TECHNICAL NOTE

Job Name: Kellogg College

Job No: 330511047

Note No: 330511047-2001-R001

Date: 9th November 2023

Subject: Surface Water Drainage Strategy

1. Introduction

1.1. Stantec UK Ltd (Stantec) have been commissioned by Oxford University Estate Services to prepare this surface water drainage strategy in support of a planning application to develop land at Kellogg College, Banbury Road, Oxford, Oxfordshire.

1.2. This report will outline the methods to intercept and dispose of surface water runoff generated from the proposed development in a sustainable manner and so as not to increase the risk of flooding at the site or elsewhere, in line with best Sustainable Drainage (SuDS) practice.

2. Site Context

2.1. The property is situated on Banbury Road and is owned by the University of Oxford, the purpose of the development is to add an extension to Kellogg College comprising storage rooms, an office space, and the kitchen to be reconfigured.

2.2. The proposed extension causes a 62m^2 increase in impermeable area producing a total of 211m^2 including the car park and rooftop catchment of the existing college.

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Approved (Project Director)
330511047-2001-R001	A	08/11/23	LP	JS	PS
330511047-2001-R001	B	09/11/23	LP	JS	PS

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3. Drainage Strategy

3.1. The footprint of the new building covers the northern portion of the grassed courtyard, totalling 62m^2. Within the footprint is presently located a soakaway; this serves a yard gully for a small area of car parking and one of the rainwater pipes from the existing kitchen building. No formal drainage of the soft landscaping is present.

3.2. The soakaway present will be abandoned and replaced to the south of the proposed extension, so it is no longer under the footprint of the proposed building. The existing connections to the yard gully and rainwater pipes will be redirected to the replacement soakaway which includes the used of geo-cellular crates.

3.3. Following the SuDS hierarchy as outlined in the Planning Policy Guidance, see Figure 4.1, the preferable outfall option is an infiltration system.

> Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:
>
> 1. into the ground (infiltration);
> 2. to a surface water body;
> 3. to a surface water sewer, highway drain, or another drainage system;
> 4. to a combined sewer.

Figure 4.1: Extract of Planning Policy Guidance on Flood Risk and Coastal Change.

3.4. On-site soakaway testing has been conducted in 2005 and 2015 providing infiltration rate measurements of 7.96x10^{-5} and 1.03x10^{-5}m/s respectively. These rates are suitable for continued use of soakaways on-site so a new soakaway will be installed, picking up the new impermeable area and areas drained by the previous soakaway being relocated.

3.5. The soakaway has been modelled in MicroDrainage Source Control (calculations included in appendices) and designed to eliminate flooding up to and including the 1 in 100-year (+40% climate change) rainfall event. To reduce the footprint the geo-cellular crate it has been specified at 1.6m deep, 3m wide and 3.5m long, providing a total volume of 16.8m^3.

3.6. As part of the scheme the maple tree in the southern portion of the courtyard is being removed, allowing this space to be available for the soakaway. It is not possible to keep it 5m from the nearby structures because of the size of the courtyard; however, all volumes being discharged to this courtyard at present discharge to this soil volume, and the stand-off from the proposed soakaway will be greater than the existing from buildings.

4. Conclusion

4.1. Following the proposed development, the geo-cellular crate will be upsized to pick up the new impermeable area and relocated to avoid buildings. The proposed crate will be 16.8m^3 and constructed in the courtyard south of the extension to Kellogg College.

Appendix A: Flood Map for Planning

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**451156/207470**	**2 Nov 2023 16:06**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
451156/207470

