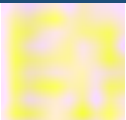


**Ref: 6326/R3
Rev C February 2025**

**Carisbrooke Road
Mitcheldean
Gloucestershire**

**Flood Risk Assessment
with Outline Drainage Strategy**

July 2024



REPORT DETAILS

Site Name:

Carisbrooke Road, Mitcheldean, Gloucestershire

Report Title:

Flood Risk Assessment with Outline Drainage Strategy

Report Number:

6326/R3

Revision	Date	Status
-	July 2024	For Planning Submission
A	November 2024	Updated to latest DFP for planning submission
B	January 2025	Updated to reflect December 2024 NPPF update
C	February 2025	Flood mapping update incorporated

Client: Gladman Developments Ltd

Client Contact: Beth Ambrose



Prepared By: John E Lees B.Sc., C.Eng., M.I.C.E., M.C.I.W.E.M.

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1.0 **INTRODUCTION**

1.1 Lees Roxburgh have been instructed by Gladman Developments Ltd to carry out a Flood Risk Assessment with Outline Drainage Strategy (FRA) for the proposed residential development of land at Carisbrooke Road, Mitcheldean, Gloucestershire.

1.2 This report has been prepared to accompany an outline planning application for up to 180 No. dwellings.

An outline planning application (P1994/18/OUT) was previously submitted on the site in December 2018 for 125 units and refused in March 2019 with insufficient information on drainage given as one of the Reasons for Refusal. Subsequent consultations with the Lead Local Flood Authority then resolved their objections. This FRA incorporates the agreement reached at that time.

1.3 The site lies within an area designated on EA Flood mapping as Flood Risk Zone 1 which comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year ($< 0.1\%$).

1.4 *The National Planning Policy Framework (NPPF)* and the accompanying *National Planning Policy Guidance* set out the requirements for addressing flood risk with respect to potential development sites.

In accordance with the NPPF at over 1 hectare in area the site is required to be the subject of an FRA.

1.5 The purpose of an FRA is to address the following;

- The potential for the proposed development to be affected by flooding either from the development proposal or external sources.
- The potential for the proposed development to increase the flood risk elsewhere.
- That mitigation measures introduced to deal with any risks identified can be successfully managed.
- That the site can be developed and occupied safely.

The NPPF indicates that an assessment of flood risk should be proportionate to the risk and appropriate to the scale, nature and location of the development. This report reflects the requirements of the NPPF in this regard.

1.6 This report has been prepared specifically for Gladman Developments Ltd for the sole purposes of the planning application and any reliance on its contents must be read in conjunction with the requirements of any subsequent planning conditions.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Location

- 2.1.1 The site is centred on National Grid references 366420, 219350 and is 9.72 ha in total area (**Appendix 1**).
- 2.1.2 The site is situated at the north of the settlement boundary of Mitcheldean, which is some 17km to the west of Gloucester.

2.2 Surrounding Land Use and Access

- 2.2.1 Mitcheldean lies to the south west and south of the site with a large industrial estate known as Vantage Point to the south east.
- 2.2.2 To the north west, north and north east of the site there is extensive open farmland, with a substantial woodland area around Wigpool located 1km to the west.
- 2.2.3 Access onto the site is via two farm gates located on the eastern boundary with Bradley Court Road.
- 2.2.4 Ross Road and Carisbrooke Road form the west and south west site boundary.

2.3 Site Description

- 2.3.1 The site is approximately a heart shape and comprises a single large field that is set to arable use.
- 2.3.2 The field boundaries are substantially formed by hedges, reinforced with post and wire fencing.
- 2.3.3 There are two trees located close to the southern corner of the site.
- Trees also line some parts of the west, south west and eastern boundaries with two trees located on or close to the north boundary.
- 2.3.4 As would be expected given the topography the site appeared well drained.

2.4 Topography

- 2.4.1 The site falls from a high point approximately central to the north boundary towards the west, south and east. This is located to the top of hill (**Appendix 1E**).
- 2.4.2 Reference should be made to the topographical survey (**Appendix 2**), but boundary levels can be summarised as follows;
- High point north boundary... 160.5m AOD
 - North west corner... 151.0m AOD
 - North east corner... 155.0m AOD

- Southern corner... 137.0m AOD

There is therefore an average fall of about 1 in 13 from the high point to the low southern corner although the southern slopes steepen to an excess of 1 in 10.

- 2.4.3 OS contours reflect the topography continuing to fall in a south easterly direction.

2.5 **Existing Drainage**

- 2.5.1 Watercourse systems in the area are identified on the OS Mapping in **Appendix 1B** which identifies a short section of ditch just to the south east of the site and an open watercourse appearing some 500m to the south east.

- 2.5.2 There are no drainage ditches within the site.

- 2.5.3 There is an active drainage ditch located within the verge along the south west boundary with Carisbrooke Road. The ditch commences with a large diameter pipe with flow entering from the north west.

The open ditch extends for some 110m and then enters a large diameter culvert (approx. 825mm) as it approaches the junction of Carisbrooke Road and Bradley Court Road (**Appendix 1C**). There is a manhole located close to the road junction with a depth to invert of 3.3m.

The drainage ditch reappears on the opposite side of Bradley Court Road before entering culvert to the south east within the Vantage Point industrial estate. Dye testing on 6th March 2019 established the link between this system and the watercourse to the south east (**Appendix 1D**).

- 2.5.4 There is a sewage pumping station located to the west of the site on the opposite of Ross Road. This is reflected on Severn Trent sewer records (**Appendix 3A**).

3.0 FLOOD RISK

3.1 Flood Mapping

3.1.1 Gov. UK Flood Map for Planning

- 3.1.1.1 Reference to the Gov.UK Flood Map for Planning (**Figure. 1**) indicates that the site is situated within a Flood Zone 1 Area of flood risk. Zone 1 is land defined within the NPPF as assessed as having a less than 1 in 1000 annual probability of flooding (<0.1% in any year). All uses of land are appropriate in this zone.

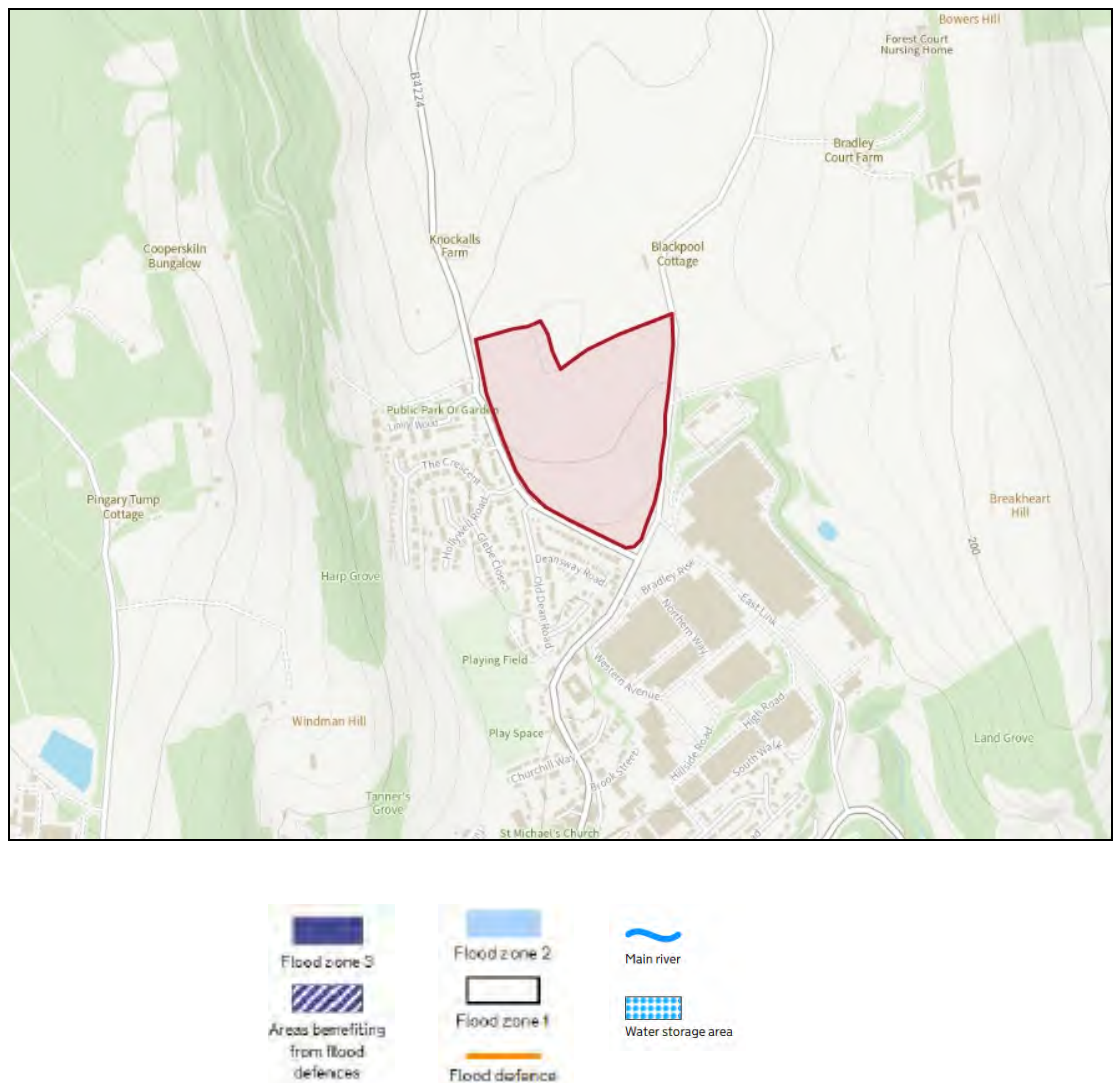


Figure 1: Gov.UK Flood Map for Planning

3.1.2 Gov. UK Surface Water Flood Risk

- 3.1.2.1 Reference to the Gov.UK Surface Water Flood Risk Map (**Figure 2**) identifies surface water flooding very sporadically in the area and not affecting the site other than a very localised area within the southern tip of the site and a ribbon of low risk alongside the road frontage to the east.



Figure 2: Gov.UK Flood Risk from Surface Water 2040 - 2060

3.1.3 Gov. UK Extent of Flooding from Reservoirs

3.1.3.1 Reference to the Gov. UK Extent of Flooding from Reservoirs Map (**Figure 3**) identifies that the site is not at risk from reservoir flooding.



Figure 3: Gov. UK Extent of Flooding from Reservoirs

3.1.4 Groundwater Flood Risk

- 3.1.4.1 Reference to the GeoSmart GWS Map (**Figure 4**) identifies the site as being at negligible risk.

