PROPOSED INDUSTRIAL DEVELOPMENT

SKIMMINGDISH LANE, BICESTER

SITE SPECIFIC FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY UPDATE

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S1230/September 2015
Flood Risk Assessment Issue 5

PROPOSED INDUSTRIAL DEVELOPMENT SKIMMINGDALE LANE, BICESTER

SITE SPECIFIC FLOOD RISK ASSESSMENT

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SKIMMINGDISH LANE, BICESTER

SITE SPECIFIC FLOOD RISK ASSESSMENT

1 DEVELOPMENT DESCRIPTION AND LOCATION

1a. What type of development is proposed and where will it be located?

This report has been prepared on behalf of Albion Land in support of an outline application for employment uses on land off Skimmingdish Lane, Bicester.

The report is an update to the FRA and Drainage Strategy produced by BJH in May 2015 (Issue 3) and submitted with the planning application in July 2015. This Update Report has been prepared to assess the recent changes to the proposed development that have responded to the adoption of the Cherwell Local Plan and to comments received from consultees on the application, not least the consultation response from the Environment Agency.

The proposed Development is for a flexible mix of B1c, B2 and B8 uses with ancillary office space on land to the north east of Skimmingdish Lane.

Site coordinates are 223600n/460100e.

- Total Site Area = circa 14.45 ha
  Building Area = 48,308 m^2

1b. What is its vulnerability classification?

As an Industrial Development the property is classified as “less vulnerable”.

1c. Is the proposed development consistent with the Local Development Documents?

The proposed development is consistent with the site’s allocation (Policy Bicester 11) within the adopted Cherwell Local Plan (2015).

1d. Please provide evidence that the Sequential Test or Exception Test has been applied in the selection of this site for this development type?

The siting of the buildings lie within a Zone 1 Flood Zone as can be seen on the attached Environment Agency Flood Zone Maps therefore the "Sequential Test" is satisfied (see Environment Agency Product 4 Flood Zone Map attached).

2 DEFINITION OF THE FLOOD HAZARD

2a. What sources of flooding could affect the site? (see Annex C PPS25).

We have considered all sources of potential flooding as follows:-

Fluvial (Rivers)

- Inundation of floodplains from rivers and watercourses
- Inundation of areas outside the floodplain due to influence of bridges, embankments and other features that artificially raise water levels
- Overtopping of defences
- Breaching of defences
- Blockages of culverts
- Blockages of flood channels, or flood corridors.

Tidal

- Sea
- Estuary
- Overtopping of defences
- Breaching of defences
- Other flows (fluvial surface water) that could pond due to tide locking
- Wave action.

Surface Water

- Sheet run – off from adjacent land (urban or rural)
- Surcharged sewers (Combined, foul or surface water sewers).

Groundwater

- Water table rising after prolonged rainfall to emerge above ground level remote from a watercourse.
- Most likely to occur in low lying areas underlain by permeable rock (aquifers).
- Groundwater recovery after pumping has ceased for mining or industry.

Infrastructure Failure

- Reservoirs
- Canals
- Industrial processes
- Burst water mains
- Blocked sewers or failed pumping stations.

The site does not have a history of Flooding & only localised flooding could occur due to blocked or inadequate drainage facilities.

2b. For each identified source, describe how flooding would occur, with reference to any historic records wherever these are available.

The site is not known to have flooded.

2c. What are the existing surface water drainage arrangements for the site?

The site is currently open farmland falling gently towards Langford Brook which takes the surface water from the area.

3 PROBABILITY

3a. Which flood zone is the site within?

The buildings are in Flood Zone 1 (see attached Environment Agency Flood Zone Map).

The lower Dock Area of Unit 1 is in Flood Zone 2/3 but the levels will remain similar to existing.

3b. If there is a Strategic Flood Risk Assessment covering this site, what does it show?

A Product 4 FRA has been undertaken by the Environment Agency and is attached. There is a floodplain to each side of the river and the 0.1% AEP is 69.85m AOD.

3c. What is the probability of the site flooding taking account of the contents of the SFRA and of any further site specific assessment?

The probability of Flooding is less than 1 in 1000 (0.1%) for building areas. The probability of flooding to Unit 1 Docks is 1/100.

3d. What are the existing rates and volumes of run-off generated by the site?

The Site is presently undeveloped open farm land and has a total area of 14.45 ha.

The existing Greenfield run-off is assessed at 128.5 litres/sec using the Institute of Hydrology Report 124 methodology for the 1/100 Year Storm.

4 CLIMATE CHANGE

4a. How is flood risk at the site likely to be affected by Climate Change?

The Drainage Scheme is designed for a 100 year event + 30% for Climate Change. This is in accordance with current guidelines and represents a very significant improvement over the existing condition.

5 DETAILED DEVELOPMENT PROPOSALS

5a. Please provide details of the development layout, referring to the relevant drawings.

The proposed development is for maximum floorspace of 48,308m^2 of buildings.

Flexibility is sought within the outline planning permission however, in order to allow for a robust assessment to be carried out of the potential impacts a series of development parameters have been set relating to:-

i. The maximum development area;
ii. The maximum area within which buildings can be located;
iii. The maximum floorspace;
iv. Maximum building heights;
v. Access zones;
vi. Minimum landscape zones.

These have been amended as part of the recent scheme changes and are presented graphically on the updated parameter plans.

The building zone parameter has been amended since the original submission to ensure that all building areas are located outside of areas at risk of flooding.

The illustrative Master Plan 3830-11 Rev 26 (attached) shows one way in which the site could be developed in line with the development parameters and how the principles of the proposed drainage strategy can be delivered. The surface water drainage scheme is to outfall to Langford Brook at Greenfield flows using on site retention tanks and swales

together with porous paving to all Car Park Areas – see BJH outline scheme plan, Drawing numbered S1230-D2E attached.

The building levels will be well above the Flood Plain.

The Scheme will incorporate SUDS features to properly serve the site in a sustainable and maintenance-friendly manner.

5b. Where appropriate, demonstrate how land-uses most sensitive to flood damage have been placed in areas within the site that are at least risk of flooding.

All Buildings are located in Flood Zone 1 but the lower Dock Area to Unit 1 will be at 69.8m level; in this Zone local flooding can be tolerated.

6 FLOOD RISK MANAGEMENT MEASURES

6a. How will the site be protected from flooding, including the potential impacts of climate change, over the development s lifetime?