Scale
1:2500

Created
2 Nov 2023 16:06

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m

Appendix B: MicroDrainage Source Control Calculations

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 989 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	61.373	0.683	0.1	6.8	O K
30 min Summer	61.581	0.891	0.1	8.9	O K
60 min Summer	61.791	1.101	0.1	11.0	O K
120 min Summer	61.989	1.299	0.1	13.0	O K
180 min Summer	62.090	1.400	0.1	14.0	O K
240 min Summer	62.149	1.459	0.2	14.6	O K
360 min Summer	62.213	1.523	0.2	15.2	O K
480 min Summer	62.243	1.553	0.2	15.5	O K
600 min Summer	62.251	1.561	0.2	15.6	O K
720 min Summer	62.247	1.557	0.2	15.5	O K
960 min Summer	62.232	1.542	0.2	15.4	O K
1440 min Summer	62.193	1.503	0.2	15.0	O K
2160 min Summer	62.119	1.429	0.1	14.3	O K
2880 min Summer	62.041	1.351	0.1	13.5	O K
4320 min Summer	61.902	1.212	0.1	12.1	O K
5760 min Summer	61.785	1.095	0.1	10.9	O K
7200 min Summer	61.684	0.994	0.1	9.9	O K
8640 min Summer	61.595	0.905	0.1	9.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	124
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	362
480 min Summer	11.622	0.0	480
600 min Summer	9.738	0.0	600
720 min Summer	8.424	0.0	698
960 min Summer	6.697	0.0	800
1440 min Summer	4.839	0.0	1052
2160 min Summer	3.490	0.0	1468
2880 min Summer	2.766	0.0	1876
4320 min Summer	1.989	0.0	2720
5760 min Summer	1.573	0.0	3512
7200 min Summer	1.311	0.0	4320
8640 min Summer	1.129	0.0	5096

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Summer	61.515	0.825	0.1	8.2	O K
15 min Winter	61.373	0.683	0.1	6.8	O K
30 min Winter	61.582	0.892	0.1	8.9	O K
60 min Winter	61.792	1.102	0.1	11.0	O K
120 min Winter	61.991	1.301	0.1	13.0	O K
180 min Winter	62.093	1.403	0.1	14.0	O K
240 min Winter	62.153	1.463	0.2	14.6	O K
360 min Winter	62.220	1.530	0.2	15.3	O K
480 min Winter	62.252	1.562	0.2	15.6	O K
600 min Winter	62.264	1.574	0.2	15.7	O K
720 min Winter	62.264	1.574	0.2	15.7	O K
960 min Winter	62.242	1.552	0.2	15.5	O K
1440 min Winter	62.194	1.504	0.2	15.0	O K
2160 min Winter	62.100	1.410	0.1	14.1	O K
2880 min Winter	61.999	1.309	0.1	13.1	O K
4320 min Winter	61.818	1.128	0.1	11.2	O K
5760 min Winter	61.667	0.977	0.1	9.7	O K
7200 min Winter	61.539	0.849	0.1	8.5	O K
8640 min Winter	61.428	0.738	0.1	7.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
10080 min Summer	0.994	0.0	5848
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	122
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	238
360 min Winter	14.585	0.0	354
480 min Winter	11.622	0.0	468
600 min Winter	9.738	0.0	578
720 min Winter	8.424	0.0	686
960 min Winter	6.697	0.0	884
1440 min Winter	4.839	0.0	1098
2160 min Winter	3.490	0.0	1560
2880 min Winter	2.766	0.0	2016
4320 min Winter	1.989	0.0	2896
5760 min Winter	1.573	0.0	3744
7200 min Winter	1.311	0.0	4544
8640 min Winter	1.129	0.0	5360

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Winter	61.332	0.642	0.1	6.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
10080 min Winter	0.994	0.0	6144

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	England and Wales	Cv (Winter)	0.950
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.021