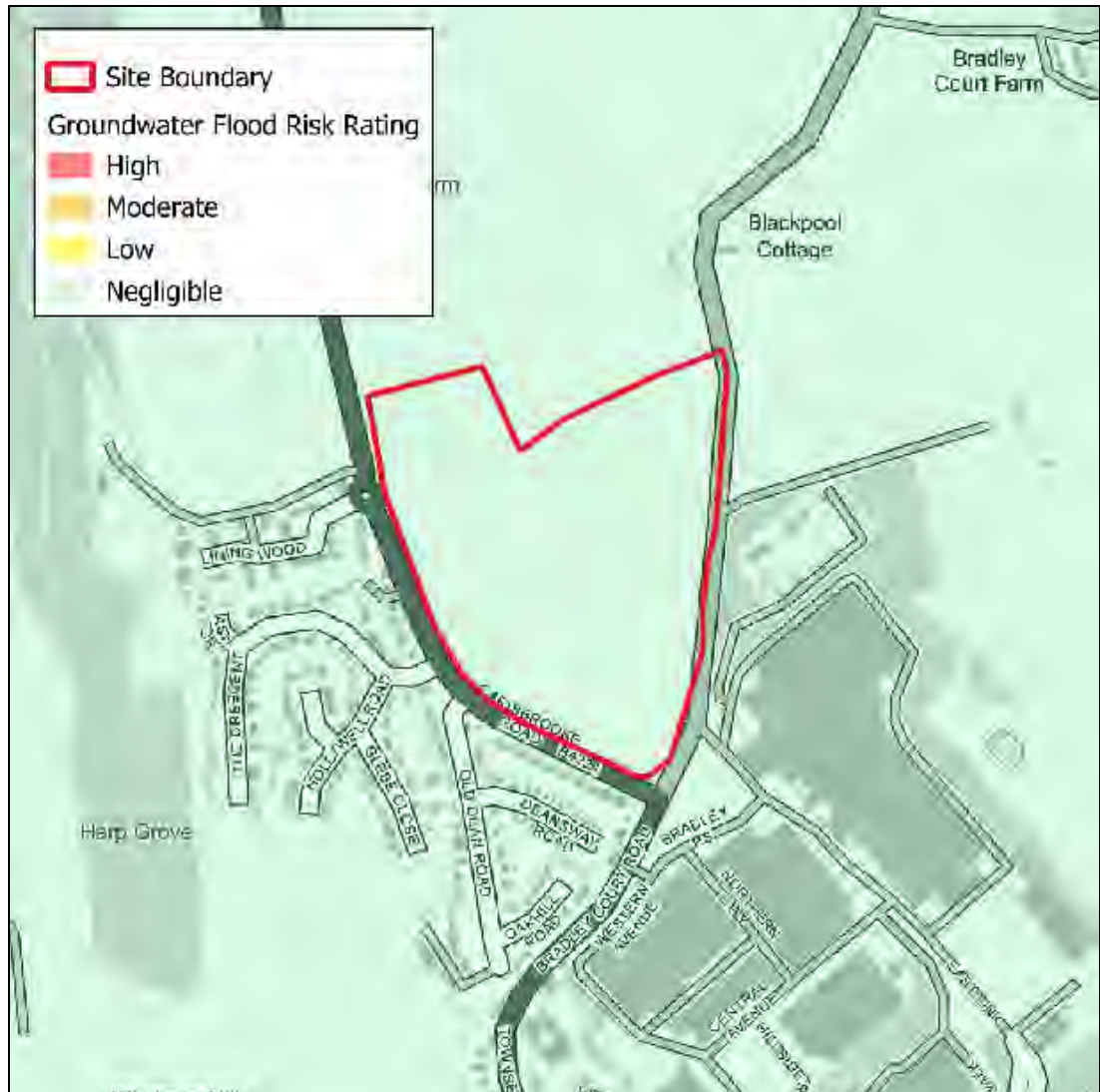


Figure 4: GeoSmart GW5 Map (GeoSmart 2024)

3.2 Sequential and Exception Tests

- 3.2.1 As set out in the NPPF, the sequential test is a risk based approach which should be applied at all stages of the planning process in order to steer new development to areas at risk from the lowest probability of flooding, in the first instance from areas mapped as Flood Zones 2 and 3 to Flood Zone 1.

The sequential test should also be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site specific Flood Risk Assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).

- 3.2.2 The NPPF Planning Practice Guidance incorporates a list of appropriate land uses in each flood zone dependent on the vulnerability of the proposed development to flooding. Table 2 of the guidance classifies residential development as 'More Vulnerable'.

Reference is made to the table below, reproduced from Table 3 of the guidance, which sets out the Flood Risk Vulnerability Classification.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	x	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	x	x	x	✓*

Key:

✓ Development is appropriate

x Development should not be permitted.

- 3.2.3 The proposed development is classified in the NPPF as 'More Vulnerable' and is located within a Zone 1 area of flood risk.

This FRA will demonstrate that no built development within the site boundary will be located on an area that would be at risk of flooding from any source having regard to reasonably foreseeable potential changes in flood risk. On this basis the sequential and exception tests will not apply.

3.3 Sources of Flood Risk

3.3.1 **Watercourse Systems, Surface Water Flooding, Water Bodies and Groundwater**

- 3.3.1.1 OS contours indicate that the northern boundary of the site is located at the top of a sub catchment with levels substantially falling to the south and south east towards and beyond the boundary watercourse system identified on mapping and described in Section 2.5.

This system sits well below site levels and does not present a risk to the development.

It has been established as appearing 500m to the south east where it meets a system entering from the west which appears substantially culverted through Mitcheldean.

- 3.3.1.2 Surface water flood mapping has identified an area of risk located to the southern tip of the site and a ribbon of localised low risk along the east boundary.

The extent of flooding to the south has been added to the topographical survey in **Appendix 3**.

- 3.3.1.3 There are no water bodies within the vicinity of the site which could present a flood risk to the development.

- 3.3.1.4 Given the topography and by reference to the groundwater flood mapping, the risk to groundwater is considered negligible.

- 3.3.1.5 On this basis, the risk associated with watercourse systems, water bodies and groundwater can be discounted but that from surface water flooding needs to be considered.

3.3.2 Land Drainage

- 3.3.2.1 Given the well drained nature of the site and the watercourse system to the boundary it is viewed that there are no land drainage issues which cannot be dealt with as part of the normal design and construction process.

3.3.3 Existing Sewers and Drainage

- 3.3.3.1 Reference to Severn Trent Water public sewer records identifies adopted drainage infrastructure in the area of the site. These records are not particularly clear.

- 3.3.3.2 These records have been incorporated in **Appendix 4A** and identify:

- Combined sewer system running alongside Ross Road/Carisbrooke Road to the west of the site and then down Old Dean Road heading south.
- Foul network within the adjacent residential development including a pumping station alongside Ross Road.
- Surface water system within the adjacent residential development with 3 No. connections shown across Carisbrooke Road into the southern boundary watercourse network.

3.3.4 Comment

- 3.3.4.1 On the basis of the assessment of the potential sources of flood risk described above, the risks associated with the following need to be considered;

- Surface water flooding
- Development drainage proposals

4.0 SURFACE WATER RUNOFF

4.1 Requirements for Surface Water Drainage of the Site

- 4.1.1 The NPPF recommends that surface water generated by the development site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development.
- 4.1.2 Proposals should ensure that peak flow rates of surface water leaving the developed site are no greater than those prior to development.

4.2 Site Area

- 4.2.1 The overall site area comprises 9.72 hectares of which the area proposed for development is 5.67 hectares.

4.3 Existing Site Run Off

- 4.3.1 The existing site is greenfield.
- 4.3.2 Existing greenfield run off rates have been calculated based on the Wallingford FEH method for the developable area (**Appendix 5**) and these are as follows;

- $Q_{bar...}$ 13.84 litres/sec
- $Q_{1...}$ 12.18 litres/sec
- $Q_{30...}$ 24.63 litres/sec
- $Q_{100...}$ 30.17 litres/sec

4.4 Surface Water Run Off from the Developed Site

- 4.4.1 The development plan is incorporated in **Appendix 7**.
- 4.4.2 Uncontrolled flows from the development will exceed greenfield run off rates. For the purposes of this FRA, it is considered that development run off rates limited to the greenfield run off rates identified in 4.3.2 would be appropriate.

5.0 SURFACE WATER DRAINAGE HIERARCHY

5.1 National Planning Practice Guidance

5.1.1 National Planning Practice Guidance states the aim that surface water run off should be discharged as high up the drainage hierarchy as reasonably practicable;

- Into the ground (infiltration)
- To a surface water body or watercourse
- To a surface water sewer, highway drain or other drainage system
- To a combined sewer

The following measures have therefore been considered and identified.

5.2 Potential for Ground Infiltration Based Drainage

5.2.1 Geoenvironmental assessment work has identified that the site is mapped as being underlain by sandstones, likely to be weathered at surface and therefore potentially suitable for infiltration.

However given the sloping nature of the site the introduction of infiltration based drainage within the main body of the development is not recommended due to the potential for springs to appear at lower levels and create flooding problems.

5.2.2 With regard to infiltration potential to the low southern area, investigation work was undertaken in November 2018 (**Appendix 6**) and included 3 No. investigation locations within this area, SA1, SA2 and WS2.

SA1 encountered topsoil overlying firm clays to 2.05m in turn overlying sandstone. Soakaway tests did identify infiltration capabilities but given the presence of overlying clays, this was achieved at depth within the underlying sandstone.

SA2 encountered topsoil overlying firm, soft clays to 2.75m overlying sand. The soakaway test which was taken into the underlying sand identified zero infiltration.

WS2 encountered 2m of made ground comprising clay overlying a 0.4m band of sand in turn overlaying clays from 2.4m.

On this basis, it has been concluded that provision of infiltration facilities within the southern tip of the site will not be deliverable.

5.2.3 A positive surface water outfall from the development will therefore be required.

5.3 Surface Water Outfall

- 5.3.1 The full site area falls south to the watercourse system alongside Carisbrooke Road.
- 5.3.2 On this basis it is proposed to connect development flows into this system at the existing culvert.

6.0 FLOOD MITIGATION MEASURES

6.1 Surface Water Flooding

6.1.1 The extent of mapped surface water flooding to the south has been correlated to the topographical survey in **Appendix 3**.

6.1.2 The central northern boundary of the site comprises the top of a hill. As a result the site in its greenfield form will make a significant contribution to surface water run off which once the site is developed will be inherently contained and controlled within the drainage system.

Notwithstanding, it is proposed to locate the proposed attenuation basin, discussed under Section 6.2 below, to the north of and outside the area mapped has been impacted by surface water flooding. The area proposed for development, including access, therefore will be located not only clear of this flood area but at a higher level.

6.1.3 Setting of development levels will inherently address the localised ribbon of low risk flooding to the east boundary.

6.1.4 On this basis it is concluded that the development will not be at risk from surface water flooding.

6.2 Development Surface Water Drainage

6.2.1 Drainage Strategy

6.2.1.1 It is proposed to overall limit flows offsite to the Q_{bar} rate of 13.84 litres/sec established in Section 4.3.2. Flows will be attenuated within a SuDS attenuation basin located within the southern area of the site.

Connection will be made to the culvert at the Carisbrooke Road frontage.

6.2.1.2 Highways, houses and associated hard surfaces will be served by a piped surface water network designed to adoptable standards to ensure, at minimum, no flooding up to the 1 in 30 year event and will be discharged into the basin. Flows from the basin will pass through a hydrobrake to ensure flows do not exceed the proposed rate prior to discharging to the culvert.

Flows up to the 1 in 100 year event plus allowance for 40% climate change will be contained on site within the basin. The attenuation volumes have been assessed on preliminary basis (**Appendix 7A**) and the basin sized accordingly.

6.2.1.3 The potential for the introduction of additional SuDS and source control measures would need to be assessed at a more detailed stage and could include;

- Swales
- Filter strips
- Permeable paving
- Rain gardens

- Rills
- Water butts

6.2.2 **Future Maintenance**

- 6.2.2.1 It is proposed that the main piped network, basin and outfall will be adopted by Severn Trent Water who will become responsible for maintenance of the system for the lifetime of the development.
- 6.2.2.2 Private drainage (i.e. not adoptable) serving houses within the development will be designed to current building standards and will become the responsibility of the individual householders.

6.2.3 **Water Quality**

- 6.2.3.1 Residential development is categorised as presenting a low to very low risk to water quality.
- 6.2.3.2 Notwithstanding, the provision of trapped gullies to adoptable roads and the attenuation basin will provide two levels of treatment to address any perceived risk to water quality.
- 6.2.3.3 At detailed design stage a surface water quality treatment assessment will be undertaken on the overall drainage proposals in accordance with the simple index approach set out in the Ciria SUDS Manual and which will include the identification of any enhancement measures required to the main basin, again all in consultation with the relevant parties.

6.2.4 **Surface Water Drainage Proposals**

- 6.2.4.1 The drainage strategy for the development has been prepared accordingly and is incorporated in **Appendix 7B**.

6.3 **Land Drainage**

- 6.3.1 Land drainage will be introduced at the northern boundary to the development to pick up any incoming flows and direct them safely around the development down to the southern boundary watercourse network. However, since the site is located on the top of a hill it is anticipated that any incoming flows are likely to be relatively nominal.

6.4 **Floor Levels and Exceedance Flows**

- 6.4.1 Floor levels will generally be set a minimum of 0.15m above external ground level and will encourage any flows generated by an exceedance event (i.e. greater than the 1 in 100 year plus climate change design event) to pass safely through the development (**Appendix 7B**).

