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**Created Life Three (Bicester) Limited  
Skimmingdish Lane, Bicester  
Drainage Strategy**

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## Document Control

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## Executive Summary

This report presents the drainage strategy for the development of a drive-through coffee shop with associated access roads and hardstandings at Skimmingdish Lane, Bicester.

The existing site consists of part of a site of former allotments allocated for development. The site area is 1.18 ha, of which 0.176 ha is to become impermeable. The developed impermeable area will occupy 15% of the total site leaving, 85% of the site as an area of undeveloped soft landscaping.

The site is in flood zone 2/3 and under 100 year flood with allowance for climate change will flood to a level of 69.750m AOD. This level has been set as the floor level of the proposed coffee shop to protect it from such a flooding event. Consequently, the building and surrounding access roads occupy part of the original flood plain, resulting in a loss of floodwater volume. In a 1 in 100 year occurrence, the remainder of the site, including the parking areas and soft landscaping, will be inundated with flood water. The loss of flood volume caused by the development will be compensated with the installation of two below-ground cellular storage tanks.

A SuDS-based approach to the surface water drainage system has been undertaken. Based on the data provided by the site investigation report, the infiltration rate of the upper strata is considered to be poor and as a result, infiltration systems for the disposal surface water systems are considered to be unsuitable for this site.

It is proposed to discharge the surface water to the ditch to the south east of the site restricting the flow to the practical minimum of 5 l/s and providing attenuation storage for the critical 100 year storm with an allowance of 40% for climate change. The attenuation will in the form of a detention basin and the outflow will be discharged to the outfall in a swale. These SuDS features will not be lined and there will be some unquantifiable infiltration which has not been taken into account in the drainage calculations. It is proposed to incorporate these shallow surface drainage features into the landscaping of the portion of the site which remains undeveloped.

The foul water from the site will be discharged via a new pumping station and pumping main to the existing foul pumping main in Skimmingdish Lane, which serves the existing care home adjacent to the development. This proposal will be subject to Thames Water approval. The new pumping main and pumping station will have a system of valves and control equipment so that both pumping stations cannot run at the same time and that flow from one site will not discharge into the other.

In conclusion, the drainage for the site has been designed to comply with all Building Regulations and planning requirements. The surface water discharge has been designed following the SuDS hierachal approach outlined in and in accordance with the CIRIA publication 'The SuDS Manual (C753)', employing the most suitable approach for the site, making use of the significant areas of remaining soft landscaping for the inclusion of surface water detention and discharge features.

## **1. Introduction**

- a. This Drainage Strategy has been prepared by Paul Owen Associates Ltd on behalf of Created Life Three (Bicester) Limited to support a planning application for a new drive-through coffee shop at Skimmingdish Lane, Bicester.
- b. The report covers the surface water and foul water discharge from the proposed development of the site. The development is located in the 1 in 100 year flood plain and additional measures are put in place to compensate for loss of flood volume arising from the proposed development.
- c. This report is prepared for the sole use of Created Life Three (Bicester) Limited. No third party may rely upon this report unless express written permission is granted by Paul Owen Associates Limited.

## **2. Site Description**

- a. The site is located to the North East of Skimmingdish Lane, Bicester OS Grid Ref SP 60026 23386. The site area is 1.18 ha with a development area of only 0.19 ha. The location of the proposed development is shown in Appendix A.
- b. The existing site was formerly the location of allotments. The site was allocated for development as part of a planning application for a care home which has already been built. Consequently, the site has been planning approved for development.
- c. After the proposed coffee shop has been constructed, the remainder of the site after the development will remain as a landscaped/wild area (approximately 0.97 ha).

## **3. Proposed Development**

- a. It is proposed to undertake a development of the site comprising of a drive through coffee shop together with the associated asphalt roads and car parking (refer to site plan in Appendix B). The development site sits in an area of undeveloped land that was previously used as allotments. The total area of the site is 1.18ha of which approximately 16% is being developed.
- b. The proposed impermeable area of the development is 0.1948 ha (1,948m<sup>2</sup>).

## **4. Flood Risk and Flood Compensation**

- a. The site falls within flood zones 2/3. Under the 1 in 100 year flood with allowance for climate change the site will flood to a level of 69.750m AOD. This level has been set as the proposed floor level of the drive-through coffee shop. During extreme flooding events the rest of the site will be inundated with flood water.

- b. The reduction of flood volume which has been caused by the development has been compensated for with the provision of underground cellular storage tanks (Volume 36.49m<sup>3</sup>). In the event of a 1 in 100 year event, the flood compensation storage will discharge into the Swale downstream of the detention basin as flood waters recede.
- c. For further information regarding the flood risk and compensation measures refer to the Flood Risk Assessment report by RSK Land and Development Engineering Ltd., their reference 680020-R1(01)-FRA, dated June 2021.

