, BN18 0DU.

Dear Mr. Jones,

We have completed the capacity check for the above development site and the results are as follows:-

Foul capacity check:

There is currently inadequate capacity within the foul sewerage network to accommodate a foul flow for the above development at manhole reference SU97037503. The proposed development would increase flows to the public sewerage system, and existing properties and land may be subject to a greater risk of flooding as a result. Additional off-site sewers, or improvements to existing sewers, will be required to provide sufficient capacity to service the development.

The nearest point where capacity is currently available is at Lidsey WTW which is located approximately 3.2 km West of the proposed development site.

Section 98 of the Water Industry Act 1991 provides a legal mechanism through which the appropriate infrastructure can be requested (by the developer) and provided to drain a specific location.

Unfortunately, it may be several years before adequate infrastructure is provided via a prioritised capital expenditure programme. Therefore, this proposed development would be considered premature until such time adequate sewerage infrastructure could be provided.

It should be noted that Southern Water has recently undertaken a review of their modelling criteria, processes and solutions for Level 2 capacity assessments (sewerage and surface water). This review has indicated concerns with inconsistencies moving through the various processes. Southern Water are not satisfied that we are fully delivering a service that meets the expectations and needs of our Customers and hence the Foul and Surface Water Level 2 capacity assessments will not be available for the foreseeable future.

Southern Water are currently developing a new process/application, which will aim to deliver a more comprehensive and robust solution in providing capacity for your proposed development site. This will appear on Southern Water's website on completion of the review process.

Southern Water will still accept **Fresh Water** Level 2 capacity assessment applications.

Before any connections are made to foul and surface sewerage network, an application form needs to be completed and approved by Southern Water Services.

Should you require any further information, please contact us at the above mentioned phone number or address.

Yours faithfully



David Akehurst
Developer Services

Please note: -

The information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Yapton

 Southern Water

Appendix 9

Proposed Impermeable Areas

Preliminary Calculations

and Proposed Drainage Strategy

SITE LEGEND:

- Site Boundary - 30005m²
- Roofs and Garages - 4781m²
- Pavils and Drives - 2831m²
- Roads and Parking Bays - 3461m²
- Pavies - 268m²

Proposed Impermeable Areas

SCALE
1:1000 @ A3

4

Design of Aquacell Trench Soakaways - Typical Residential Unit

Project Name:

Land at Stakers Farm, Yapton

Project Number:

22814

Soakaway No

Cover Level

100.000 m AOD

Invert of pipe

99.000 m AOD

Pipe Invert Depth

1.000 m

Depth to top of Soakaway

1.000 m

Depth to Permeable Strata

1.000 m

Soakaway Width

3.000 m

(Crate Size 1m x 0.5m)

Depth to Base

2.200 m

3 crates

Impermeable Area

125 m²

Void Ratio

95 %

Allow Drainage Through Base?

No



(Default No)

Storm Profiles

Return Period

100 years

(10years-BRE 365)

M5-60

20 mm

Ratio r1

0.35

Consider Storms Beyond 6 hour duration?

...



Soil Characteristics

Soil Infiltration Rate

10.00 x10⁻⁶m/s

Soil Description

Calculations based on BRE Digest 365 - September 1991.

Return Storm Period Assessments available are: 1, 2, 5, 10, 20, 25, 50, 100 years.

Ratio r1 in the range 0.12, 0.15, 0.18, 0.21, 0.24, 0.27, 0.30-0.45

40% Additional Rainfall to account for Climate Change (Where Appropriate)

Crate Depth 400 mm each

Soakaway Results

Width

3.000 m

Excavation Depth

2.200 m

Storage Depth

1.200 m

Effective Outflow Depth

1.200 m

Length of Soakaway

3.03 m

ts50

19.89 hrs

Design OK

Design of Trench Soakaways - Roads Only

Project Name: Land at Stakers Farm, Yapton
Project Number: 22814

Soakaway No

Cover Level 50.000 m AOD
Invert of pipe 49.000 m AOD
Pipe Invert Depth 1.000 m
Depth to top of Soakaway 0.750 m
Depth to Permeable Strata 0.750 m
Soakaway Width 1.000 m (Normal 1.2m)
Depth to Base 2.500 m
Impermeable Area 3,500 m²
Gravel Fill Void Ratio 30 % (Normal 30%)

Allow Drainage Through Base? No ☐ (Default No)

Storm Profiles

Return Period 100 years (10years-BRE 365)
M5-60 20 mm
Ratio r1 0.35

Consider Storms Beyond 6 hour duration? ☐

Soil Characteristics

Soil Infiltration Rate 10.00 x10⁻⁶m/s
Soil Description

Calculations based on BRE Digest 365 - September 1991.