6.5 **Land Drainage Consent**

- 6.5.1 Formal land drainage consent will be required from the Lead Local Flood Authority for the connection to the watercourse.

7.0 **FOUL DRAINAGE**

- 7.1 It is proposed that connection for foul flows be made to the combined system at the junction of Hollywell Road, Ross Road and Carisbrooke Road and this has been agreed by Severn Trent Water (**Appendix 4B**) who have also noted that due to the size of development they will need to undertake further assessment work. It is noted here that this will not compromise the agreement to connect.

Levels dictate that this connection will need to be pumped.

- 7.2 The foul system including pumping station will be designed to adoptable standards and submitted for adoption under the new Sewerage Sector Guidance by Severn Trent Water in conjunction with the surface water scheme.
- 7.3 The outline foul drainage strategy for the development has been prepared accordingly and is incorporated in **Appendix 7B**.

8.0 **CONCLUSIONS**

- 8.1 The proposed development is classified in the NPPF as 'More Vulnerable' and is located within a Zone 1 area of flood risk.

Potential sources of flooding from watercourse systems, water bodies and groundwater have been considered, found to be negligible and can be discounted.

Whilst a mapped area of surface water flood risk has been identified occupying the southern tip of the site, it is proposed to locate the SuDS basin outside this area of risk with the area proposed for development located beyond at a higher level. Setting of development levels will inherently address the localised ribbon of low risk flooding to the east boundary. The risk from surface water flooding can therefore also be discounted.

This FRA has therefore demonstrated that no built development within the site boundary will be located on an area that would be at risk of flooding from any source having regard to reasonably foreseeable potential changes in flood risk. On this basis the sequential and exception tests will not apply.

- 8.2 Geoenvironmental Assessment work has identified that whilst ground conditions may be suitable for surface water infiltration based drainage the introduction of infiltration drainage within the main body of the development could create a flood risk and is therefore not recommended due to the topography.

Investigation in the area of the low southern corner of the site has identified ground conditions as being unsuitable for infiltration.

It is therefore proposed to connect surface water drainage into the watercourse alongside Carisbrooke Road.

- 8.3 It is proposed to overall limit flows offsite to the Q_{bar} rate with flows to be contained in an attenuation basin located within the southern area of the site.

Highways, houses and associated hard surfaces will be served by a piped surface water network designed to adoptable standards to ensure, at minimum, no flooding up to the 1 in 30 year event and will be discharged into the basin which will overall contain flows up to the 1 in 100 year event plus allowance for 40% climate change.

The potential for the introduction of additional SuDS and source control measures would need to be assessed at a more detailed stage.

- 8.4 It is proposed that the main piped network, basin and outfall will be adopted by Severn Trent Water who will become responsible for maintenance of the system for the lifetime of the development.

Private drainage (i.e. not adoptable) serving houses within the development will be designed to current building standards and will become the responsibility of the individual householders.

- 8.5 Residential development is categorised as presenting a low to very low risk to water quality. Notwithstanding, the provision of trapped gullies to adoptable roads and the attenuation basin will provide two levels of treatment to address any perceived risk to water quality.

At detailed design stage a surface water quality treatment assessment will be undertaken on the overall drainage proposals in accordance with the simple index approach set out in the Ciria SUDS Manual and which will include the identification of any enhancement measures required to the main basin, again all in consultation with the relevant parties.

- 8.6 Land drainage will be introduced at the northern boundary to the development to pick up any incoming flows, considered likely to be relatively nominal, and direct them safely around the development down to the southern boundary watercourse network.

- 8.7 Formal land drainage consent will be required from the Lead Local Flood Authority for the connection to the watercourse.

- 8.8 Floor levels will generally be set a minimum of 0.15m above external ground level and will encourage any flows generated by an exceedance event (i.e. greater than the 1 in 100 year plus climate change design event) to pass safely through the development.

- 8.9 It is proposed that connection for foul flows be made to the combined system at the junction of Hollywell Road, Ross Road and Carisbrooke Road and this has been agreed by Severn Trent Water who have also noted that due to the size of development they will need to undertake further assessment work. It is noted here that this will not compromise the agreement to connect.

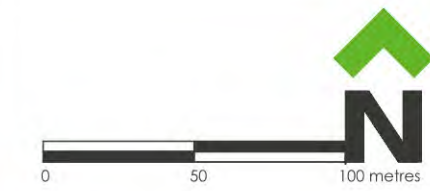
Levels dictate that this connection will need to be pumped.

The foul system including pumping station will be designed to adoptable standards and submitted for adoption under the new Sewerage Sector Guidance by Severn Trent Water in conjunction with the surface water scheme.

- 8.10 It is therefore concluded that this FRA has demonstrated in accordance with the NPPF that the development can be delivered so as not to be at risk of flooding from external sources or from within the development and so as not to increase flood risk to the surrounding area and is therefore appropriate.

Appendix 1: Site Details

Appendix 1A: Site Location



 Site Boundary: **9.72ha**

Rev	Date	By	Description

Drawing Status
FOR INFORMATION

CSA
environmental

Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT

t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

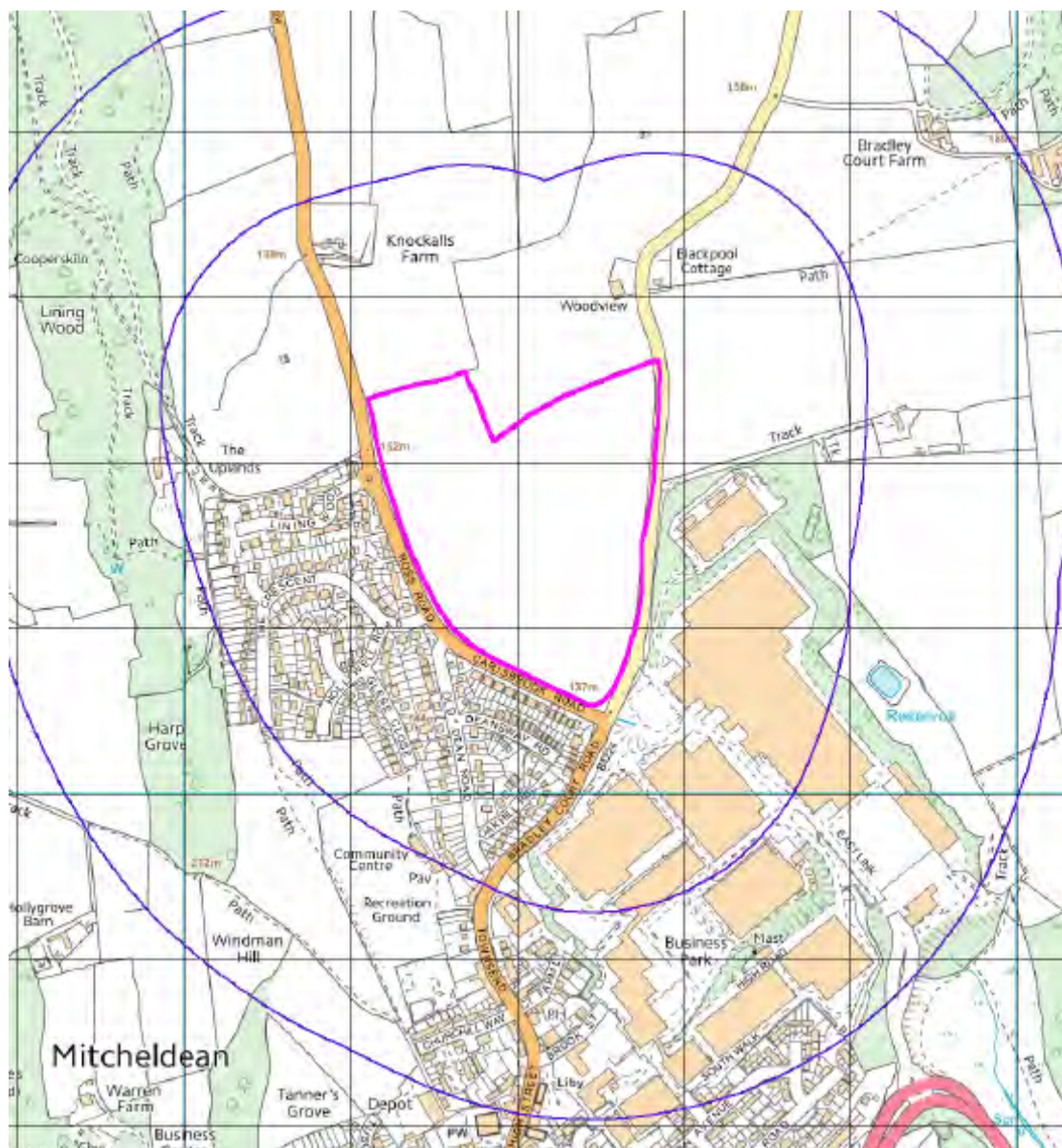
Project Carisbrooke Road,
Mitcheldean

Title Site Location Plan

Client Gladman Developments Ltd

Scale	1:2500 @ A3	Drawn	SM
Date	June 2024	Checked	RR
Drawing No.	CSA/4057/115	Rev	-