## **5. Proposed Drainage Strategy**

- a. **Planning Policy and Guidance**
  - i. National Planning Policy Framework (NPPF) – The site falls within Flood Zone 2/3, defined as having a greater than 1 in 100 annual probability of flooding. The NPPF for such sites aims to seek opportunities to reduce the overall flood risk in the area with the use of sustainable drainage systems (SuDS) on site. The EA Flood Map for the site is shown in Appendix G for more information on flood risk refer to the Flood Risk Assessment referenced in Section 4c.
  - ii. Environment Agency Policy – The Environment Agency require that the run-off from the site is managed so that there is no increase in flood risk off-site for rainfall events up and including the 100 year critical event including an allowance for climate change.  
Their Ground Water Protection Policy requires that infiltration drainage solutions are not used within areas of contaminated land and places restrictions on drainage and development types within Source Protection Zones (SPZ) of abstraction points.
  - The Environment Agency has produced pollution prevention guidelines on the use and design of oil separators in surface water drainage systems (PPG3). Efforts should be made so that the post development volume and peak rate of run-off should not be greater than of the pre-development for the same rainfall event.
  - iii. Thames Water Policy  
Sewers that are to be adopted should be designed and constructed in accordance with the requirements of Sewers for Adoption 7th Edition.
  - iv. Building Regulations – Part H of the Building Regulations Act states that rainfall from a system shall discharge to one of the following listed in order of priority:-
    1. An adequate soakaway or some other adequate infiltration system.
    2. A watercourse
    3. A sewer

**b. Design Development**

- i. Existing Drainage Regime – The existing site consists of part of a site of former allotments, allocated (and planning approved) for development. The site has already been part-developed as a care home. The surface water runoff from the care home drains to the south east towards an existing watercourse.

**Greenfield site runoff rates for the proposed development site.**

Return Period	Green Field Discharge Rate (l/s)	Discharge from existing site (l/s)
1 yr	0.02	0.02
30 yr	0.07	0.07
100 yr	0.09	0.09

**c. Proposed Surface Water Drainage.**

- i. A site investigation has been undertaken for the site. The findings of the site investigation can be found in the Site Investigation Report undertaken by Risk Management Limited, their reference RML 7118, dated May 2021.
- ii. The site investigation states that the ground conditions “according to information published by the British Geological Survey (BGS) (1:50,000 Drift Edition, Sheet 219, Buckingham) the site is shown as being the Cornbrash Formation (limestone, grey to brown, rubbly) of the Great Oolite Group (GtO). An area of possible overlying Alluvium is shown in the far southern portion of the current site”. No ground water was encountered during the site investigation.
- iii. The site investigation states that “Soakage was found to be “good” within the standpipe fitted within borehole BH1, however, owing to the shallow depth of the test the results pertain to the superficial deposits overlying the Limestone”. The result of the soakage test was 3.43E-06 m/s. This result puts the soakage at the bottom of good and the top of poor. Soakaway calculations based on the result above give half drain down times in excess of 24 hours which is deemed to be unacceptable in BRE365. Therefore, soakaways or infiltration drainage are not considered to be suitable for this site.
- iv. The site does not lie within an Environment Agency Source Protection Zone (SPZ).
- v. The project requires flood compensation storage which is discussed in the Flood Risk Assessment which has been agreed in principle with the Environment Agency. The Environment Agency require that the flood compensation storage should discharge to the existing ditch south east of the site. This storage is separate from the attenuation storage provided by the Detention Basin provided for the surface water drainage. The flood compensation storage will discharge to the swale downstream of the Detention Basin.
- vi. It is proposed to drain surface water from the new development to the existing ditch to the south east of the site controlling the flow to a practical minimum

and providing attenuation storage for the critical 100 year storm with an allowance of 40% for climate change. This would be subject to Local Authority approval.

- vii. As discussed in 5.C iii, ground infiltration of the surface water has not been considered in the design of the surface water drainage system. However, the detention basin and swale are intended to be left unlined so that infiltration can take place if the local permeability of the ground permits it.

**Attenuation volumes required for site runoff rates for proposed development.**

Return Period	Practical Minimum Discharge Rate (l/s)	Estimated Volume of Attenuation Required (m³)
30 years +40%	4.8	58.3
100 years +40%	5.0	83.1

- viii. We have considered the following SuDS systems and shown the systems that have been included in the design and reasons they have not been used if they have not been included. The site layout has precluded some of the systems available.