The Drainage Scheme is designed for a 100 year event + 30% for Climate Change.

7 OFF SITE IMPACTS

7a. How will you ensure that your proposed development and the measures to protect your site from flooding will not increase flood risk elsewhere?

The outflows from the site are restricted by use of the On Site Balancing swales/tanks and will not exceed the present Greenfield flow rates (I0H report 124) and relating to Ground Conditions present.

Refer to illustrative Drainage Scheme Plan numbered S1230/D2E.

7b. How will you prevent run-off from the completed development causing an impact elsewhere?

As 7a.

8 RESIDUAL RISKS

8a. What flood-related risks will remain after you have implemented the measures to protect the site from flooding?

The Flood Risks are associated with Blocking Up / Silting of outlets.

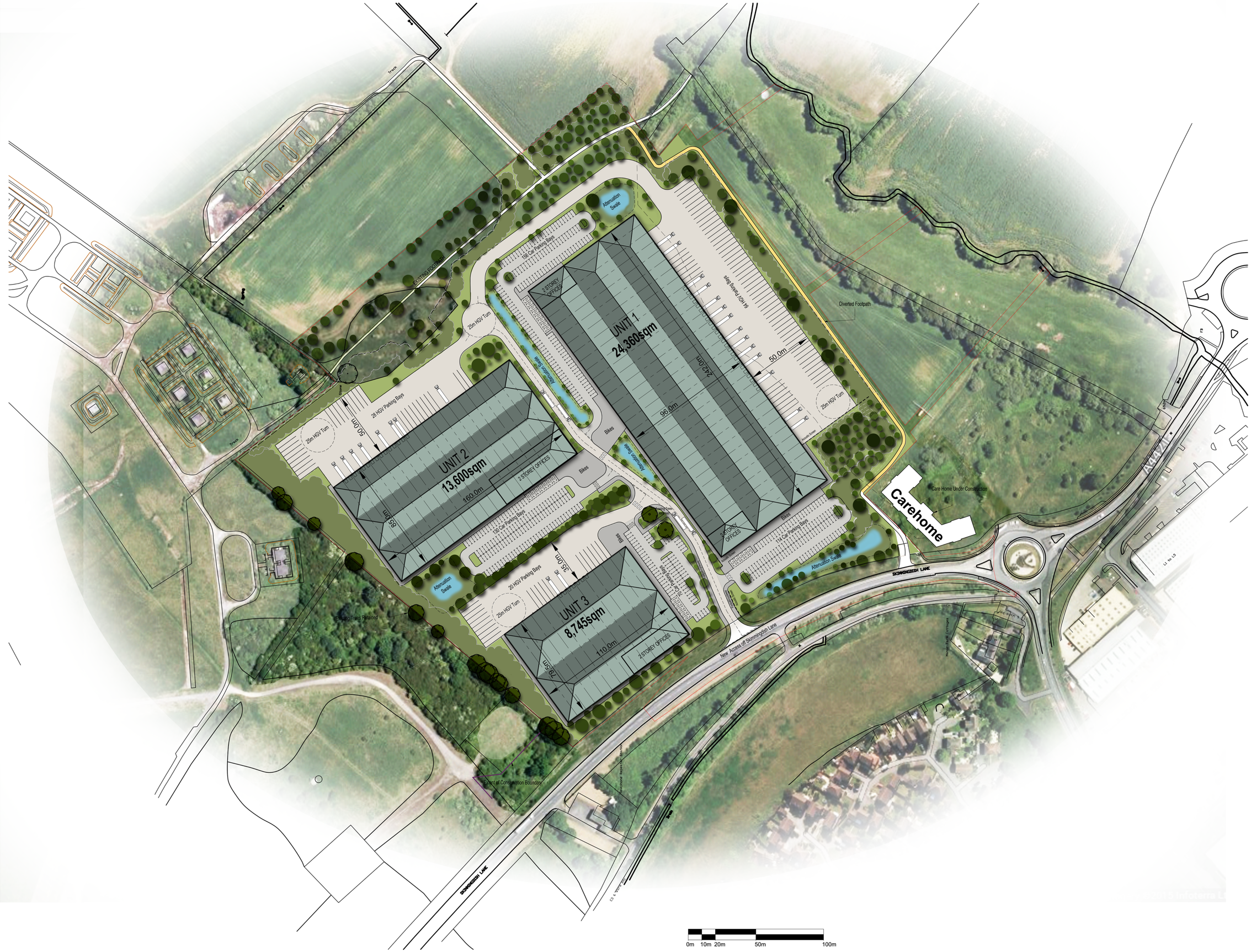
8b. *How, and by whom, will these risks be managed over the lifetime of the development.*

These Risks can be controlled by a Condition requiring a scheme for the management/maintenance of the Proposed Drainage to be submitted and agreed with the Planning Authority.

Bailey Johnson Hayes
Consulting Engineers
S1230/FRA/September 2015

APPENDIX A

CHETWOODS LAYOUT PLAN
3830-11 REV 26



Notes:
Contractors must verify all dimensions on site before commencing any work or shop drawings. This drawing is not to be scaled. Use figured dimensions only.

Subject to statutory approvals and survey.

AREAS
Building areas are liable to adjustment over the course of the design process due to the ongoing construction detailing developments.

SCHEDULE OF ACCOMMODATION GIA

	sq. ft.	sq.m.
UNIT 1 (inc. 10% Offices at G+1)	262,210	24,360
UNIT 2 (inc. 10% Offices at G+1)	146,390	13,600
UNIT 3 (inc. 10% Offices at G+1)	94,130	8,745
TOTAL DEVELOPMENT	502,730	46,705

UNIT 1

Car parking (inc. disabled)	270 spaces
HGV parking	64 spaces
Dock levellers	24 No.
Level access doors	4 No.

UNIT 2

Car parking (inc. disabled)	130 spaces
HGV parking	28 spaces
Dock levellers	15 No.
Level access doors	3 No.

UNIT 3

Car parking (inc. disabled)	70 spaces
HGV parking	20 spaces
Dock levellers	7 No.
Level access doors	2 No.