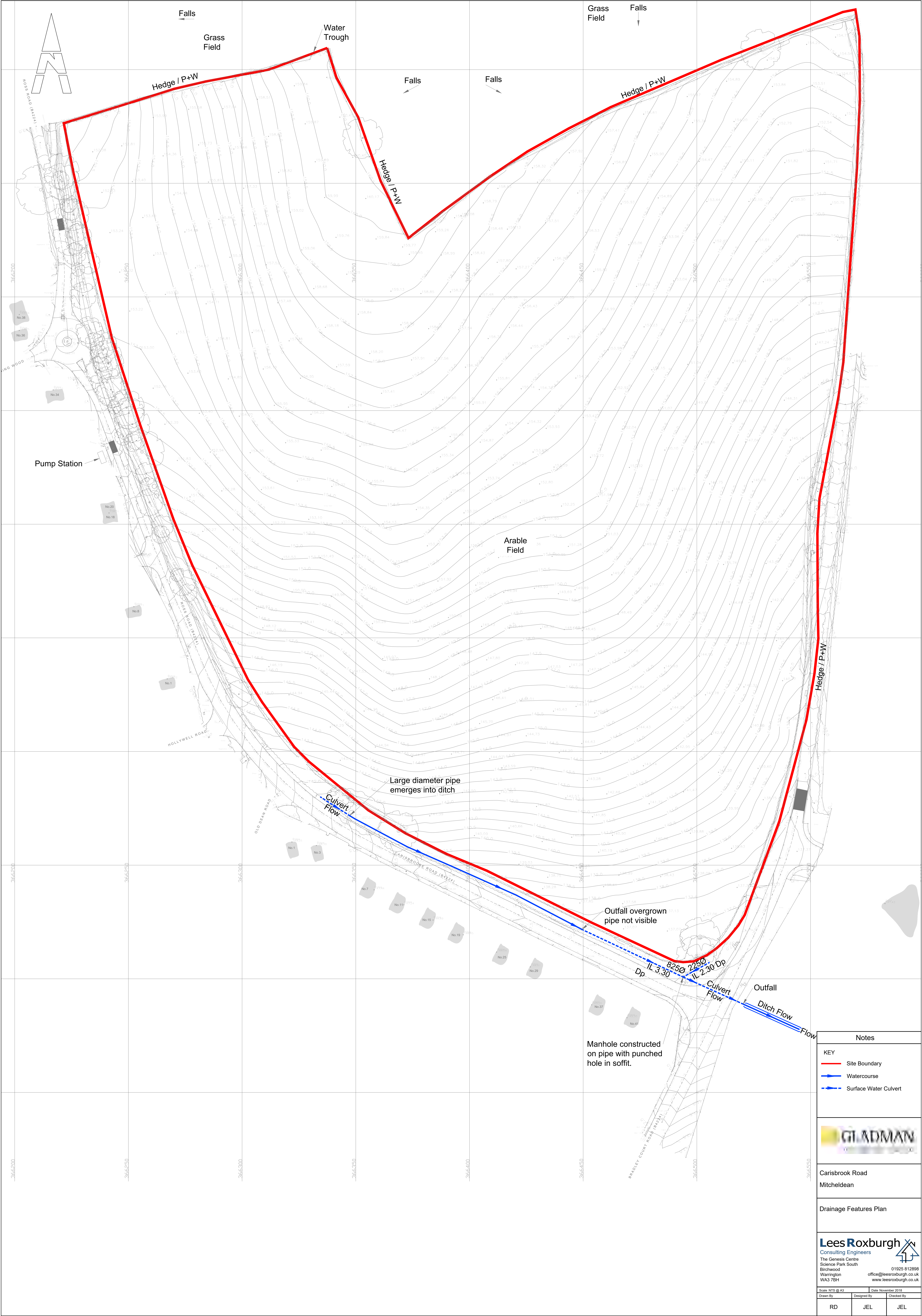
Appendix 1B: Watercourse Systems



WATERCOURSE SYSTEMS

CARISBROOK ROAD, MITCHELDEAN, GLOUCESTERSHIRE

Appendix 1C: Drainage Features



Notes

KEY

Site Boundary

Watercourse

Surface Water Culvert

Carisbrook Road

Mitcheldean

Drainage Features Plan

LeesRoxburgh

Consulting Engineers

The Genesis Centre

Science Park South

Birchwood

Warrington

WA3 7BH

01925 812888

office@leesroxburgh.co.uk

www.leesroxburgh.co.uk

Scale: A3

Date: November 2018

Drawn By: RD

Designed By: JEL

Checked By: JEL

Appendix 1D: Dye Testing 6th March 2019

From: [Matthew Banks](#)
To: [Lees Roxburgh](#)
Subject: RE: Carrisbrook Road, Mitcheldean, Gloucestershire: Dye Testing of Existing Culvert 6326/5.8
Date: 07 March 2019 15:04:04

Hi Karen,

The engineers arrived on site and using the drawings provided located point X first, then made their way to point Y to locate that. Upon locating this, one engineer stayed at the outfall while the driver went back to point X to start the process of dye testing. We placed around 2litres of dye mix into point X. The photos provided were taken between 10-15 minutes later proving connectivity between point X and point Y.

If you require anything else, please feel free to call.

Matt

From: Lees Roxburgh [mailto:Office@leesroxburgh.co.uk]
Sent: 07 March 2019 12:36
To: Matthew Banks <Matthew.Banks@lanesfordrains.co.uk>
Subject: RE: Carrisbrook Road, Mitcheldean, Gloucestershire: Dye Testing of Existing Culvert 6326/5.8

Hi Matthew,

Thanks for these. Is there a report of your investigation to follow?

Regards,

Karen Blaydon

LEES ROXBURGH Ltd, The Genesis Centre, Science Park South, Birchwood, Warrington, WA3 7BH
Tel: **01925 812 898**, Fax: **01925 838 864**, Email: office@leesroxburgh.co.uk, Web Site: www.leesroxburgh.co.uk

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From: Matthew Banks <Matthew.Banks@lanesfordrains.co.uk>
Sent: 07 March 2019 09:04
To: Lees Roxburgh <Office@leesroxburgh.co.uk>
Subject: RE: Carrisbrook Road, Mitcheldean, Gloucestershire: Dye Testing of Existing Culvert 6326/5.8

Hi John,

Please see attached photos evidencing the dye coming from the outfall as marked on the drawings.

If you require anything else, please feel free to call.

Many Thanks,

Matt

From: Lees Roxburgh [<mailto:Office@leesroxburgh.co.uk>]
Sent: 04 March 2019 15:56
To: Matthew Banks <Matthew.Banks@lanesfordrains.co.uk>
Subject: RE: Carrisbrook Road, Mitcheldean, Gloucestershire: Dye Testing of Existing Culvert 6326/5.8

Thanks Matthew.

John

From: Matthew Banks <Matthew.Banks@lanesfordrains.co.uk>
Sent: 04 March 2019 11:15
To: Lees Roxburgh <Office@leesroxburgh.co.uk>
Subject: RE: Carrisbrook Road, Mitcheldean, Gloucestershire: Dye Testing of Existing Culvert 6326/5.8

Hi John,

I can complete this on Wednesday.

Shall I use your name as our reference? No CCTV will be completed on site.

Matt

From: Lees Roxburgh [<mailto:Office@leesroxburgh.co.uk>]
Sent: 04 March 2019 09:20
To: Matthew Banks <Matthew.Banks@lanesfordrains.co.uk>
Subject: Carrisbrook Road, Mitcheldean, Gloucestershire: Dye Testing of Existing Culvert 6326/5.8

Hi Matt,

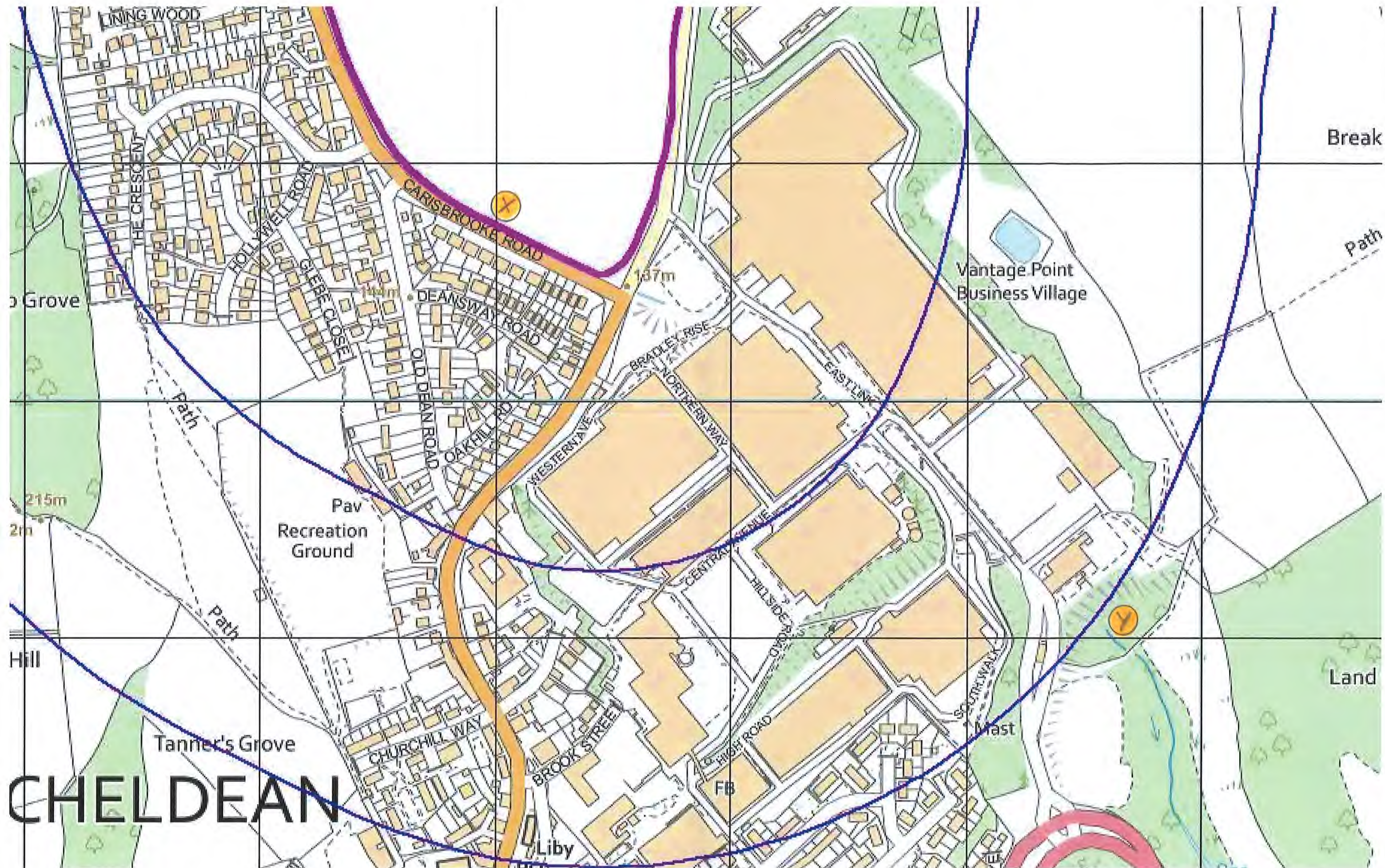
I confirm acceptance of your quote.

To confirm no CCTV work to be done, simply dye testing.

Please confirm receipt of this email and advise programme.

Many thanks.

John Lees







Appendix 1E: OS Contours



Appendix 2: Topographical Survey

2018-089 Topo_01 & 02_2D



THIS SURVEY IS ORIENTATED TO ORDNANCE SURVEY GRID NORTH. THE SURVEY IS TO A PLANE GRID. HORIZONTAL MEASUREMENTS TAKEN FROM THIS SURVEY WILL BE GROUND DISTANCES.

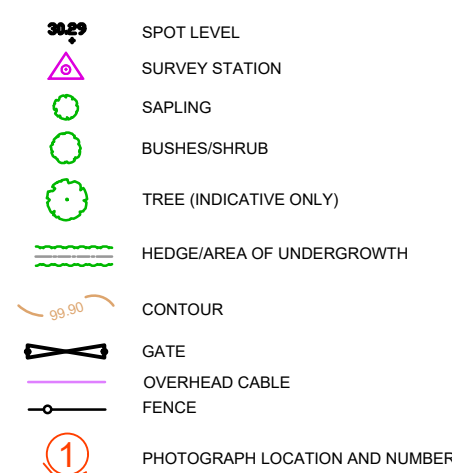
LOCAL SCALE FACTOR: 0.9666151

ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM GENERATED BY ACTIVE GPS NETWORK.

NO ALLOWANCE HAS BEEN MADE FOR SUB SURFACE ACCESS TO MANHOLES OR CHAMBERS. ANY PIPE SIZES, DEPTHS OR BELOW GROUND DIMENSIONS ARE TAKEN FROM THE SURFACE AND THIS WILL ONLY BE APPROXIMATE. ANY FLOW TYPES (FOUL WATER, SURFACE WATER OR COMBINED) ARE ASSUMED AND THEREFORE REQUIRE VERIFICATION.

ROAD MARKINGS:-
ROAD MARKINGS DISPLAYED ARE SYMBOLIC. LENGTH, SPACING AND THICKNESS
ETC. ARE INDICATIVE ONLY.