Time (mins) From:	To:	Area (ha)
0	4	0.021

Model Details

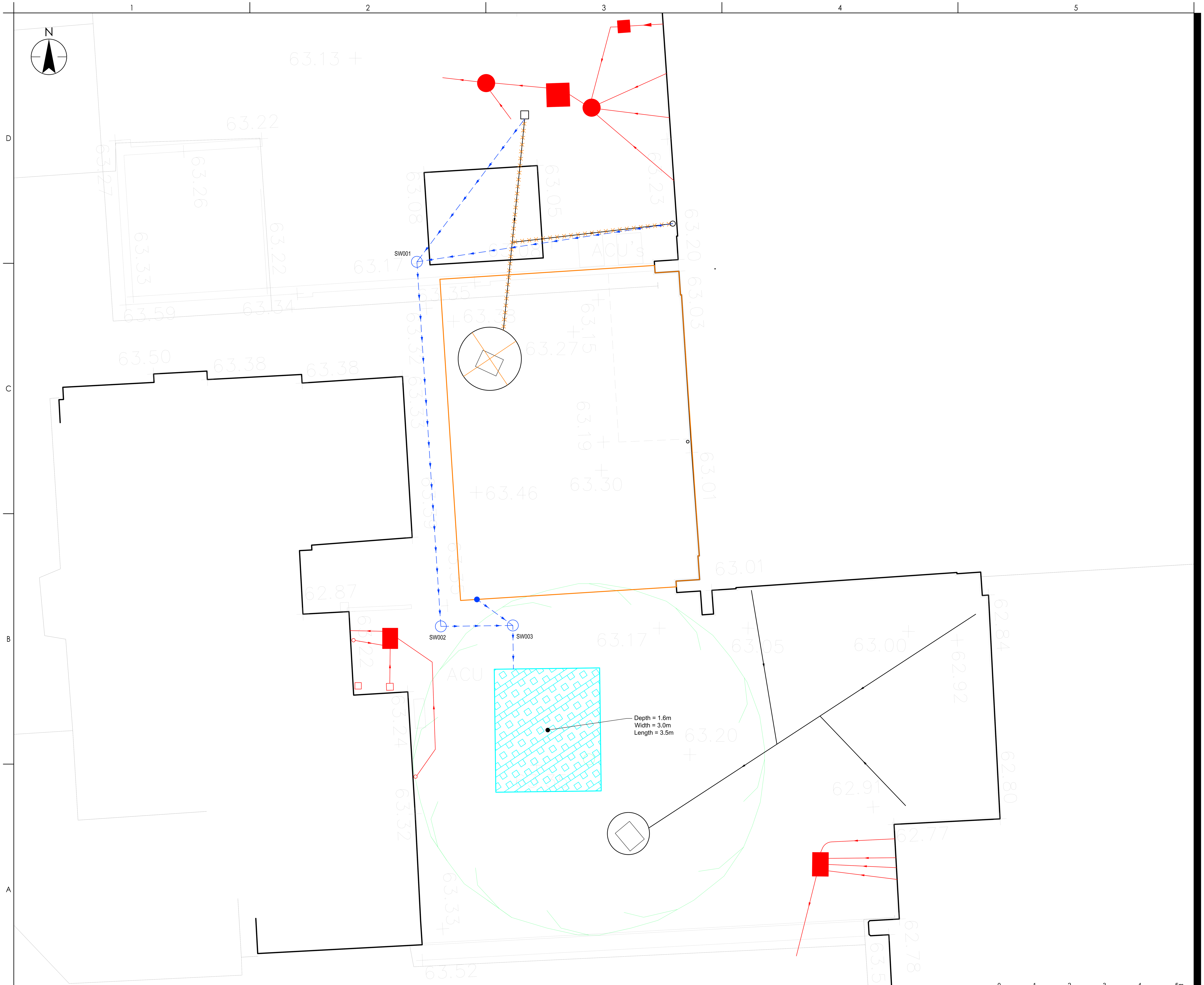
Storage is Online Cover Level (m) 63.300

Cellular Storage Structure

Invert Level (m) 60.690 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.03708 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.03708

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	10.5	10.5	1.601	0.0	31.3
1.600	10.5	31.3			

Appendix C: Surface Water Layout Drawing



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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

1. Do not scale from this drawing.
2. This drawing has been produced in colour and should be reproduced in colour.
3. All dimensions are in metres unless otherwise stated.
4. All levels are in metres AOD unless otherwise stated.

Existing Key:

- Surface Water Manhole
- Surface Water Manhole
- Surface Water Manhole to be Abandoned
- Surface Water Pipe to be Abandoned
- Surface Water RWP
- Surface Water Gully
- Foul Water Manhole
- Foul Water Pipe
- Tree to be Removed

Proposed Key:

- SW000 Surface Water Manhole
- Surface Water Pipe
- Surface Water RWP
- Geocellular Attenuation Tank
- New Building Footprint

Issued/Revision	By	Appd	YYYY.MM.DD
P02 RWP POSITION AMENDED	LP	PS	2023.11.09
P01 FIRST ISSUE	LP	PS	2023.11.08

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
LP	JS	PS	2023.11.08

Issue Status

S2 - FOR INFORMATION

This document is suitable only for the purpose noted above. Use of this document for any other purpose is not permitted.

Client/Project Logo

UNIVERSITY OF OXFORD

Client/Project

Oxford University Estate Services

Kellogg College

Title

Surface Water Layout

Project No. 330511047

A1 Scale 1:50

Revision P02

Drawing No. 330511047-STN-01-ALL-DR-D-0501