**SuDS Systems**

SuDS System	Yes/No/ Possible	Reasons system has not been used
Soakaways	No	Not suitable due to the infiltration rate encountered on site.
Rainwater Harvesting	Yes	Rainwater butts to be fitted to RWPs
Green Roofs	No	Not used as PVs are to be installed on roof.
Infiltration Systems	No	Not suitable due to infiltration rate encountered on site.
Filter strips	No	Not suitable due to site layout. Insufficient room to provide filter strips.
Filter Drains	No	Not suitable due to site layout.
Swales	Yes	Outfall to existing watercourse provided which is intended to partially act as a swale.
Bioretention Systems	No	Not suitable due to the infiltration rate.
Porous Pavements	No	Not considered suitable for a site that is within a flood plain. Flooding events may cause the permeable paving to silt up, reducing its efficiency.
Attenuation Storage Tanks	No	Retention basin used for storage. Attenuation tanks are not required, therefore.
Retention Basins	Yes	Retention basin provided as part of proposals.
Ponds and Wetlands	No	Retention basin used for storage and infiltration rate.

ix. Water Quality – the development is a drive through coffee shop together with the associated roads and car parking and as such the pollution hazard level would be considered as being between Low and Medium. We have considered the above SuDS options for the site as shown above and have included a retention basin and swale as SuDS features that will provide protection to the watercourse from pollution. Refer to Appendix D for the proposed locations of the swale and attenuation basin.

**d. Proposed Foul Drainage**

i. It is proposed to discharge foul water from the site via a new pumping station and pumping main to the existing foul pumping main in Skimmingdish Lane, which serves the existing care home. All foul water designs and the discharge of the foul water will be subject to Thames Water approval at the detailed design

stage. The new pumping main and pumping station will have a system of valves and control equipment so that both pumping stations cannot run at the same time and that flow from one site will not discharge into the other.

- ii. Any drains that are required to be adopted by Thames Water will need to be constructed in accordance with Sewers for Adoption.

**6. Maintenance**

- a. Maintenance of the drainage for of the proposed restaurants is to be the responsibility of the landowner.
- b. Detention Basin - Regular inspections are required to ensure the long term operation of the Detention Basin. These inspections should be carried out monthly for the first three months of operation and annually thereafter. Any maintenance work required identified during the inspections should carried out as required. All maintenance and inspections should be carried out by experienced personnel.
- c. Flood Compensation Tanks - Regular inspections are required to ensure the long term operation of the tank. These inspections should be carried out monthly for the first three months of operation and annually thereafter. Any maintenance work required identified during the inspections should carried out as required. All maintenance and inspections should be carried out by experienced personnel.
- d. Gullies - Regular inspections and maintenance are required to ensure the long term operation of the gullies in the development. Inspections and cleaning should be carried out annually or as required. All maintenance and inspections should be carried out by experienced personnel.
- e. Drainage channels - Regular inspections and maintenance are required to ensure the long term operation of the drainage channels in the development. Inspections and cleaning should be carried out annually or as required. All maintenance and inspections should be carried out by experienced personnel.
- f. Flow control device - Regular inspections should be carried out to ensure the long term operation of the drainage system. Inspections should be carried out annually or as required. Any maintenance work required identified during the inspections should carried out as required. All maintenance and inspections should be carried out by experienced personnel.
- g. Silt Traps - Regular inspections should be carried out to ensure the long term operation of the drainage system. Inspections should be carried out annually or as required. Any maintenance work required identified during the inspections should carried out as required. All maintenance and inspections should be carried out by experienced personnel.
- h. Manholes - Regular inspections should be carried out to ensure the long term operation of the drainage system. Inspections should be carried out annually or as required. Any maintenance work required identified during the inspections should carried out as required. All maintenance and inspections should be carried out by experienced personnel.

- i. Pipelines - Regular inspections should be carried out to ensure the long term operation of the drainage system. Inspections should be carried out annually or as required. Any maintenance work required identified during the inspections should be carried out as required. All maintenance and inspections should be carried out by experienced personnel.
- j. Swales - Regular inspections should be carried out to ensure the long-term operation of the drainage system. Inspections should be carried out annually or as required. Any maintenance work required identified during the inspections should be carried out as required. All maintenance and inspections should be carried out by experienced personnel.
- k. Pumping Station -Regular inspections should be carried out to ensure the long term operation of the drainage system. Inspections should be carried out annually or as required. Any maintenance work required identified during the inspections should be carried out as required. All maintenance and inspections should be carried out by experienced personnel.

### Summary of Maintenance Requirements

Operation and maintenance activity	SuDS Component											
	Pond N/A	Wetland N/A	Detention basin	Infiltration Basin N/A	Soakaway N/A	Infiltration Trench N/A	Filter drain N/A	Modular storage N/A	Previous pavement N/A	Swale/Bioretention/Trees	Filter strip N/A	Green roofs N/A
<b>Regular Maintenance</b>												
Inspection	●	●	●	●	●	●	●	●	●	●	●	●
Litter and debris removal	●	●	●	●	○	●	●	○	●	●	●	○
Grass cutting	●	●	●	●	○	●	●	○	○	●	●	
Weed and invasive plant control	○	○	○	○		○	○		○	○	●	
Shrub management	○	○	○	○				○	○	○		
Shoreline vegetation management	●	●	○									
Aquatic vegetation management	●	●	○									
<b>Occasional Maintenance</b>												
Sediment management	●	●	●	●	●	●	●	●	●	●	●	
Vegetation replacement	○	○	○	○					○	○	●	
Vacuum sweeping and brushing								●				
<b>Remedial Maintenance</b>												
Structure rehabilitation/repair	○	○	○	○	○	○	○	○	○	○	○	○
Infiltration surface reconditioning				○	○	○	○	○	○	○	○	