LEGEND



ABBREVIATIONS

[illegible]

STATION CO-ORDINATES

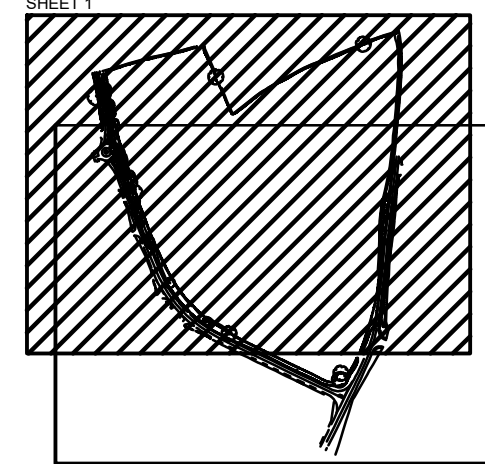
STATION	EASTING	NORTHING	LEVEL	DESCRIPTION
STN4	366372.20	219147.32	139.29	Survey Nail
STN8	366246.57	219320.50	149.62	Survey Nail
STN9	366301.67	219195.91	143.58	Survey Nail

TREE SCHEDULE

No.	CHAM	SPREAD	HEIGHT
TE0	0.50	8	8
TE1	1.30	10	10
TE2	0.50	8	8
TE3	0.50	8	8
TE4	0.50	8	8
TE5	0.50	8	8
TE6	0.50	10	10
TE7	0.50	10	10
TE8	0.50	10	10
TE9	0.50	20	10
TE10	0.50	20	10
TE11	0.50	20	10
TE12	0.50	20	10
TE13	0.50	8	10
TE14	0.50	8	10
TE15	0.50	8	10
TE16	0.50	8	10
TE17	0.50	12	10
TE18	0.50	12	10
TE19	0.50	12	10
TE20	0.50	8	10
TE21	0.50	8	10
TE22	0.50	8	10
TE23	0.50	22	20
TE24	0.50	12	20
TE25	0.50	12	20
TE26	0.50	12	10
TE27	0.50	12	10
TE28	0.50	12	10
TE29	0.50	16	10
TE30	0.50	16	10
TE31	0.50	2	16
TE32	0.50	2	16
TE33	0.70	14	16
TE34	0.50	16	16
TE35	0.50	8	16
TE36	0.50	8	16
TE37	0.50	8	16
TE38	0.50	10	12
TE39	0.50	10	12
TE40	0.50	10	12
TE41	0.50	10	12
TE42	0.50	8	12
TE43	0.50	8	12
TE44	0.50	14	12
TE45	0.50	14	12
TE46	0.50	14	12
TE47	0.50	16	16
TE48	0.50	16	16
TE49	0.50	16	16
TE50	0.70	14	16
TE51	0.50	16	16
TE52	0.50	16	16
TE53	0.75	14	16
TE54	0.50	16	16
TE55	0.50	8	16
TE56	0.50	8	16
TE57	0.50	8	16
TE58	0.50	12	16
TE59	0.40	12	16
TE60	0.50	10	8
TE61	0.50	10	8
TE62	0.50	10	8

TREE DIAMETER MEASURED APPROXIMATELY 1.5M ABOVE GROUND LEVEL. TREE SPREADS ARE SYMBOLIC ONLY AND ARE REPRESENTATIVE OF THE GENERALISED CANOPY SIZE. TREE BOLE MAY NOT SIT CENTRALLY TO THE CANOPY. TREE HEIGHT ESTIMATED FROM CROWN TO LOGS.

PLOT LOCATIONS



★	★	★	★
A	08.10.24	Gullies south of site investigated	JW
Rev	Date	Revision notes	By

Status	
--------	--

INFORMATION

Project

Carisbrooke Road, Mitcheldean.

Title

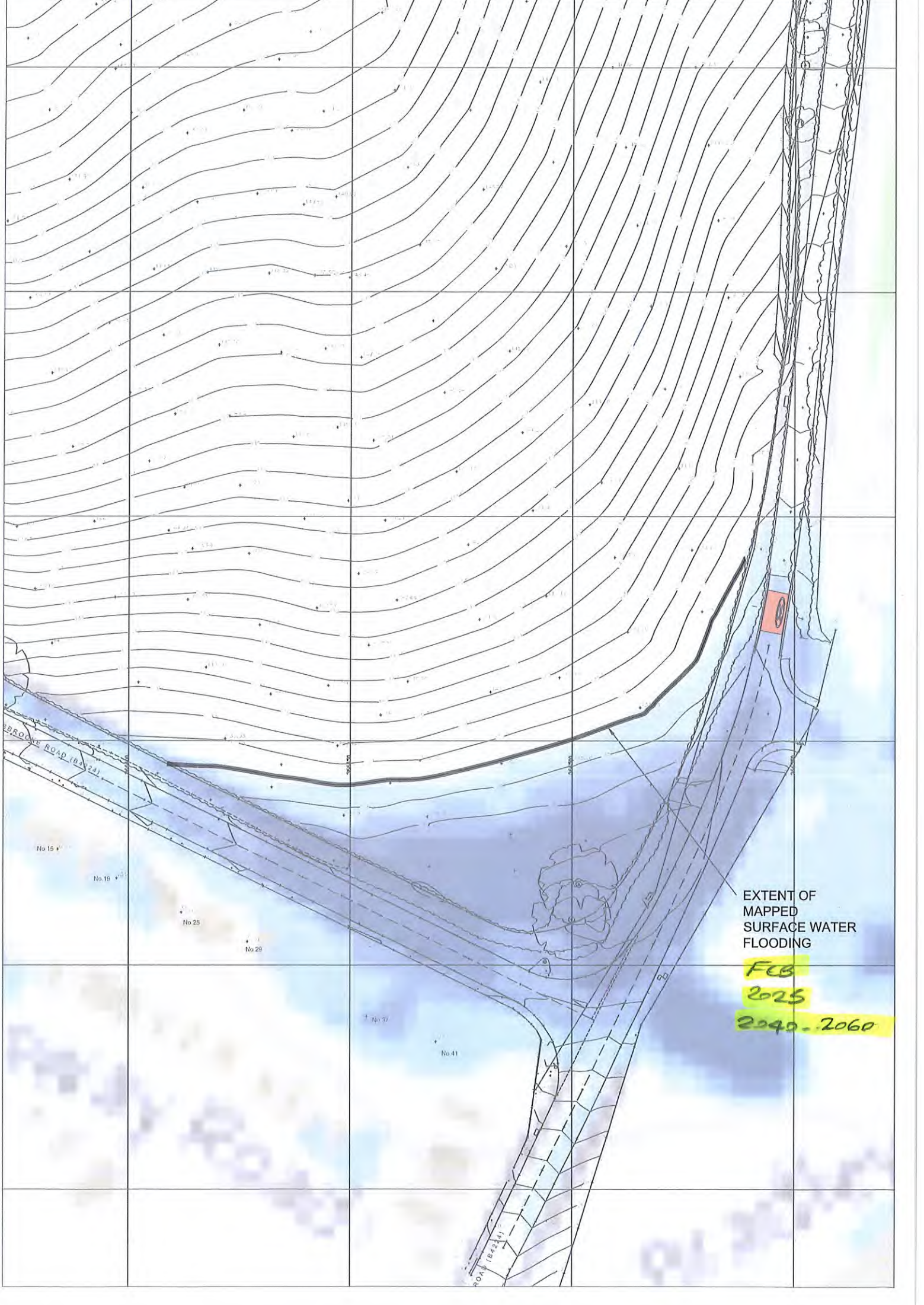
TOPOGRAPHICAL SURVEY
AS OF 01.10.18
SHEET 1 OF 2

H:\AutoCAD Files\Standards\Images\Drawing block RGB_new.jpg

Drawn By	Publish Date	Scale(s)	Sheet Size
JH	04.10.18	1:500	A0
Project no. 2018-089		Drawing no. Topo_01_2D	Revision A

Appendix 3: Surface Water Flooding

**Extent of Mapped Flooding 2040 – 2060
Correlated to Survey**



EXTENT OF
MAPPED
SURFACE WATER
FLOODING

FEB
2025
2040 - 2060

Appendix 4: Severn Trent Water

Appendix 4A: Public Sewer Records



0m 250m 500m

Map Centre: 366440,218242

Scale: 1:1250

Data updated: 14/05/24

Our Ref: 1474892 - 1

Wastewater Plan A0

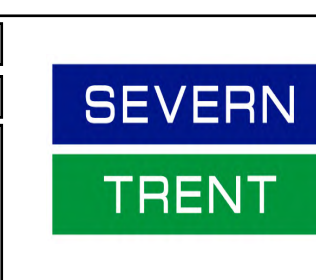
(c) Crown copyright and database rights 2024 Ordnance Survey 100031673

Date: 23/06/24

Do not scale of this map. The plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or made. In particular, this plan and any information shown on it shall not be relied upon in the event of any development or works. It is hereby acknowledged that the plan and any information shown on it is not intended to be used for the purpose of determining the liability of any person or corporation in the event of any claim or damage. The plan and any information shown on it is not intended to be used for the purpose of determining the liability of any person or corporation in the event of any claim or damage. The plan and any information shown on it is not intended to be used for the purpose of determining the liability of any person or corporation in the event of any claim or damage.

Public: Final Gravity/Lateral Drain	Highway Drain	Mainline Final
Public: Combined Gravity/Lateral Drain	Overflow Pipe	Mainline Surface
Public: Surface Water Gravity/Lateral Drain	Disposal Pipe	Abandoned Pipe
Pressure Final	Customer Water Course	Overhead
Pressure Combined	Pumping Station	Overhead (Red line with black dots)
Pressure Surface Water	Pitting	Overhead (Blue line with black dots)

Office@severn.co.uk
Mitchellian 6326





GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on: **0800 783 4444 (24 hours)**

- a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991(a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as "STW Apparatus" in these general conditions and precautions.
- b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.
- c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.
- d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.
- e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).
- f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.
2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).
3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.
4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.
5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.
6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.
7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.
8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.
9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.
10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.
11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.
12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.
13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants.
14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.
16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.
17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014
18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.
19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
3701	C	148.47	146.65	1.82
3801	C	153.15	151.27	1.88
3802	C	151.36	149.45	1.91
3803	C	150.53	148.61	1.92
3804	C		0	0
3806	C		0	0
4701	C	148.31	146.9	1.51
4704	C	149.06	147.76	1.3
5707	C	139.54	137.18	2.36
5718	C	138.43	136.32	2.11
5719	C	138.41	136.4	2.01
6803	C	136.04	134.52	1.52
7801	C	135.99	134.01	1.98
8702	C	126.11	120.86	4.25
8802	C		0	0
8903	C		0	0
8904	C		0	0
9706	C	118.66	117.21	1.45
9802	C		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
0000	F		0	0
0001	F		0	0
0003	F		0	0
0100	F		0	0
0101	F		0	0
0103	F		0	0
0104	F		0	0
0107	F		0	0
0109	F		0	0
0111	F		0	0
0114	F		0	0
0116	F		0	0
0117	F		0	0
0118	F		0	0
0119	F		0	0
0121	F		0	0
0122	F		0	0
0126	F		0	0
0127	F		0	0
0128	F		0	0
0129	F		0	0
0200	F		0	0
0202	F		0	0
0204	F		0	0
0206	F		0	0
0207	F		0	0
0208	F		0	0
0210	F		0	0
0212	F		0	0
0213	F		0	0
0214	F		0	0
0217	F		0	0
0219	F		0	0
0220	F		0	0
1000	F		0	0
1001	F		0	0
1002	F		0	0
1003	F		0	0
1004	F		0	0
1006	F		0	0
1007	F		0	0
1009	F		0	0
1010	F		0	0
1100	F		0	0
1101	F		0	0
1102	F		0	0
1103	F		0	0
1104	F		0	0
1105	F		0	0
1106	F		0	0
1107	F		0	0
1108	F		0	0
1109	F		0	0
1110	F		0	0
1111	F		0	0
1112	F		0	0
1113	F		0	0
1114	F		0	0
1115	F		0	0
1116	F		0	0
1117	F		0	0
1118	F		0	0
1119	F		0	0
1120	F		0	0
1121	F		0	0
1122	F		0	0
1123	F		0	0
1124	F		0	0
1125	F		0	0
1126	F		0	0
1127	F		0	0
1128	F		0	0
1129	F		0	0
1130	F		0	0
1132	F		0	0
1133	F		0	0
1134	F		0	0
1135	F		0	0
1136	F		0	0
1137	F		0	0
1138	F		0	0
1139	F		0	0
1140	F		0	0
1141	F		0	0
1143	F	154.63	153.79	0.84
1144	F	156.21	154.91	1.3
1145	F	157.82	155.71	2.11
1200	F		0	0
1201	F		0	0
1202	F		0	0
1203	F		0	0
1204	F		0	0
1205	F		0	0
1206	F		0	0
1207	F		0	0
1208	F		0	0
1209	F		0	0
1210	F		0	0
1211	F		0	0
1212	F		0	0
1213	F		0	0
1214	F		0	0
1216	F		0	0
1218	F		0	0
1219	F		0	0
1220	F		0	0
1221	F		0	0
1224	F		0	0
1225	F		0	0
1226	F		0	0
1227	F		0	0
1228	F		0	0
1229	F		0	0
1230	F		0	0
1231	F		0	0
1232	F		0	0
1233	F		0	0
1234	F		0	0
1235	F		0	0
1236	F		0	0
1237	F		0	0
1238	F		0	0
1239	F		0	0
1240	F		0	0
1241	F		0	0