Site Area 35.71acres / 14.45ha

26	Lagoons updated.	08.09.15	PMJS
25	Lagoons and mounding updated.	03.09.15	PMJS
24	Acoustic fence added.	27.08.15	PMJS
23	Amended to suit minor changes.	07.08.15	RS
22	Scheme updated to 3 unit layout	03.08.15	PMJS
21	Planning Issue	15.05.15	SM

revisions

PROPOSALS

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Project Job Number 3830-11
SKIMMINGDISH LANE, BICESTER

ALBION LAND

Drawing Title Drawing Size A1
ILLUSTRATIVE MASTERPLAN
(Other than the siting of Unit 1)

Drawn AF	Date Oct 14	Scale 1/1250	Cadfile 3830
Reviewed by GC	Drawing No. 3830-11		Rev. 26

APPENDIX B

ENVIRONMENT AGENCY PRODUCT 4 FLOOD MAPS

Product 4 (Detailed Flood Risk) fo Skimmingdish Lane - Bicester
Our Ref: OX_0115_02

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This
i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq meters; and all domestic extensions",
ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map areas benefiting from defences (where available/relevant);
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;
Statutory (Sealed) Main River (where available within map extents);

A table showing:
i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
ii) Flood defence locations unique identifiers and attributes; (supplied seperately)
iii) Historic flood events outlines unique identifiers and attributes; and
iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please read the enclosed guidance which sets out our requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at

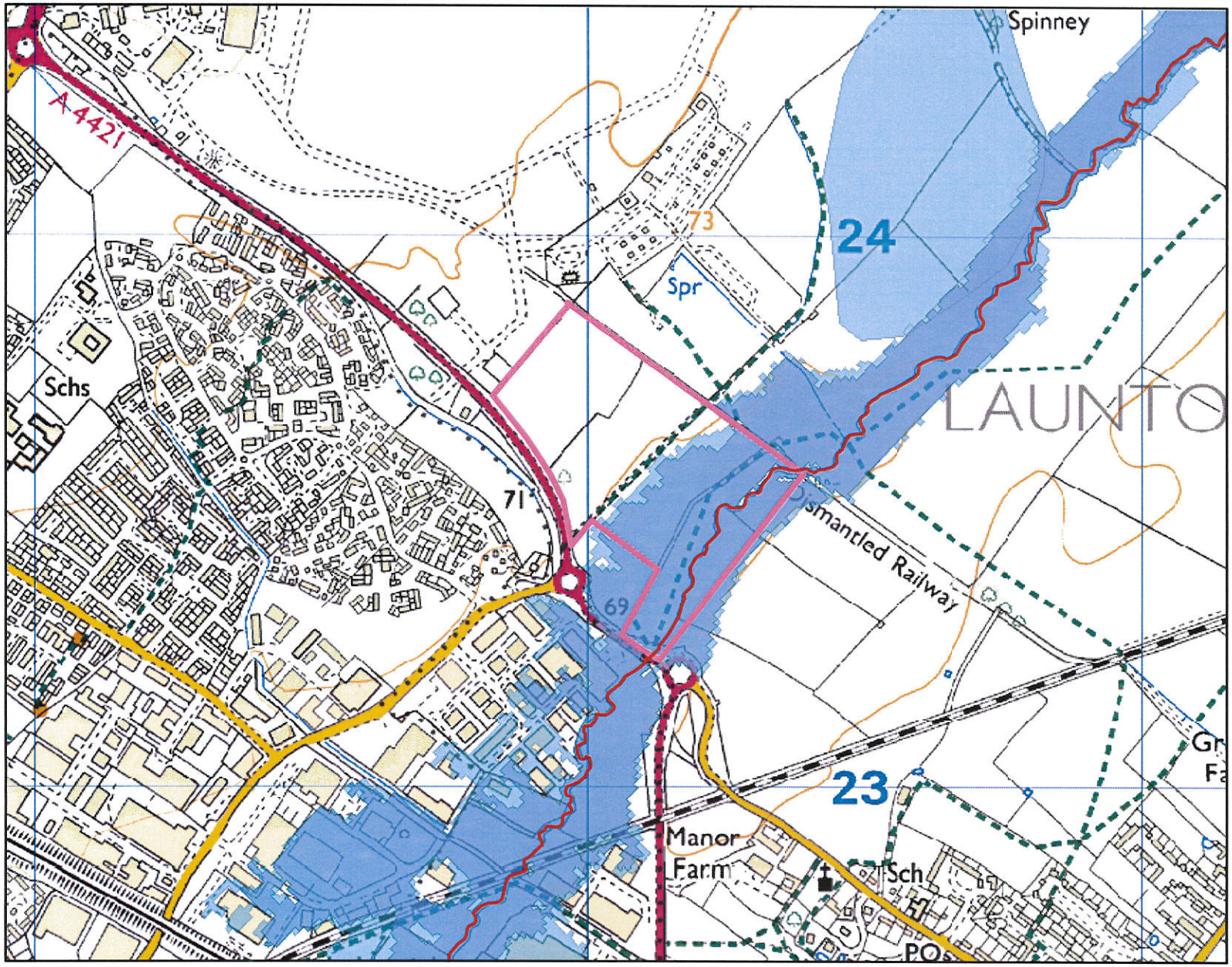
http://www.environment-agency.gov.uk/research/planning/82584.aspx

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at

http://www.environment-agency.gov.uk/research/planning/33580.aspx

Red Kite House, Howbery Park, Wallingford, Oxon OX10 8BD
Customer services line: 08708 506 506
Email: WTenquiries@environment-agency.gov.uk

Basic Flood Map centred on Skimmingdish Lane - Bicester
Created 09/10/2012 - REF: OX_0115_02



Environment Agency

Kilometres

0 0.1 0.2

N W E S

Legend

- Main River
- Site Location
- Flood defences
- Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled floodplain flood levels

OX_0115_02

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Northing	flood levels (mAOD)					
				20% AEP	5% AEP	2% AEP	1% AEP	1% AEP with climate change allowance (+20% on river flows)	0.1% AEP
Floodplain 1	Langford Brook (Bicester) & Pingle-Back-Bure 2010	459901	222987	No data	No data	69.58	69.64	69.73	69.82
Floodplain 2	Langford Brook (Bicester) & Pingle-Back-Bure 2011	460035	223476	No data	No data	69.56	69.62	69.69	69.77
Foodplain 3	Langford Brook (Bicester) & Pingle-Back-Bure 2012	460091	223448	No data	69.39	69.56	69.62	69.69	69.77
Floodplain 4	Langford Brook (Bicester) & Pingle-Back-Bure 2013	460108	223271	69.02	69.34	69.48	69.54	69.60	69.67
Floodplain 5	Langford Brook (Bicester) & Pingle-Back-Bure 2014	460125	223325	69.03	69.35	69.50	69.55	69.61	69.68
Floodplain 6	Langford Brook (Bicester) & Pingle-Back-Bure 2015	460182	223443	69.03	69.39	69.57	69.63	69.70	69.78
Floodplain 7	Langford Brook (Bicester) & Pingle-Back-Bure 2016	460213	223485	No data	69.39	69.58	69.64	69.72	69.8
Floodplain 8	Langford Brook (Bicester) & Pingle-Back-Bure 2017	460329	223587	No data	69.53	69.64	69.68	69.75	69.85