#### Key

- will be required
- may be required

Operation and maintenance activity	Drainage Component									
	Petrol Interceptor	Grease Trap	Gully	Drainage Channel	Flow Control device	Silt Traps	Manholes	Pipelines	Ditches N/A	Pumping Station
<b>Regular Maintenance</b>										
Inspection	●	●	●	●	●	●	●	●	●	●
Litter and debris removal	●	●	●	●	●	●	●	○	○	●
Grass cutting									○	
Weed and invasive plant control									○	
Shrub management									○	
Shoreline vegetation management									○	
Aquatic vegetation management									○	
<b>Occasional Maintenance</b>										
Sediment management	●	●	●	●	●	●	●	○	○	●
Vegetation replacement									○	
<b>Remedial Maintenance</b>										
Structure rehabilitation/repair	○	○	○	○	○	○	○	○	○	○

#### Key

- will be required
- may be required

## **7. Conclusions and Recommendations**

- a. The soakage rate obtained of 3.43E-6 m/s does not allow for the practical use of infiltration drainage.
- b. Although the site is an old allotment the green field site run off for the new area of impermeable surface (1,948m<sup>2</sup>) gives flow rates of 0.07 l/s for a 30 year storm and 0.09 l/s for a 100 year storm. It is not practical to restrict the surface water flow from the site to these rates.
- c. It is proposed to restrict the flow arising from surface water runoff from the site to a practical minimum of 5 l/s. Attenuation storage will be provided for the critical 100 year storm with an allowance of 40% for climate change. The attenuation will be provided in the form of a detention basin. A flow control device will be provided on the outfall of the detention basin.
- d. It is proposed to discharge the surface water to the ditch south east of the site via the detention basin and swale.
- e. Although ground infiltration of surface water through the base of the detention tank and swale has been ignored, these drainage features are intended to be left unlined so that infiltration can take place if the local permeability of the ground permits it.
- f. The site is within the flood plain and will be inundated with flood waters to a level of 69.750m AOD under a 100 year flood with allowance for climate change. (For further information refer to the Flood Risk Assessment Report)
- g. The proposed development will partially reduce the flood volume for a 1 in 100 year event. As compensation, floodwater storage has been provided on the site which will discharge into the watercourse adjacent to the site as floodwaters recede. This storage is separate from the attenuation storage provided by the detention basin provided for the surface water drainage. The flood compensation storage will discharge to the swale downstream of the detention basin.
- h. It is proposed to discharge foul water from the site via a new pumping station and pumping main to the existing foul pumping main in Skimmingdish Lane, which serves the existing care home, subject to Thames Water approval. The new pumping main and pumping station will have a system of valves and control equipment so that both pumping stations cannot run at the same time and that flow from one site will not discharge into the other.

## **Appendix A – Site Location Plan**

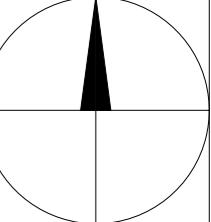


Application site

New Development Site

### Location Plan

## **Appendix B – Proposed Site Layout**



## Site Area Schedule

## Planning Application Boundary

**Proposed Development /  
Hard Surface Area  
0.19 hectares  
(0.48 acres)**


**Proposed Soft  
Landscape Area  
0.04 hectares  
(0.93 acres)**

**Retained as Soft  
Landscape Area  
0.93 hectares  
(2.30 acres)**

**Total Site Area  
1.16 hectares  
(3.71 acres)**

0 5 10 15 20 25m  
SCALE 1:500

## Appendix C – Topographical Survey



**Appendix D – Proposed Drainage.**

CDM REGULATION: NO DRAWING OR OTHER DESIGN INFORMATION SHOULD BE READ WITHOUT REFERENCE TO THE HEALTH AND SAFETY PLAN.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST SUB-CONTRACTORS' DRAWINGS AND SPECIFICATIONS AND EMPLOYER'S SPECIFICATION. ANY DISCREPANCIES BETWEEN THESE DRAWINGS ARE TO BE REPORTED IMMEDIATELY.

SITE IS TO VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION.  
THIS DRAWING IS NOT TO BE SCALED IN HARD FORMAT AND/OR ELECTRONIC FORMAT.