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
1242	F		0	0
1244	F		0	0
1245	F		0	0
2000	F		0	0
2001	F		0	0
2003	F		0	0
2004	F		0	0
2006	F		0	0
2006	F		0	0
2008	F		0	0
2009	F		0	0
2010	F		0	0
2011	F		0	0
2012	F		0	0
2013	F		0	0
2014	F		0	0
2015	F		0	0
2016	F		0	0
2101	F		0	0
2103	F		0	0
2104	F		0	0
2106	F		0	0
2107	F		0	0
2108	F		0	0
2109	F		0	0
2110	F		0	0
2111	F		0	0
2112	F		0	0
2113	F		0	0
2114	F		0	0
2115	F		0	0
2116	F		0	0
2117	F		0	0
2118	F		0	0
2120	F		0	0
2121	F		0	0
2122	F		0	0
2123	F		0	0
2126	F		0	0
2127	F		0	0
2128	F		0	0
2129	F		0	0
2130	F		0	0
2131	F		0	0
2132	F		0	0
2133	F		0	0
2134	F		0	0
2135	F		0	0
2138	F		0	0
2139	F		0	0
2140	F		0	0
2141	F		0	0
2143	F		0	0
2144	F		0	0
2145	F		0	0
2146	F		0	0
2200	F		0	0
2201	F		0	0
2202	F		0	0
2203	F		0	0
2204	F		0	0
2205	F		0	0
2206	F		0	0
2207	F		0	0
2208	F		0	0
2209	F		0	0
2210	F		0	0
2211	F		0	0
2212	F		0	0
2213	F		0	0
2214	F		0	0
2215	F		0	0
2216	F		0	0
2217	F		0	0
2218	F		0	0
2219	F		0	0
2220	F		0	0
2221	F		0	0
2222	F		0	0
2223	F		0	0
2224	F		0	0
2225	F		0	0
2226	F		0	0
2227	F		0	0
2228	F		0	0
2229	F		0	0
2230	F		0	0
2231	F		0	0
2232	F		0	0
2233	F		0	0
2234	F		0	0
2235	F		0	0
2236	F		0	0
2237	F		0	0
2238	F		0	0
2239	F	151.59	150.54	1.05
2300	F	151.63	0	0
2302	F		0	0
2303	F		0	0
2900	F	155.67	154.84	0.83
2901	F	155.66	154.85	0.81
2902	F	155.56	154.22	1.34
3000	F		0	0
3001	F		0	0
3002	F		0	0
3003	F		0	0
3004	F		0	0
3005	F		0	0
3007	F		0	0
3008	F		0	0
3009	F		0	0
3010	F		0	0
3011	F		0	0
3012	F		0	0
3013	F		0	0
3014	F		0	0
3017	F		0	0
3018	F		0	0
3019	F		0	0
3020	F		0	0
3021	F		0	0
3022	F		0	0
3024	F		0	0
3026	F		0	0
3027	F		0	0
3028	F	143.87	143.11	0.76
3100	F		0	0
3101	F		0	0
3102	F		0	0
3103	F		0	0
3105	F		0	0
3106	F		0	0
3107	F		0	0
3108	F		0	0
3109	F		0	0
3110	F		0	0
3111	F		0	0
3112	F		0	0
3113	F		0	0
3116	F		0	0
3117	F		0	0
3800	F	153.31	0	0
3900	F		0	0
3901	F		0	0
3902	F		0	0
3903	F		0	0
3904	F		0	0
3905	F		0	0
3906	F		0	0
3907	F		0	0

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
3908	F		0	0
3909	F		0	0
3910	F		0	0
3911	F		0	0
3912	F		0	0
3913	F		0	0
3914	F		0	0
3915	F		0	0
3916	F		0	0
3917	F		0	0
3918	F		0	0
3919	F		0	0
3920	F		0	0
3921	F		0	0
3922	F		0	0
3923	F		0	0
3924	F		0	0
3926	F		0	0
3927	F		0	0
3928	F		0	0
3929	F		114.17	0
3930	F		52.06	0
3931	F	154.99	154.19	0.8
3932	F	154.74	154.36	0.38
3933	F	154.74	154.35	0.39
3934	F	154.75	154.09	0.66
4000	F		0	0
4001	F		0	0
4002	F		0	0
4005	F		0	0
4006	F		0	0
4007	F		0	0
4008	F		0	0
4010	F		0	0
4011	F		0	0
4012	F		0	0
4013	F		0	0
4014	F		0	0
4015	F		0	0
4016	F		0	0
4017	F		0	0
4019	F		0	0
4020	F		0	0
4022	F		0	0
4023	F		0	0
4024	F		0	0
4025	F		0	0
4026	F		0	0
4027	F		0	0
4028	F		0	0
4029	F		0	0
4030	F		0	0
4031	F		0	0
4032	F		0	0
4033	F		0	0
4034	F		0	0
4035	F		0	0
4036	F		0	0
4038	F	142.3	140.33	1.97
4040	F	140.42	138.54	1.88
4100	F		0	0
4101	F		0	0
4102	F		0	0
4103	F		0	0
4104	F		0	0
4105	F		0	0
4106	F	137.63	136.04	1.59
4107	F	137.58	135.99	1.59
4900	F		0	0
4901	F		0	0
4902	F		0	0
4903	F		0	0
0002	S		0	0
0102	S		0	0
0105	S		0	0
0106	S		0	0
0108	S		0	0
0110	S		0	0
0112	S		0	0
0113	S		0	0
0115	S		0	0
0120	S		0	0
0123	S		0	0
0124	S		0	0
0125	S		0	0
0130	S	165.1	163.26	1.84
0131	S	164.18	162.65	1.53
0201	S		0	0
0203	S		0	0
0205	S		0	0
0209	S		0	0
0211	S		0	0
0215	S		0	0
0216	S		0	0
0218	S		0	0
0221	S	162.54	161.06	1.48
0305	S		0	0
0308	S		0	0
0311	S	154.51	152.89	1.62
0313	S		0	0
0312	S	151.9	0	0
0314	S	153.75	152.25	1.5
0315	S		0	0
0317	S		0	0
0322	S		0	0
0323	S		0	0
0324	S		0	0
0326	S		0	0
0327	S		0	0
0328	S		0	0
0329	S		0	0
0330	S	146.68	0	0
0331	S	146.52	145.41	1.11
0332	S	146.96	145.95	1.01
0333	S	148.8	0	0
0334	S		0	0
0335	S		0	0
0336	S		0	0
0337	S		0	0
0338	S		0	0
0339	S		0	0
0340	S		0	0
0341	S		0	0
0342	S		0	0
0343	S		0	0
0344	S		0	0
0345	S		0	0
0346	S		0	0
0347	S		0	0
0348	S		0	0
0349	S		0	0
0350	S		0	0
0351	S		0	0
0352	S		0	0
0353	S		0	0
0354	S		0	0
0355	S		0	0
0356	S		0	0
0357	S		0	0
0358	S		0	0
0359	S		0	0
0360	S		0	0
0361	S		0	0
0362	S		0	0
0363	S		0	0
0364	S		0	0
0365	S		0	0
0366	S		0	0
0367	S		0	0
0368	S		0	0
0369	S		0	0
0370	S		0	0
0371	S		0	0
0372	S		0	0
0373	S		0	0
0374	S		0	0
0375	S		0	0
0376	S		0	0
0377	S		0	0
0378	S		0	0
0379	S		0	0
0380	S		0	0
0381	S		0	0
0382	S		0	0
0383	S		0	0
0384	S		0	0
0385	S		0	0
0386	S		0	0
0387	S		0	0
0388	S		0	0
0389	S		0	0
0390	S		0	0
0391	S		0	0
0392	S		0	0
0393	S		0	0
0394	S		0	0
0395	S		0	0
0396	S		0	0
0397	S		0	0
0398	S		0	0
0399	S		0	0
0400	S		0	0
0401	S		0	0
0402	S		0	0

Appendix 4B: Letter of 11th June 2024

WONDERFUL ON TAP



Lees Roxburgh Ltd,
The Genesis Centre,
Science Park South,
Birchwood,
Warrington,
WA3 7BH.

FAO John Lees

11th June 2024

Dear Mr Lees,

Severn Trent Water Ltd
Leicester Water Centre
Gorse Hill
Anstey
Leicester
LE7 7GU

www.stwater.co.uk
Network.Solutions@severntrent.co.uk

Contact: Emma Nowak
Mob: 07970361864

Our ref: 1118649

**Proposed Residential Development (180 Dwellings) at:
Carisbrooke Road, Mitcheldean, Gloucestershire, GL17 0SA.**

X: 366420 / Y: 219350

I refer to your Development Enquiry Request submitted in respect of the above site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) referred to below.

Public Sewers in Site – Required Protection

There are no public sewers crossing the proposed development site area.

Please Note: On 1st October 2011 many private sewers were transferred into the ownership of Severn Trent Water as public sewers, where two or more properties in separate ownership are served by those sewers. Most of these former private sewers will not be shown on the public sewer records, therefore a full site survey should be carried out prior to any layout design or construction works to identify where these sewers may be and to avoid later delays and possible added costs.

Foul Water Drainage

The closest point of connection for foul flows from the site would be to the public 150mm combined sewer located west of the site at the junction of Hollywell Road, Ross Road & Carisbrook Road. Due to the size of the development, further assessment would be

WONDERFUL ON TAP



needed to determine the impact of the proposed 180 dwellings on the receiving network.

We are undergoing a prioritisation process of all investment requirements and emerging risks from growth on our network and treatment works as we build our plan for the coming Asset Management Plan period (2025-2030) and beyond. We will pass details of your site over for consideration and feedback if anything arises which is of concern. We will let you know as soon as possible if anything will affect your connection point or timescales, should we need to make representation to the Planning Authority to apply conditions relating to phasing or occupation of the site.

Surface Water Drainage

Under the terms of Section H of the Building Regulations 2000, the disposal of surface water by means of soakaways should be considered as the primary method. If this is not practical and no watercourse is available as an alternative, the use of sewerage should be considered. In addition, other sustainable drainage methods should also be explored before a discharge to the public sewerage system is considered.

In the event that following testing, it is demonstrated that soakaways would not be possible on the site; satisfactory evidence will need to be submitted. The evidence should be either percolation test results or a statement from the SI consultant (extract or a supplementary letter).

STW will need to be satisfied that all SUDs options have been exhausted before discharge to public sewer. Severn Trent Water expects all surface water from the development to be drained in a sustainable way to the nearest watercourse or land drainage channel, subject to the developer discussing all aspects of the developments surface water drainage with the Local Lead Flood Authority (LLFA). Any discharge rate to a watercourse or drainage ditch will be determined by the LLFA.

Surface water will not be entering the public network.

New Connections

For any new connections including the use, reuse and indirect to the public sewerage system, the developer will need to submit Section 106 application. Our Developer Services department are responsible for handling all such enquiries and applications. To

WONDERFUL ON TAP



contact them for an application form and associated guidance notes, please call 0800 707 6600, email new.connections@severntrent.co.uk or download from www.stwater.co.uk

Please quote the above reference number in any future correspondence (including e-mails) with STW Limited. Please send **all correspondence** to the network.solutions@severntrent.co.uk email inbox address, a response will be made within 15 days.

If you require a VAT receipt for the application fee please email MISCINCOME.NC@SEVERNTRENT.CO.UK quoting the above Reference Number.

Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely,

A handwritten signature in grey ink, appearing to be "EN" or "Emma Nowak".

Emma Nowak.
Senior Evaluation Technician
Network Solutions
Developer Services

Appendix 5: Existing Run Off Rates

Wallingford FEH Method

Calculated by:	Lees Roxburgh
Site name:	6326 Carisbrook Road
Site location:	Mitcheldean

Site Details

Latitude:	51.87084° N
Longitude:	2.4889° W
Reference:	489778220
Date:	Nov 11 2024 15:15

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

Runoff estimation
approach

FEH Statistical

Site characteristics

Total site area (ha):	5.67
-----------------------	------

Methodology

Q _{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	.678
Q _{MED} (l/s):	
Q _{BAR} / Q _{MED} factor:	1.08

Hydrological
characteristics

	Default	Edited
SAAR (mm):	819	819
Hydrological region:	9	9
Growth curve factor 1 year:	0.88	0.88
Growth curve factor 30 years:	1.78	1.78
Growth curve factor 100 years:	2.18	2.18
Growth curve factor 200 years:	2.46	2.46

Notes

(1) Is $Q_{\text{BAR}} < 2.0 \text{ l/s/ha}$?