This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

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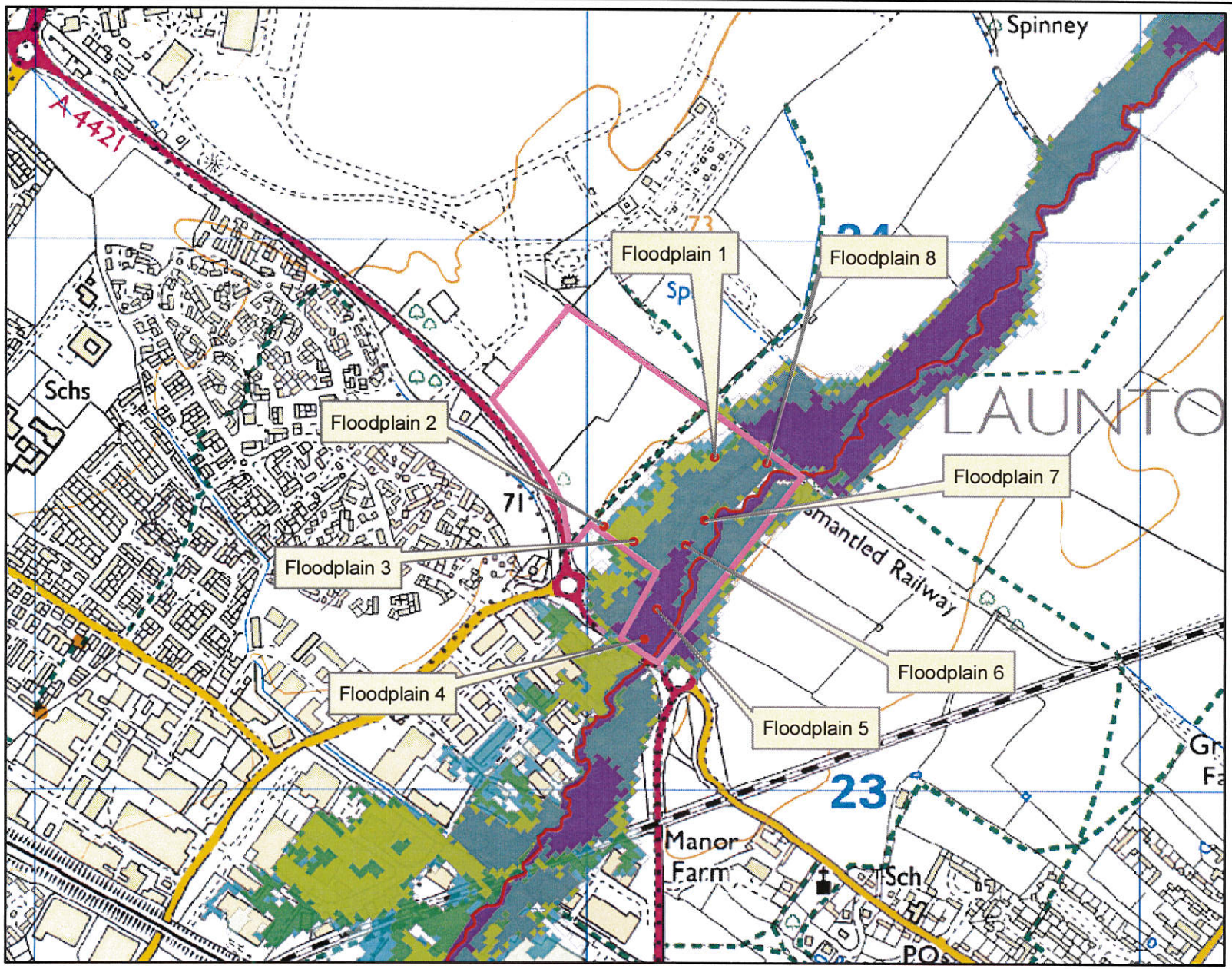
FRA Map centred on Skimmingdish Lane - Bicester
Created 09/10/2012 - REF: OX_0115_02



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Model information

OX_0115_02

Model: Langford Brook (Bicester) & Pingle-Back-Bure 2010

Description: The information provided is from the Langford Brook (Bicester) & Pingle-Back-Bure 2010 detailed mapping project. The study was carried out using 2D modelling software (ISIS-Tuflow).