#### DRAINAGE

1. INVERT LEVELS AND POSITIONS OF EXISTING DRAINS / CHAMBERS / SEWERS WHERE NEW CONNECTIONS ARE TO BE MADE MUST BE CHECKED AND CONFIRMED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF ANY WORKS.
2. THE CONTRACTOR IS MAKE APPLICATION TO THE WATER AUTHORITY FOR THE DIRECT OR INDIRECT CONNECTIONS FOR THE FOUL AND SURFACE WATER TO THE PUBLIC SEWERS.
3. ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY AND IN CONJUNCTION WITH ALL RELEVANT BRITISH STANDARDS, CODES OF PRACTICE AND SEWERS FOR ADOPTION AS APPROPRIATE.
4. ALL DRAINAGE SHALL COMPLY WITH THE TYPICAL DETAILS AND THE REQUIREMENTS OF BSEN 752.
5. FOR SETTING-OUT DIMENSIONS OF SVP'S, RWPS ETC REFER TO ARCHITECT'S OR MECHANICAL ENGINEER'S DRAWINGS.
6. SEWERS UP TO 300mm DIAMETER TO BE BITRIFIED CLAY, EXTRA STRENGTH TO BSEN 295 OR BS 65 WITH PLAIN ENDED SLEVED OR SOCKETED FLEXIBLE JOINTS OR PLASTIC TO BSEN 4660 AND BSEN 1401-1. ALL SEWERS OF 375mm DIAMETER AND OVER, TO BE SOFTCAST TO BSEN 295 OR BS 65 WITH PLAIN ENDED SLEVED OR SOCKETED FLEXIBLE JOINTS. PLASTIC PIPEWORK SHALL BE CAPABLE OF DEMONSTRATING A JETTING RESISTANCE OF 400bar (280bar) WITHOUT DAMAGE WHEN TESTED IN ACCORDANCE WITH SECTION 6.10 OF WIS 4-35-01.
7. INVERTS OF INCOMING BRANCHES SHALL BE AT SPRINGING LEVEL TO THE MAIN PIPE AND FORMED GENERALLY USING CHANNEL PIPES AND SLIPPER BENDS, CUT TO SUIT.
8. ALL PRECAST CONCRETE UNITS USED IN THE DRAINAGE WORKS SHALL BE MANUFACTURED USING SULPHATE RESISTING CEMENT.
9. EPDM JOINTS ARE TO BE USED IN AREAS WHERE CONCENTRATED COCA COLA WILL BE USED.
10. MANHOLE COVERS AND FRAMES IN VEHICULAR AREAS SHALL BE CAST IRON TO BSEN 124, GRADE D400 AND IN PEDESTRIAN AREAS GRADE B125. COVERS AND FRAMES IN BLOCK PAVED AREAS SHALL BE RECESSED FABRICATED STEEL AS MANUFACTURED BY DRAINAGE SYSTEMS, LIST NO. 6333, OR SIMILAR APPROVED.
11. COVER LEVELS ARE TO ADJUSTED LOCALLY TO SUIT FINISHED GROUND LEVELS.
12. DRAINAGE CHANNELS SHALL BE LAID STRICTLY IN ACCORDANCE WITH THE PRACTICE RECOMMENDED WITH PARTICULAR CARE BEING TAKEN TO PREVENT DAMAGE DURING INSTALLATION, PAVEMENT CONSTRUCTION OR SURFACING ETC.
13. ALL ROAD GULLY AND DRAINAGE CHANNEL CONNECTIONS SHALL BE 150MM DIAMETER UNLESS OTHERWISE SPECIFIED.
14. ALL FOUL AND RAIN WATER PIPE CONNECTIONS SHALL BE 100MM DIAMETER UNLESS OTHERWISE SPECIFIED.
15. INTERNAL DRAINAGE SHOWN IS INDICATIVE, FINAL DESIGN SUBJECT TO FINAL INTERNAL LAYOUT.
16. ALL PUMPING APPARATUS, EQUIPMENT AND MATERIALS SUPPLIED, TOGETHER WITH ALL WORK UNDERTAKEN SHALL COMPLY WITH THE APPROPRIATE BRITISH STANDARDS, SPECIFICATIONS BS 7671, THE IEE REGULATIONS FOR ELECTRICAL INSTALLATIONS, THE ELECTRICITY AT WORK REGULATIONS 1989 AND THE REQUIREMENTS OF THE ELECTRICITY COMPANY.
17. PUMPS AND ELECTRICAL EQUIPMENT WITHIN THE WET WELL SHALL BE DESIGNED FOR HAZARDOUS ZONE 1 PROTECTION.
18. PUMPING MAINS SHALL BE ADEQUATELY RESTRAINED AT CONNECTIONS AND BENDS AGAINST THRUSTS PRODUCED BY INTERNAL WATER PRESSURE AND VELOCITY.