When Q_{BAR} is $< 2.0 \text{ l/s/ha}$ then limiting discharge rates are set at 2.0 l/s/ha .

(2) Are flow rates $< 5.0 \text{ l/s}$?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $\text{SPR}/\text{SPRHOST} \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q _{BAR} (l/s):		13.84
1 in 1 year (l/s):		12.18
1 in 30 years (l/s):		24.63
1 in 100 year (l/s):		30.17
1 in 200 years (l/s):		34.05

Appendix 6: Site Investigation November 2018

Appendix 6A: Investigation Plan and Logs



KEY

— APPROXIMATE SITE BOUNDARY

NOTES

- 1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
- 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS REPORTS. THIS DRAWING IS COPYRIGHT OF BSL.
- 3. DRAWING NOT FOR CONSTRUCTION PURPOSES.

REV	DATE	DESCRIPTION	BY	CKD



CLIENT			
LEES ROXBURGH LTD			
PROJECT TITLE			
CARISBROOK ROAD, MITCHELDEAN			
DRAWING TITLE			
EXPLORATORY HOLE LOCATION PLAN			
DRAWING No.	REVISION	SCALE	DATE
M4083/02	-	NTS	29/11/18
DRAWN BY		CHECKED BY	
PD		JW	



Brownfield Solutions Limited,
Unit 5, Alfred Court,
Saxon Business Park,
Stoke Prior, Worcestershire
B60 4AD

Trial Pit Log

Trialpit No

SA1

Sheet 1 of 1

Project Name: CARISBROOK ROAD

Project No.
M4083

Co-ords: 366506.00 - 219142.00
Level:

Date
27/11/2018

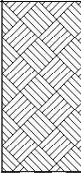
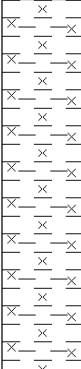
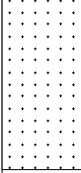
Location: MITCHELDEAN

Dimensions (m): 2.6
Depth 2.50

Scale
1:20

Logged
PD

Client: LEES ROXBURGH LTD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					Grass over brown slightly sandy clay TOPSOIL with occasional rootlets.	
				0.45			Firm to stiff reddish brown mottled bluish grey slightly sandy silty CLAY of high strength.	1
			HVR=120					
			HVR=120					
			HVR=120					
				1.43			Firm friable brown sandy CLAY.	2
				2.05				
				2.50			Bluish grey mottled reddish brown medium SANDSTONE recovered as sandy GRAVEL and COBBLES. Gravels and cobbles are angular and platy.	
							End of pit at 2.50 m	3
								4

Remarks: 1. No groundwater encountered.
2. Soil percolation test undertaken at 2.5m bgl on 27/11/2018.
3. Backfilled with arising upon completion.
4. Location surveyed using a hand-held GPS.

Stability: Sides stable.





Brownfield Solutions Limited,
Unit 5, Alfred Court,
Saxon Business Park,
Stoke Prior, Worcestershire
B60 4AD

Trial Pit Log

Trialpit No

SA2

Sheet 1 of 1

Project Name: CARISBROOK ROAD

Project No.
M4083

Co-ords: 366489.00 - 219116.00
Level:

Date
27/11/2018

Location: MITCHELDEAN

Dimensions (m): 2.3

Client: LEES ROXBURGH LTD

Depth
3.00

0.6

Scale
1:20

Logged
PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.55			Grass over brown slightly sandy clay TOPSOIL with occasional rootlets.	
				1.55			Firm friable brown very sandy CLAY.	1
			HVR=30	2.75			Soft reddish brown sandy CLAY of low strength.	2
				3.00			Brown mottled reddish brown slightly gravelly medium to coarse SAND. Gravel is angular to rounded fine to coarse predominantly of quartz and sandstone.	3
							End of pit at 3.00 m	4

Remarks: 1. No groundwater encountered.
2. Soil percolation test undertaken at 3.0m bgl on 27/11/2018.
3. Backfilled with arising upon completion.
4. Location surveyed using a hand-held GPS.

Stability: Sides stable.





Brownfield Solutions Limited,
Unit 5, Alfred Court,
Saxon Business Park,
Stoke Prior, Worcestershire
B60 4AD

Borehole Log

Borehole No.

WS2

Sheet 1 of 2

Project Name: CARISBROOK ROAD

Project No.
M4083

Co-ords: 366488.00 - 219125.00

Hole Type
WS

Location: MITCHELDEAN

Level:

Scale
1:25

Client: LEES ROXBURGH LTD

Dates: 28/11/2018 - 28/11/2018

Logged By
PD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Grass over brown slightly sandy clay topsoil with occasional rootlets.	
		0.50	ES					MADE GROUND: Soft dark brown sandy clay.	
		1.20		N=12 (3,3/3,3,3,3)	1.05			MADE GROUND: Reddish brown slightly gravelly sandy clay. Gravel is angular to rounded fine to coarse of mixed lithologies including rare clinker and brick fragments.	1
		1.50	ES						
		2.00		N=3 (1,2/0,1,1,1)	2.00			Very loose reddish brown fine to medium SAND.	2
		2.40						Soft to firm brown slightly sandy silty CLAY.	
		3.00		N=0 (0,0/0,0,0,0)				Becoming very soft and wet between 3.0m and 4.0m bgl	3
		3.50	ES					Becoming mottled grey with an organic odour below 3.4m bgl.	
		4.00		N=25 (2,4/3,3,7,12)					4
		5.00		0 (21,31/0 for 0mm)	4.95 5.00				5

Continued on next sheet

Remarks

1. Hand excavated inspection pit to 1.2m bgl.
2. Groundwater encountered below 4.0m bgl.
3. Installation to 5.0m bgl; G.L. - 1.0m plain pipe, 1.0 - 5.0m slotted pipe.
4. Location surveyed using a hand-held GPS.





Brownfield Solutions Limited,
Unit 5, Alfred Court,
Saxon Business Park,
Stoke Prior, Worcestershire
B60 4AD

Borehole Log

Borehole No.

WS2

Sheet 2 of 2

Project Name: CARISBROOK ROAD

Project No.
M4083

Co-ords: 366488.00 - 219125.00

Hole Type
WS

Location: MITCHELDEAN

Level:

Scale
1:25

Client: LEES ROXBURGH LTD

Dates: 28/11/2018 - 28/11/2018

Logged By
PD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Dense to very dense bluish grey mottled reddish brown fine to medium SAND. End of borehole at 5.00 m	
									6
									7
									8
									9
									10

Remarks

1. Hand excavated inspection pit to 1.2m bgl.
2. Groundwater encountered below 4.0m bgl.
3. Installation to 5.0m bgl; G.L. - 1.0m plain pipe, 1.0 - 5.0m slotted pipe.
4. Location surveyed using a hand-held GPS.



Appendix 6B: Soakaway Tests

Percolation Test

LEES ROXBURGH

SA1

Test 1

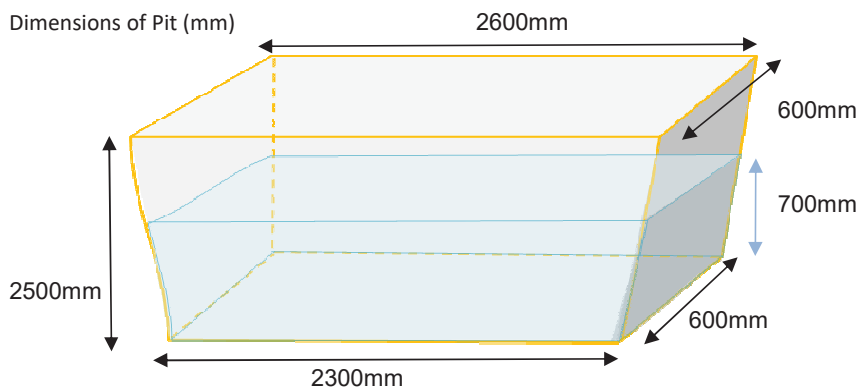
CARISBROOK ROAD, MITCHELDEAN

M4083

BROWNFIELD
SOLUTIONS LTD

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test:
27/11/2018Logged By:
PDChecked By:
JW

Strata Description	1.43 - 2.05m bgl: Firm friable brown sandy CLAY.		
	2.05 - 2.5m bgl: Bluish grey medium to coarse SANDSTONE.		
Depth of Pit	2500mm		
Depth of Water (start)	700mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m ³)	1.029
Infill Volume (m ³)	N/A	Water Volume (m ³)	1.029

Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	1800	700	30.0	1970	530
0.50	1805	695	35.0	2005	495
1.00	1810	690	40.0	2040	460
1.50	1815	685	50.0	2070	430
2.00	1820	680	60.0	2105	395
2.50	1824	676	65.0	2120	380
3.00	1827	673	80.0	2170	330
3.50	1830	670	120.0	2300	200
4.00	1835	665	145.0	2350	150
4.50	1838	662	150.0	2380	120
5.00	1840	660	155.0	2410	90
6.00	1845	655	165.0	2440	60
7.00	1850	650	End of Test	End of Test	End of Test
8.00	1860	640			
9.00	1865	635			
10.00	1870	630			
20.00	1920	580			
25.00	1940	560			

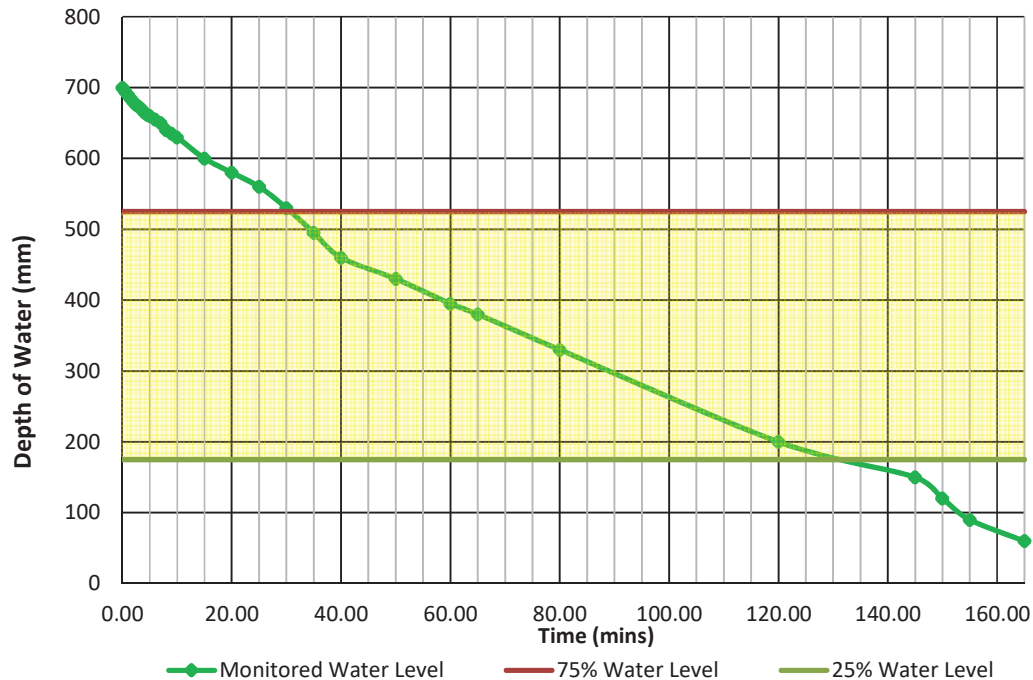
Percolation Test

LEES ROXBURGH**SA1**

CARISBROOK ROAD, MITCHELDEAN

Test 1

M4083

Data Analysis
**BROWNFIELD
SOLUTIONS LTD**
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE
Graph of Depth vs Time**Soil Infiltration Rate Calculation**

Water Level 1 (mm)

525

Water Level 2 (mm)