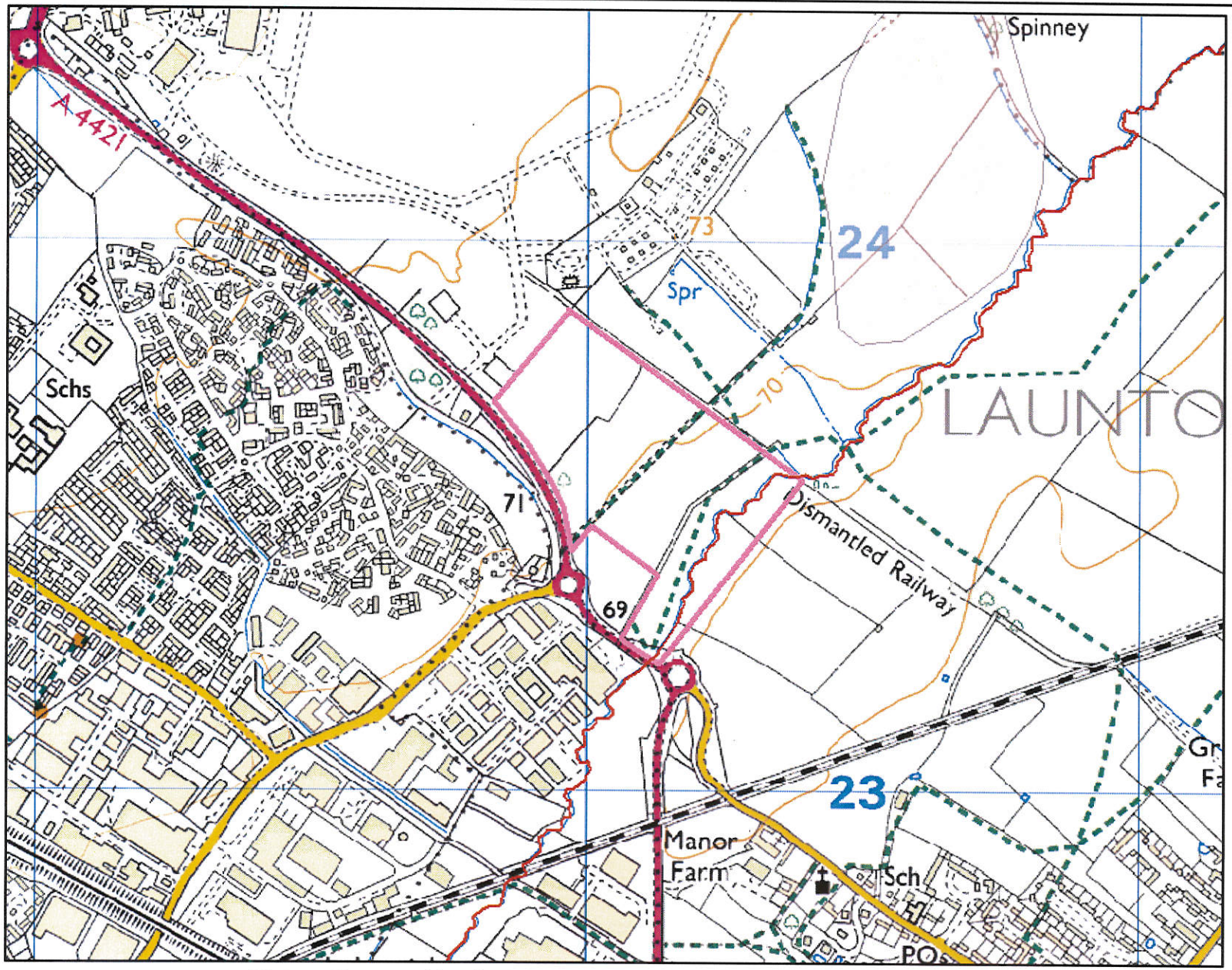
Model design runs:
1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 50 / 2% AEP; 1 in 100 / 1% AEP; 1 in 100+20% / 1% AEP with climate change and 1 in 1000 / 0.1% AEP

Mapped Outputs:
1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 50 / 2% AEP; 1 in 100 / 1% AEP; 1 in 100+20% / 1% AEP with climate change and 1 in 1000 / 0.1% AEP

Model accuracy:
Levels ± 250mm

© Environment Agency 2012

Historic Flood Map centred on Skimmingdish Lane - Bicester
Created 09/10/2012 - REF: OX_0115_02



Environment Agency

Kilometres

0 0.1 0.2

N W E S

Legend

- 1992 Flood Event Outline
- Main River
- Site Location

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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Historic flood data

OX_0115_02

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
EA0619920900273	06SeptemberAutumn1992	01/01/1992	12/12/1992	main river	channel capacity exceeded (no raised defences)

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

Start and End Dates shown above may represent a wider range where the exact dates are not available.

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Environment Agency

Defence information

OX_0115_02

Defence Location:	No defences on Main River
Description:	This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.

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APPENDIX C

BJH SURFACE WATER GREENFIELD RUN-OFF ESTIMATION ON SITE RETENTION VOLUME

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Project	Project No.	Sheet No.
Proposed Development Skimmingdish Lane, Bicester. for Albion Land Ltd.	S1230	D1A
	Drawing No.	Rev.
Section	By	Date
Surface Water Drainage Design	P.A.B.	Apr 15
	Checked	Date

Calculations

PROPOSED DEVELOPMENT,

SKIMMINGDISH LANE, BICESTER

FOR

ALBION LAND LTD

SURFACE WATER DRAINAGE DESIGN

GREENFIELD RUN OFF AND STORAGE VOLUME ESTIMATIONS

1.0 INTRODUCTION

The following calculations are prepared to justify the principles for design of below-ground surface water drainage systems for the above development.

The site has a total area of 12.6 ha and exhibits a gentle gradient from north to south. The site is presently undeveloped and comprises of open fields used as arable land. The proposed scheme is to redevelop the site with new roads, buildings and external yard / hardstanding areas for warehousing.

The surface water drainage strategy for the developed site is to limit flows to existing greenfield values by utilising a series of retention swales and/or ponds and incorporating flow control devices to the drainage network. The drainage will discharge via a new outfall to Langford Brook to the south east of the site. The design for the site drainage shall include an allowance for climate change.

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Project	Project No.	Sheet No.
Proposed Development Skimmingdish Lane, Bicester. for Albion Land Ltd.	S1230	D2A
	Drawing No.	Rev.
Section: Surface Water Drainage Design	By: P.A.B.	Date: Apr 15
	Checked	Date

Calculations

2.0 GROUND CONDITIONS

The published geology map indicates the site to be underlain by Alluvium, overlying Oxford Clay and Kellaway Beds, overlying Cornbrash Limestone.

3.0 DESIGN

3.1 GREENFIELD RUNOFF ESTIMATE

Greenfield runoff estimation is undertaken using the UK SuDS Tools Website. Based upon local knowledge, of the ground conditions the SOIL is considered to be type 4 for the purpose of greenfield runoff estimation. The default value of SOIL type 1 (sandy highly permeable material), allocated by the UK SuDS Tools Website for the subject site, is considered inappropriate and is therefore edited within the input data.

Greenfield runoff is calculated using the Institute of Hydrology Report 124 methodology, assuming a site area of 50ha, and linearly interpolating the final value for the formally drained site area of 9.62ha. The greenfield runoff estimation for a 50ha site in this location is presented on the following sheet.
The greenfield runoff estimate of Qbar for a 50ha site is 209.4 litres/sec.
Accordingly the value of Qbar for the subject site is (9.62 / 50) x 668 = 128.5 **litres/sec**

For the purpose of initial sizing of flood storage requirements it shall be assumed that the outflow from the whole site shall be restricted to Qbar for all rainfall events up to and including the 1 in 100 year event (inclusive of an allowance of 20% for climate change).

Drainage design is undertaken using the Source Control module of Microdrainage Windes software. The input data and results of a Quick Storage Estimate are presented on the following sheet. For 1 in 100 year +20% storm events (using FEH design rainfall) the software predicts storage volumes between 5906 m^3 and 8259 m^3 will be required.