P5	03/11/21	DETENTION BASIN AND SWALE ADDED	GHB	TS
P4	23/06/21	FLOOD COMPENSATION TANK AMMENDED	GHB	TS
P3	21/06/21	ISSUED FOR COMMENT	GHB	TS
P2	08/06/21	ISSUED FOR COMMENT	GHB	TS
P1	19/05/21	PRELIMINARY ISSUE	GHB	TS

Rev Date Description Drn Chkd

Revisions

Drawing Originator

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Title Original drawing sheet is A1

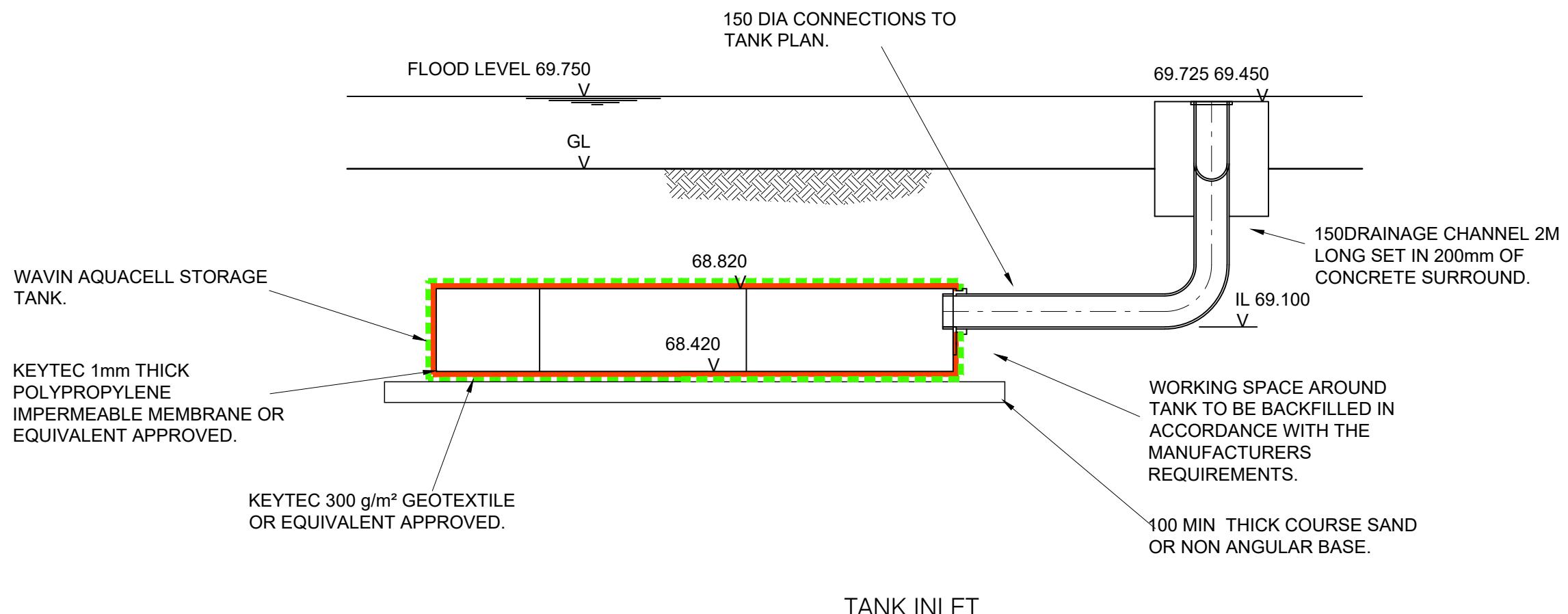
DRAINAGE LAYOUT

Drawing Number 220029/100 Revision P5

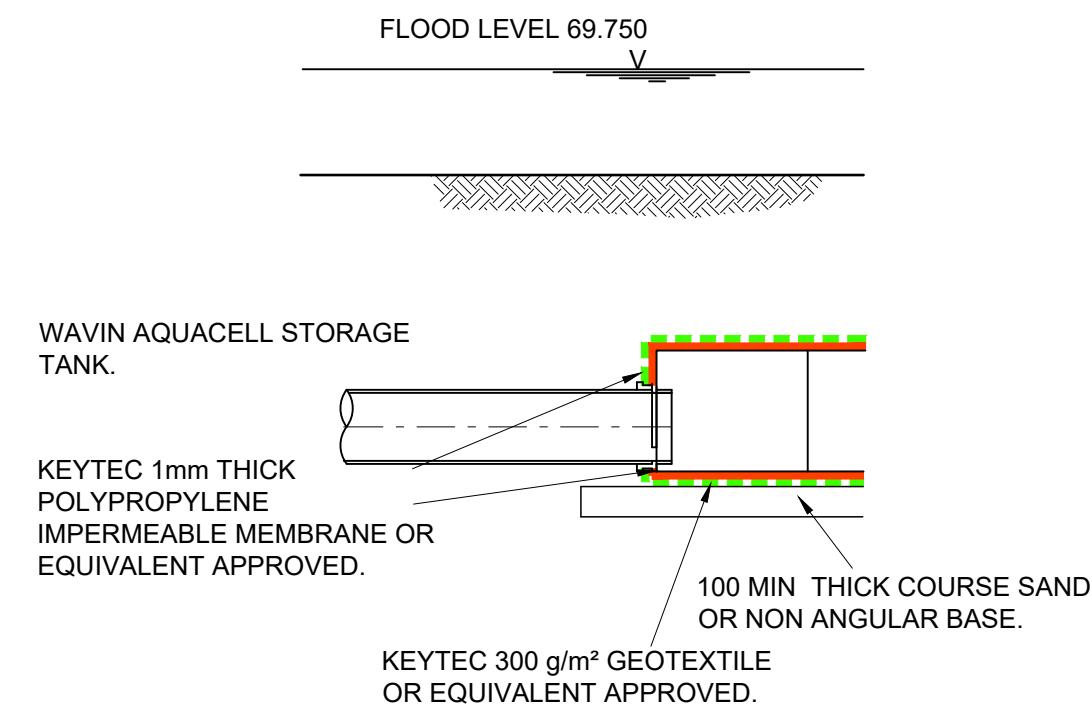
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### TANK INLET