Return Storm Period Assessments available are: 1, 2, 5, 10, 20, 25, 50, 100 years.

Ratio r1 in the range 0.12, 0.15, 0.18, 0.21, 0.24, 0.27, 0.30-0.45

40% Additional Rainfall to account for Climate Change (Where Appropriate)

Soakaway Results

Width 1.000 m
Excavation Depth 2.500 m
Storage Depth 1.750 m
Effective Outflow Depth 1.750 m
Length of Soakaway 374.86 m
ts50 4.16 hrs

Design OK

Design of Trench Soakaways - Combined Roads and Residential

Project Name: Land at Stakers Farm, Yapton
Project Number: 22814

Soakaway No

Cover Level 50.000 m AOD
Invert of pipe 49.000 m AOD
Pipe Invert Depth 1.000 m
Depth to top of Soakaway 0.750 m
Depth to Permeable Strata 0.750 m
Soakaway Width 2.500 m (Normal 1.2m)
Depth to Base 3.000 m
Impermeable Area 12,239 m²
Gravel Fill Void Ratio 30 % (Normal 30%)

Allow Drainage Through Base? ☐ No ☒ (Default No)

Storm Profiles

Return Period 100 years (10years-BRE 365)
M5-60 20 mm
Ratio r1 0.35

Consider Storms Beyond 6 hour duration? ☐ ☒

Soil Characteristics

Soil Infiltration Rate 10.00 x10⁻⁶m/s
Soil Description

Calculations based on BRE Digest 365 - September 1991.

Return Storm Period Assessments available are: 1, 2, 5, 10, 20, 25, 50, 100 years.

Ratio r1 in the range 0.12, 0.15, 0.18, 0.21, 0.24, 0.27, 0.30-0.45

40% Additional Rainfall to account for Climate Change (Where Appropriate)

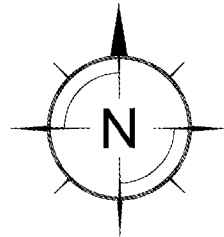
Soakaway Results

Width 2.500 m
Excavation Depth 3.000 m
Storage Depth 2.250 m
Effective Outflow Depth 2.250 m
Length of Soakaway 516.37 m
ts50 10.37 hrs

Design OK

KEY:

- Existing Foul Water Sewer
- Proposed Foul Water Sewer
- Surface Water infiltration Trench
- 3m x 3m x 1.2m deep Aquacell Crate soakaway

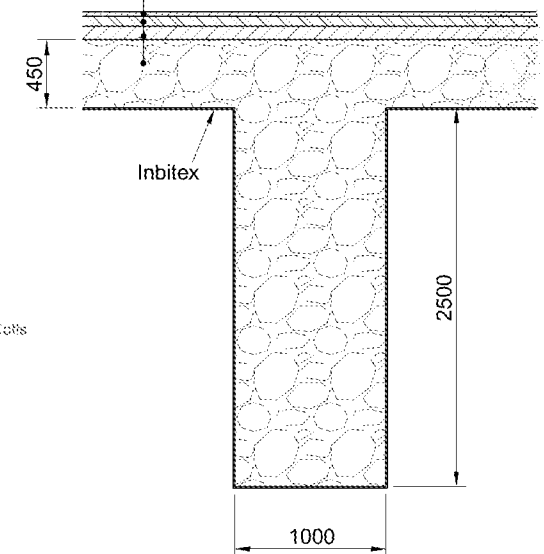


-10m 0 10 20 30 40 50m

Scale 1:1250

ACCESS ROAD CONSTRUCTION

- 30mm AC10 surf 60/40 to BSEN 13108-1
- 65mm AC20 dense bin 100/150 to BSEN 13108-1
- 80mm thick AC 20 base course 40/60 to BS EN 13108-1 (construction traffic running surface course)
- Voided Subbase minimum 450mm thick 63-10mm stone



TYPICAL SECTION THROUGH INFILTRATION TRENCH
(Scale 1:50)

Proposed Drainage Strategy

SCALE 1:1250 @ A3

DWG No. 5