HR Wallingford
Working with water

Greenfield runoff estimation for sites

Site name: Skimmingdish Lane

Site location: Bicester

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments" W5-074/A/TR1.1 rev. E (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Site coordinates

Latitude: 51.90824° N

Longitude: 1.12735° W

Reference: gcppq3e56v6b / 50

Date: 26 Nov 2014

Site characteristics

Total site area	50	ha
Significant public open space	0	ha
Area positively drained	50	ha

Methodology

Greenfield runoff method	IH124
Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type
SOIL type	4
HOST class	N/A
SPR	0.47

Hydrological characteristics

	Default	Edited	
SAAR	620	620	mm
M5-60 Rainfall Depth	20	20	mm
'r' Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.88	0.88	
Hydrological region	6	6	
Growth curve factor: 1 year	0.85	0.85	
Growth curve factor: 10 year	1.62	1.62	
Growth curve factor: 30 year	2.3	2.3	
Growth curve factor: 100 year	3.19	3.19	

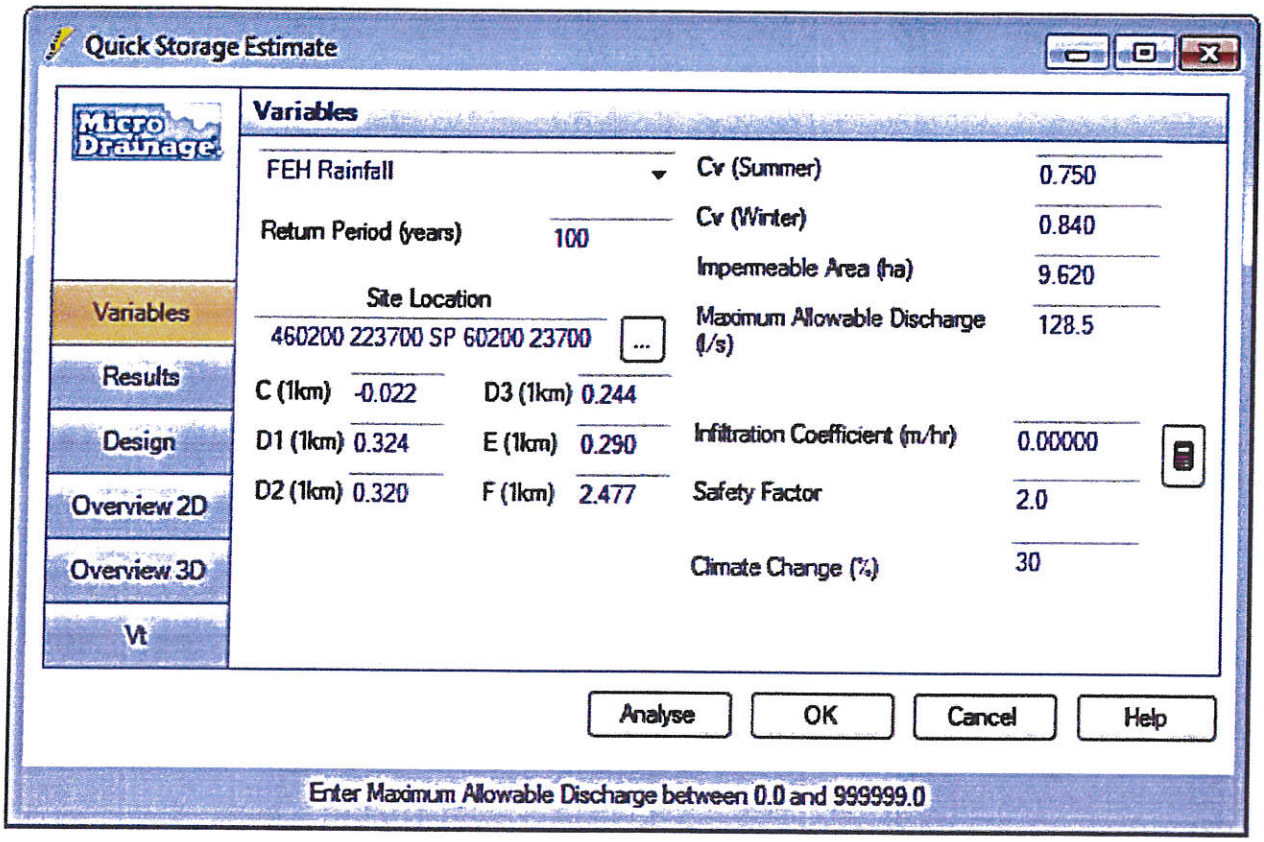
Greenfield runoff rates

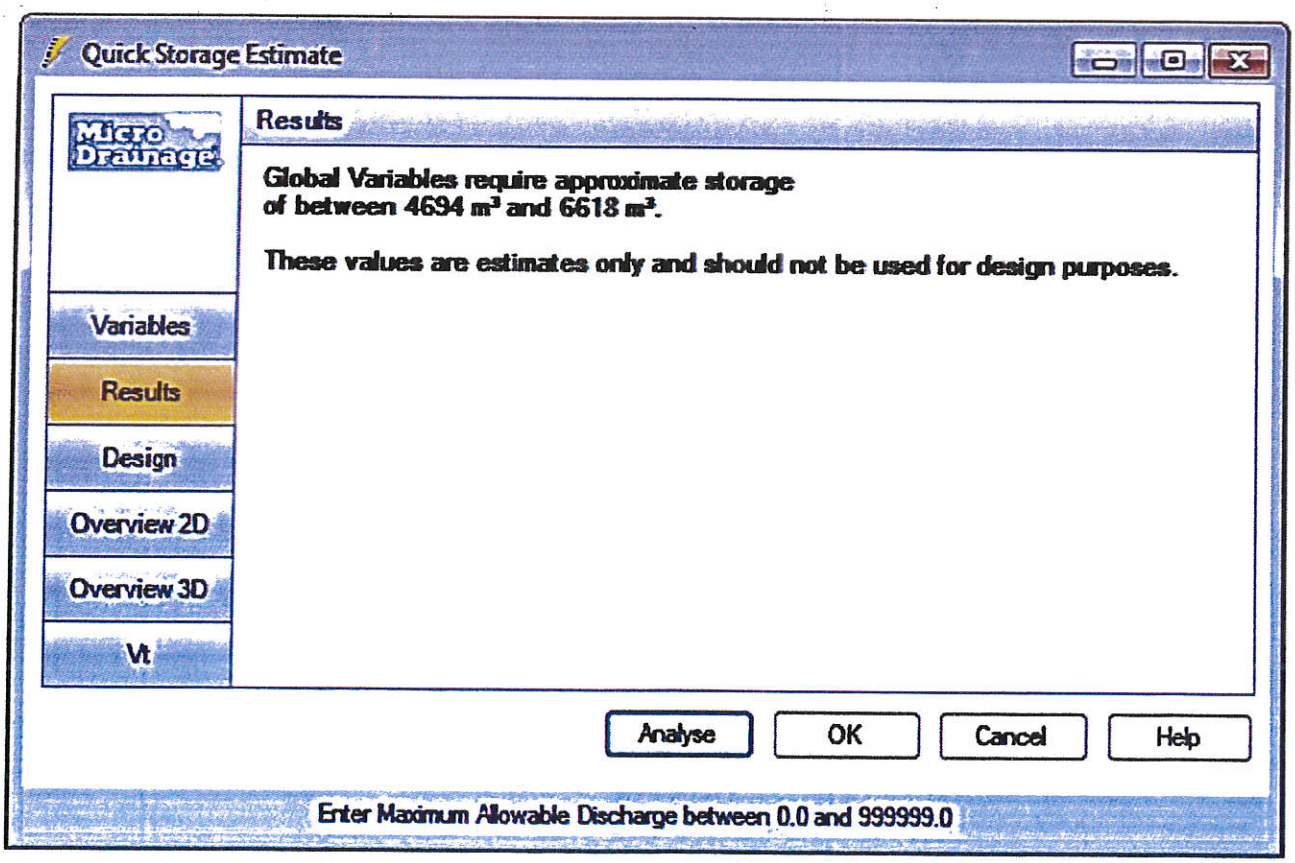
	Default	Edited	
Qbar	7.29	209.44	l/s
1 in 1 year	42.50	178.02	l/s
1 in 30 years	115.00	481.71	l/s
1 in 100 years	159.50	668.11	l/s

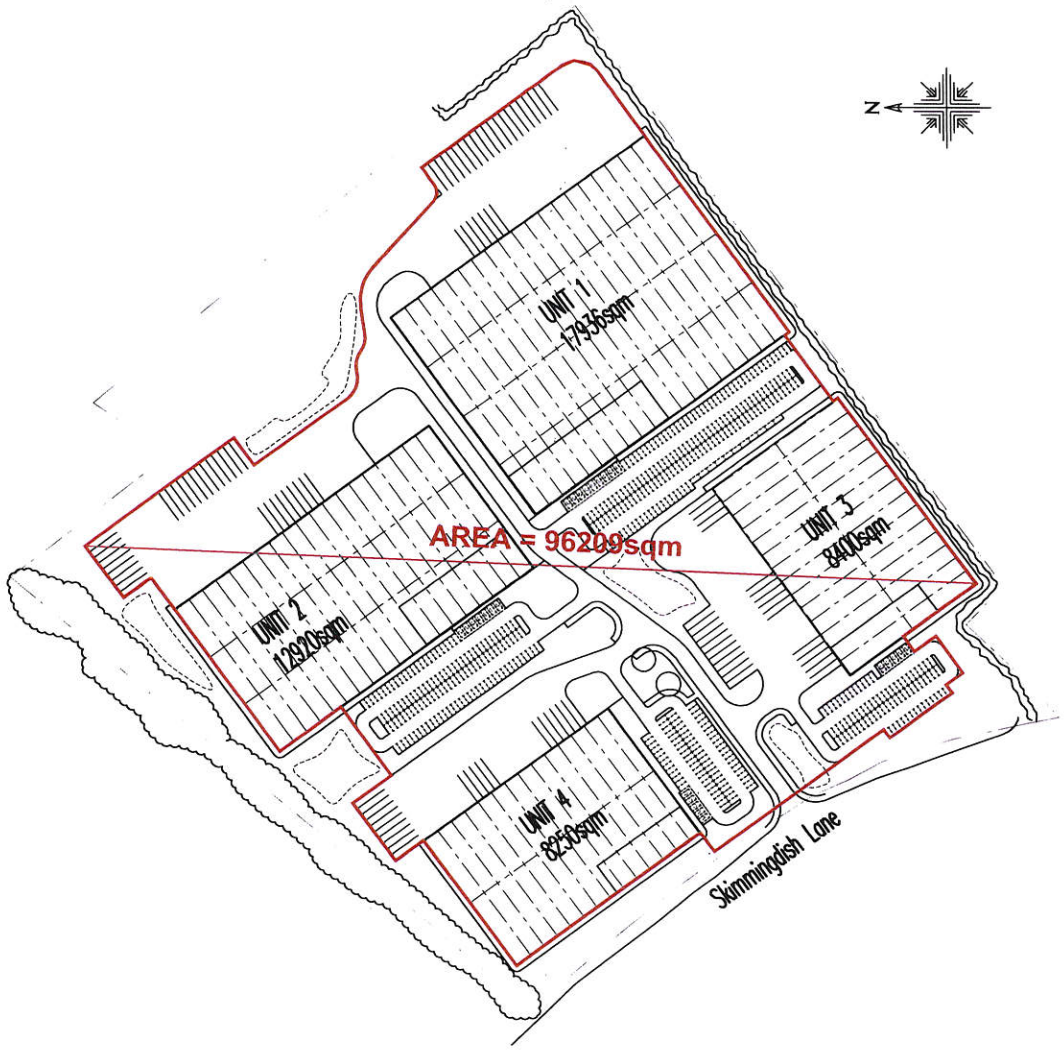
Please note that a minimum flow of 5 l/s applies to any site

HR Wallingford, the Environment Agency and any local authority are not liable for the performance of drainage scheme which is based upon the output of this report.