### TANK OUTLET

P1	21/06/21	PRELIMINARY ISSUE	GHB	TS
Rev	Date	Description	Drn	Chk'd

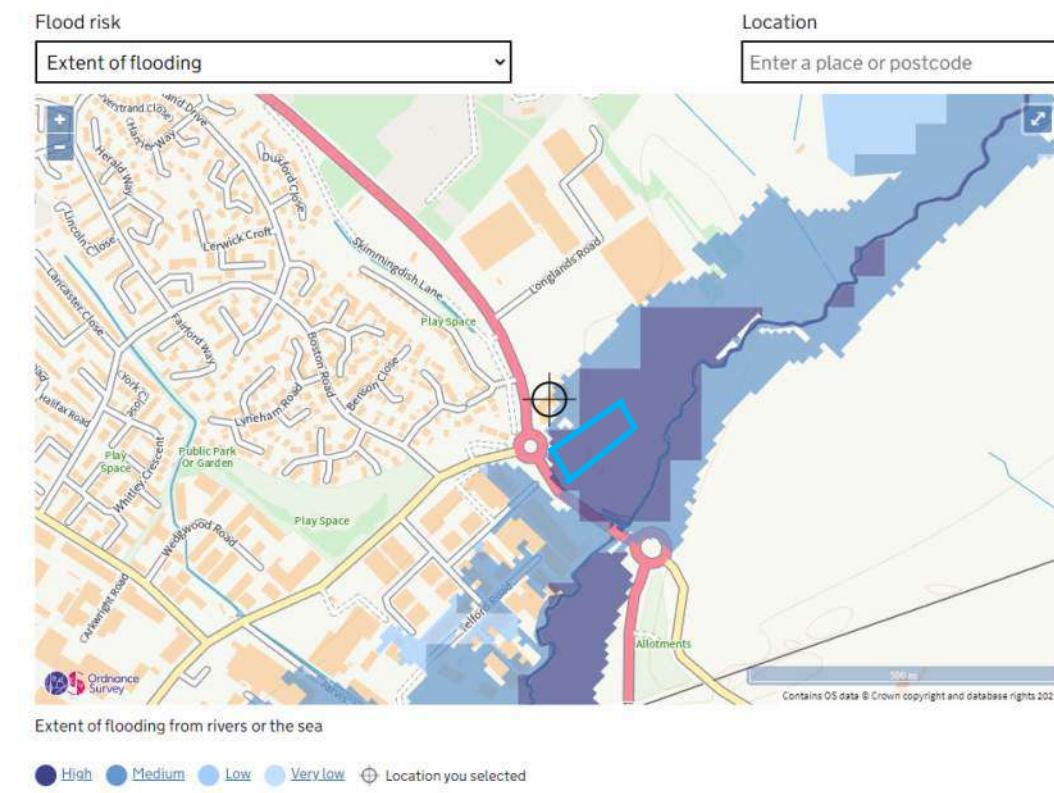
Revisions

**Appendix E – EA Flood Maps**

## Maps taken from the government web site Check the long term flood risk



### Flood Risk from Reservoirs



### Flood Risk from Rivers and Sea

High	-	greater than 3.3% chance of flooding
Medium	-	between 1 and 3.3% chance of flooding
Low	-	between 0.1 and 1% chance of flooding
Very Low	-	less than 0.1% chance of flooding

For more detailed flood maps see Flood Risk Assessment



### Pluvial Flood Risk Map

- |          |   |                                       |
|----------|---|---------------------------------------|
| High     | - | greater than 3.3% chance of flooding  |
| Medium   | - | between 1 and 3.3% chance of flooding |
| Low      | - | between 0.1 and 1% chance of flooding |
| Very Low | - | less than 0.1% chance of flooding     |