175

Time to Drain from Level 1 to
Level 2 (mins)

99

Volume of water discharged
(m³)

0.5145

Discharge Area (m²)

3.515

Soil Infiltration Rate (m/min)

0.001478512

Soil Infiltration Rate (m/sec)

2.46E-05

Compliance CheckWater Level at 75% effective
depth (mm)

525

Water Level at 25% effective
depth (mm)

175

Compliant with BRE 365

Percolation Test

LEES ROXBURGH

SA1

Test 2

CARISBROOK ROAD, MITCHELDEAN

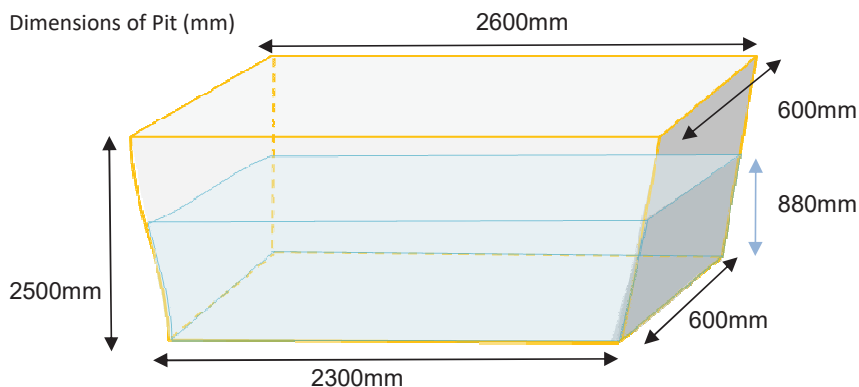
M4083

BROWNFIELD
SOLUTIONS LTD

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Dimensions of Pit (mm)

Date of Test:
27/11/2018Logged By:
PDChecked By:
JW

Strata Description	1.43 - 2.05m bgl: Firm friable brown sandy CLAY.		
	2.05 - 2.5m bgl: Bluish grey medium to coarse SANDSTONE.		
Depth of Pit	2500mm		
Depth of Water (start)	880mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m ³)	1.294
Infill Volume (m ³)	N/A	Water Volume (m ³)	1.294

Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	1620	880	160.0	2320	180
1.00	1630	870	End of Test	End of Test	End of Test
2.00	1640	860			
3.00	1650	850			
4.00	1660	840			
5.00	1670	830			
6.00	1680	820			
7.00	1690	810			
8.00	1700	800			
9.00	1710	790			
10.00	1720	780			
15.00	1760	740			
20.00	1790	710			
25.00	1820	680			
30.00	1870	630			
40.00	1930	570			
105.00	2170	330			
120.00	2210	290			

Percolation Test

LEES ROXBURGH**SA1**

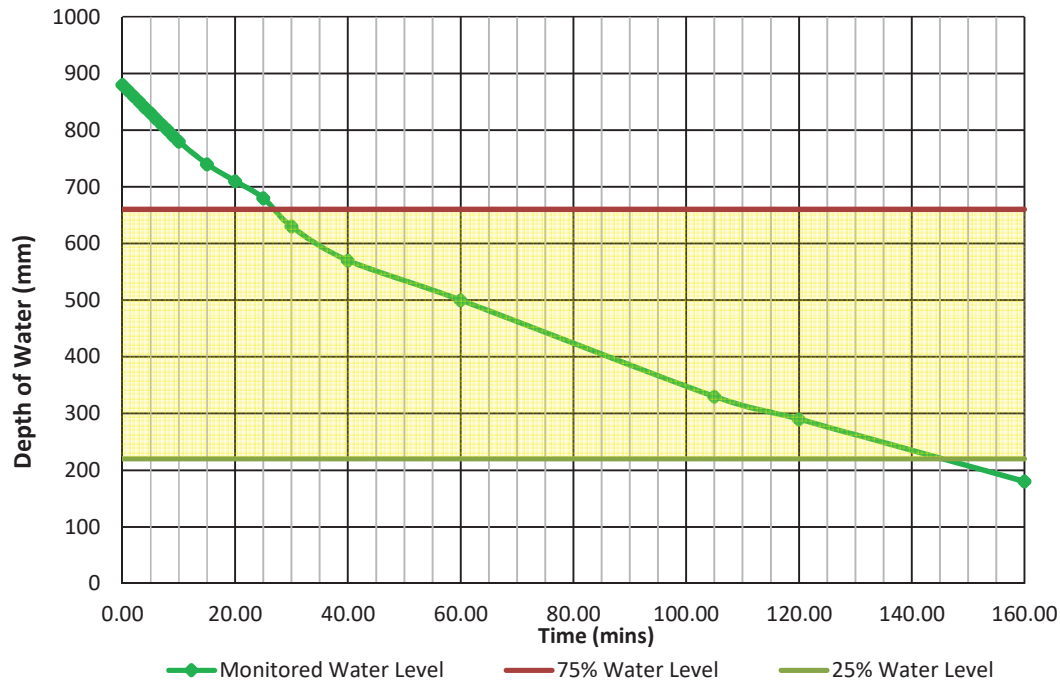
CARISBROOK ROAD, MITCHELDEAN

Test 2

M4083

**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis**Graph of Depth vs Time****Soil Infiltration Rate Calculation**

Water Level 1 (mm)

660

Water Level 2 (mm)

220

Time to Drain from Level 1 to
Level 2 (mins)

118

Volume of water discharged
(m³)

0.6468

Discharge Area (m²)

4.064

Soil Infiltration Rate (m/min)

0.001348759

Soil Infiltration Rate (m/sec)

2.25E-05

Compliance CheckWater Level at 75% effective
depth (mm)

660

Water Level at 25% effective
depth (mm)

220

Compliant with BRE 365

Percolation Test

LEES ROXBURGH

SA2

Test 1

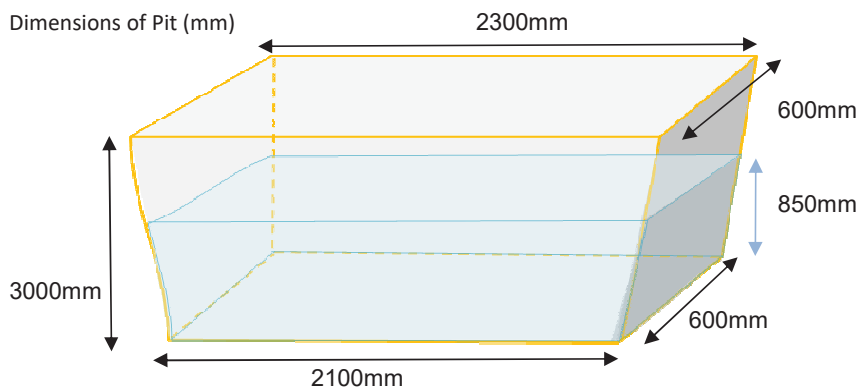
CARISBROOK ROAD, MITCHELDEAN

M4083

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GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test:
27/11/2018Logged By:
PDChecked By:
JW

Strata Description	1.55 - 2.75m bgl: Soft reddish brown very sandy CLAY.		
	2.75 - 3.0m bgl: Dense brown slightly gravelly clayey medium SAND		
Depth of Pit	3000mm		
Depth of Water (start)	850mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m ³)	1.122
Infill Volume (m ³)	N/A	Water Volume (m ³)	1.122

Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	2150	850	30.0	2160	840
0.50	2150	850	40.0	2160	840
1.00	2150	850	50.0	2160	840
1.50	2150	850	60.0	2160	840
2.00	2150	850	90.0	2160	840
2.50	2150	850	120.0	2160	840
3.00	2150	850	180.0	2160	840
3.50	2150	850	End of Test	End of Test	End of Test
4.00	2150	850			
4.50	2150	850			
5.00	2150	850			
6.00	2150	850			
7.00	2150	850			
8.00	2150	850			
9.00	2150	850			
10.00	2150	850			
20.00	2160	840			
25.00	2160	840			

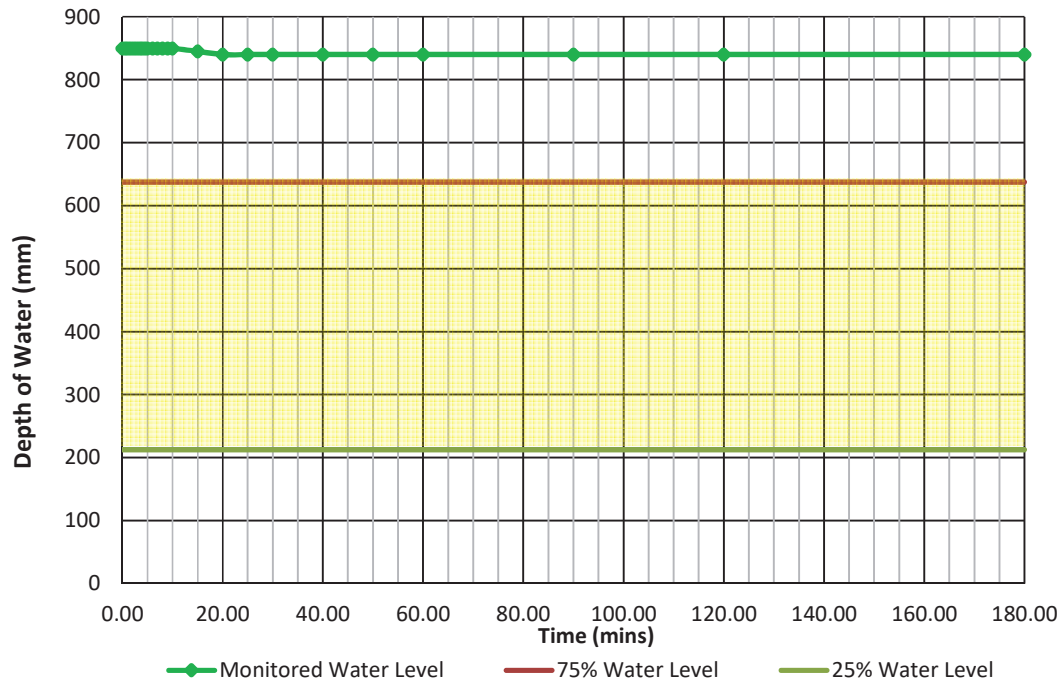
Percolation Test

LEES ROXBURGH**SA2**

CARISBROOK ROAD, MITCHELDEAN

Test 1

M4083

Data Analysis
**BROWNFIELD
SOLUTIONS LTD**
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE
Graph of Depth vs Time**Soil Infiltration Rate Calculation**

Water Level 1 (mm)

840

Water Level 2 (mm)

840

Time to Drain from Level 1 to
Level 2 (mins)

160

Volume of water discharged
(m³)

0

Discharge Area (m²)

5.964

Soil Infiltration Rate (m/min)

0

Soil Infiltration Rate (m/sec)

0.00E+00

Compliance CheckWater Level at 75% effective
depth (mm)

637.5

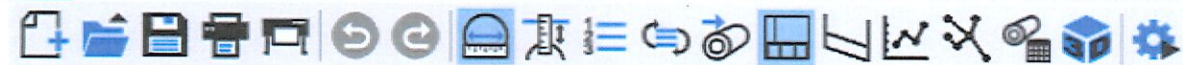
Water Level at 25% effective
depth (mm)

212.5

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

Appendix 7: Outline Drainage Strategy

Appendix 7A: Preliminary Attenuation Volume Calculation



Simulation Settings

Storm Network

Design Settings

Nodes

Links

Manhole Schedule

Hydrographs

Flow Controls

Storage

Other

Results

Approval Settings

Approval Results

Libraries

Manhole Types

Link Types

Networks

Preferences

Sketch

Storage Estimate

Return Period (years)

100

OK

Climate Change (%)

40

Cancel

Impermeable Area (ha)

3.120

Update

Peak Discharge (l/s)

13.840

Infiltration Coefficient (m/hr)
(leave blank if no infiltration)

Calc

Required Storage (m³)

Calc

from

2905

to

3659

With infiltration (m³)

from

to

Appendix 7B: Lees Roxburgh Drg. No. 6326/01-04 B