[redacted]


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FEH Rainfall
Return Period (years) 100
Site Location
460200 223700 SP 60200 23700
C (1km) -0.022
D1 (1km) 0.324
D2 (1km) 0.320
D3 (1km) 0.244
E (1km) 0.290
F (1km) 2.477
Cv (Summer) 0.750
Cv (Winter) 0.840
Impermeable Area (ha) 9.620
Maximum Allowable Discharge (l/s) 128.5
Infiltration Coefficient (m/hr) 0.00000
Safety Factor 2.0
Climate Change (%) 30
Analyse
OK
Cancel
Help
Enter Maximum Allowable Discharge between 0.0 and 999999.0


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage of between 4694 m³ and 6618 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help
Enter Maximum Allowable Discharge between 0.0 and 999999.0



Skimmingdish Lane
Bicester

Client:
ALBION LAND LTD

Illustration Of Drained Area

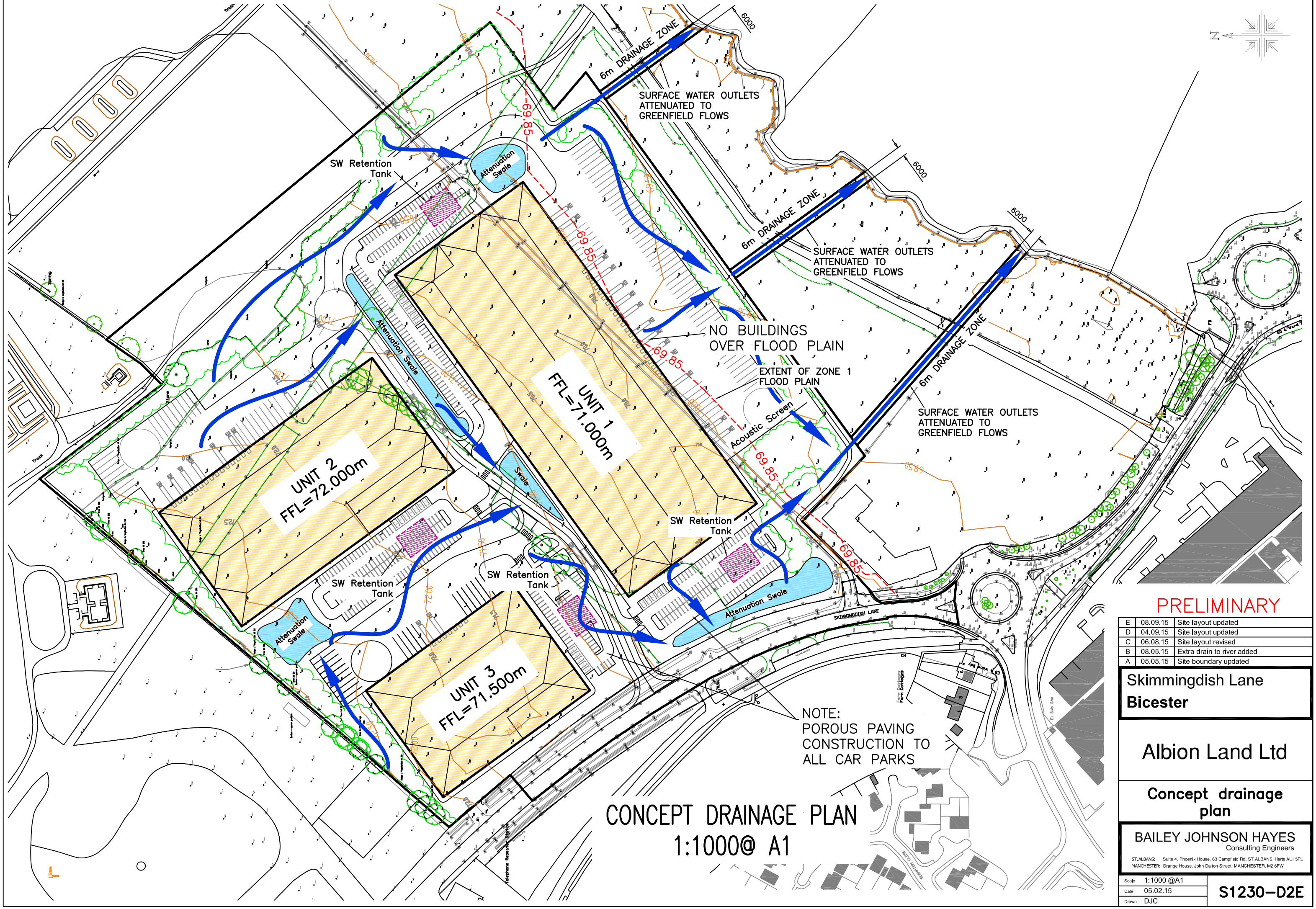
BAILEY JOHNSON HAYES
Consulting Engineers
MANCHESTER : Grange House, John Dalton St. Tel 0161 279 7777 Fax 0161 228 3882
ST ALBANS : Phoenix House, 63 Campfield Road. Tel 01727 861172 Fax 01727 841035

Scale	1:1250 at A1
Date	Nov 2014
Drawn	-

S1230-Ext-01

APPENDIX D

BJH SURFACE WATER DRAINAGE PLAN S1230/D2E



PRELIMINARY

E	08.09.15	Site layout updated
D	04.09.15	Site layout updated
C	06.08.15	Site layout revised
B	08.05.15	Extra drain to river added
A	05.05.15	Site boundary updated

Skimmingdish Lane
Bicester

Albion Land Ltd

Concept drainage plan

BAILEY JOHNSON HAYES
Consulting Engineers
ST.ALBANS: Suite 4, Phoenix House, 63 Campfield Rd, ST.ALBANS, Herts AL1 5FL
MANCHESTER: Grange House, John Dalton Street, MANCHESTER, M2 6FW

Scale	1:1000 @A1
Date	05.02.15
Drawn	DJC

S1230–D2E

APPENDIX E

FLOOD ZONE 1 LINE
BJH PLAN S1230-03A

LANGFORD BROOK

SKIMMINGDISH LANE

69.85

FLOOD PLAIN

FLOOD PLAIN

FLOOD PLAIN

ZONE 1

ZONE 1

ZONE 1

UNIT 1
FFL=71.000m

UNIT 2
FFL=72.000m

UNIT 3
FFL=71.500m

ZONE 1 FLOOD PLAIN
1:1000@ A1

PRELIMINARY

A	08.09.15	Site layout updated

Skimmingdish Lane
Bicester

Albion Land Ltd

Zone 1 Flood plain on survey plan

BAILEY JOHNSON HAYES
Consulting Engineers
ST.ALBANS: Suite 4, Phoenix House, 63 Campfield Rd, ST.ALBANS, Herts AL1 5FL
MANCHESTER: Grange House, John Dalton Street, MANCHESTER, M2 6FW

Scale	1:1000 @A1
Date	15.07.15
Drawn	DJC

S1230–03A