For more detailed flood maps see Flood Risk Assessment

## Appendix F – Calculations

50 Burnhill Road  
Beckenham  
Kent BR3 3LA

Bicester  
30 years plus 40%

Date May 2021  
File bicester DB 30 40SRC.SRC  
Micro Drainage

Designed By GHB  
Checked By  
Source Control W.10.4



Summary of Results for 30 year Return Period (+40%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Maximum Status
15 Summer	4.8	4.8	68.5028	0.2027	34.4	O K
30 Summer	4.8	4.8	68.5478	0.2477	43.0	O K
60 Summer	4.8	4.8	68.5778	0.2777	49.0	O K
120 Summer	4.8	4.8	68.5838	0.2837	50.1	O K
180 Summer	4.8	4.8	68.5768	0.2767	48.8	O K
240 Summer	4.8	4.8	68.5663	0.2662	46.7	O K
360 Summer	4.8	4.8	68.5438	0.2437	42.1	O K
480 Summer	4.8	4.8	68.5218	0.2217	37.9	O K
600 Summer	4.8	4.8	68.5013	0.2012	34.1	O K
720 Summer	4.8	4.8	68.4823	0.1822	30.6	O K
960 Summer	4.8	4.8	68.4508	0.1508	24.9	O K
1440 Summer	4.2	4.2	68.4098	0.1098	17.7	O K
2160 Summer	3.6	3.6	68.3698	0.0698	11.0	O K
2880 Summer	3.1	3.1	68.3468	0.0467	7.2	O K
4320 Summer	2.4	2.4	68.3238	0.0237	3.6	O K
5760 Summer	2.0	2.0	68.3103	0.0103	1.6	O K
7200 Summer	1.7	1.7	68.3018	0.0018	0.3	O K
8640 Summer	1.5	1.5	68.3000	0.0000	0.0	O K
10080 Summer	1.3	1.3	68.3000	0.0000	0.0	O K
15 Winter	4.8	4.8	68.5273	0.2272	39.0	O K
30 Winter	4.8	4.8	68.5783	0.2782	49.0	O K
60 Winter	4.8	4.8	68.6143	0.3142	56.4	O K
120 Winter	4.8	4.8	68.6233	0.3232	58.3	O K
180 Winter	4.8	4.8	68.6138	0.3137	56.3	O K
240 Winter	4.8	4.8	68.5998	0.2997	53.4	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
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15 Summer	76.03	21
30 Summer	49.50	34
60 Summer	30.81	62
120 Summer	18.61	100
180 Summer	13.72	132
240 Summer	10.99	166
360 Summer	8.03	234
480 Summer	6.43	302
600 Summer	5.40	366
720 Summer	4.69	428
960 Summer	3.74	548
1440 Summer	2.72	794
2160 Summer	1.98	1148
2880 Summer	1.58	1500
4320 Summer	1.14	2208
5760 Summer	0.91	2936
7200 Summer	0.76	3672
8640 Summer	0.66	0
10080 Summer	0.58	0
15 Winter	76.03	21
30 Winter	49.50	34
60 Winter	30.81	62
120 Winter	18.61	114
180 Winter	13.72	142
240 Winter	10.99	180

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30 years plus 40%

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Summary of Results for 30 year Return Period (+40%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
360 Winter	4.8	4.8	68.5673	0.2672	46.8	O K
480 Winter	4.8	4.8	68.5343	0.2342	40.3	O K
600 Winter	4.8	4.8	68.5033	0.2032	34.4	O K
720 Winter	4.8	4.8	68.4753	0.1752	29.3	O K
960 Winter	4.6	4.6	68.4353	0.1353	22.1	O K
1440 Winter	3.8	3.8	68.3838	0.0838	13.3	O K
2160 Winter	3.1	3.1	68.3438	0.0437	6.8	O K
2880 Winter	2.5	2.5	68.3258	0.0257	4.0	O K
4320 Winter	1.8	1.8	68.3058	0.0058	0.9	O K
5760 Winter	1.5	1.5	68.3000	0.0000	0.0	O K
7200 Winter	1.2	1.2	68.3000	0.0000	0.0	O K
8640 Winter	1.1	1.1	68.3000	0.0000	0.0	O K
10080 Winter	0.9	0.9	68.3000	0.0000	0.0	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
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360 Winter	8.03	254
480 Winter	6.43	324
600 Winter	5.40	390
720 Winter	4.69	452
960 Winter	3.74	572
1440 Winter	2.72	812
2160 Winter	1.98	1148
2880 Winter	1.58	1504
4320 Winter	1.14	2244
5760 Winter	0.91	0
7200 Winter	0.76	0
8640 Winter	0.66	0
10080 Winter	0.58	0