

Dean Swann CIHT FIHE

## Summary



# Land at Culham No1 Site, Culham

Drainage: Proof of Evidence Summary

PINS Reference: [NATTRAN/SE/HAO/286 \(DPI/U3100/23/12\)](#)

# Document Control Sheet

<b>Document Title</b>	Drainage: Proof of Evidence Summary Document
<b>Document Ref</b>	10812 POE02 Rv0
<b>Project Name</b>	Land at Culham No1 Site, Culham
<b>Client</b>	CEG
<b>In relation to</b>	PINS reference: NATTRAN/SE/HAO/286 (DPI/U3100/23/12)  The CPO and Side Roads Order were both made by Oxfordshire County Council on 21 December 2022.
<b>Dated</b>	January 2024

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Appendix D - Flood Risk Assessment and Drainage Strategy (10812-DR-01 C)  
Appendix E – Constraints and Opportunities Plan (10812-SK-02 A)

# 1 Organisation and Proof of Evidence Author

## Brookbanks

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- 1.1** I work for Brookbanks. Brookbanks is a leading development consultancy in the planning promotion of residential and commercial led projects. Across the UK, we are currently providing advice to land promoters and developers on many strategic residential and commercial development sites ranging from 100 – 5,500 residential dwellings and / or in excess of 100 ha of business and commercial property.
- 1.2** Now with 26 years of operation, the company specialises in the pre and post planning delivery of major development initiatives and is currently working on some of the largest projects being executed across the UK. Our team has significant and probably unparalleled experience in successfully providing multi-disciplinary services to deliver strategic land through the planning process and into production.

## Dean Swann

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- 1.3** I am a HND qualified Civil Engineer and act as the Technical Director for Brookbanks. I am a lead in the Highways and Environmental Services provided by Brookbanks and in particular oversee the Hydrology Team including flood risk and drainage services. I am the witness for Flood Risk and Surface Urban Drainage Systems infrastructure.
- 1.4** I have 38 years experience in engineering consultancy and have specialised in the delivery of strategic development planning applications. I have also acted as expert witness on numerous occasions.
- 1.5** I through Brookbanks, have been involved in the site known as Culham No1. Site since 2015, providing drainage, Utilities, ground conditions, noise, air and general engineering advice to support the emerging proposals.

## Statement of Truth

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- 1.6** My evidence, set out herein, is true and has been prepared and is given in accordance with the guidance of my professional training and I confirm that the opinions expressed are my true and professional opinions.

## 2 Introduction

- 2.1** This Proof of Evidence Summary (POES) supports the original Objection to CPO as submitted on behalf of CEG on the 23<sup>rd</sup> March 2023. It also supports the subsequent Statement of Case (SOC<sup>1</sup>) as submitted on behalf of CEG on the 14<sup>th</sup> December 2023). Finally it responds to the undated Oxfordshire County Council joint Statement of Case (JSOC<sup>2</sup>) as led by Oxfordshire County Council relating to CPOs and accompanying Side Roads Order for:

“The Oxfordshire County Council (Didcot Garden Town Highways Infrastructure – A4130 Improvement (Milton to Collett Roundabout), A4197 Didcot to Culham Link Road, and A415 Clifton Hampden Bypass) Compulsory Purchase Order 2022”

Reference is made to the subsequent CEG objection<sup>3</sup> following the Statement of Cases as referred to above.

- 2.2** The CPO parcels in question and detail within this POES are 16/6a, 16/6g, 16/6j and 16/6z as detailed on Oxfordshire County Council drawing GH-132861001-LOLP-LEDA-1 revision P02.2, in Appendix A. It is understood that the County Council proposes to acquire such areas for the provision of works compounds during the construction stage of the wide road scheme as stated in the JSOC<sup>4</sup>.
- 2.3** The comments within this POES relate specifically to section 4 and paragraph 4.5 of the above SOC and work completed by me on behalf of Brookbanks in the preparation of supporting an imminent Outline Planning Permission for the development of land known as Culham No 1 and for the purposes of this evidence is the “Site”, as shown within the redline on the plan in Appendix B. It should also be understood that the Site is allocated in the District Council’s Local Plan. Further details of the allocation are referenced in Carter Jonas Proof of Evidence dated January 2024, in particular section 3 paragraphs 3.1 through 3.4.

## 3 Local Planning Policy Compliance

- 3.1** South Oxfordshire District Council adopted its 2035 Local Plan in 2020. The following policies from the Local Plan relate directly to the site and flood risk and drainage and again reference is made to Carter Jonas Proof of Evidence of January 2024 section 3, paragraphs 3.1 to 3.4.

Policy STRAT9: Land Adjacent to Culham Science Centre Site Area directly relates to the site but does not have any specific flood risk or drainage policy. However for planning and development generally Policy EP4:Flood Risk would generally apply.

- 3.2** Attention is drawn to points 4, 5 and 6 of the policy EP4, in terms of drainage development of the site. From day one of the drainage design process, a complete system to outfall needs to be planned in line with intended phasing and therefore delivery to meet these points.
- 3.3** The Lead Local Flood Authority (LLFA) and the Drainage Officer for the Vale of the White Horse District Council have attended meetings discussing the overall development of the Site. Specific reference is made to comments received from the LLFA, (paraphrased) “that the design of the development should be led by the needs of the drainage and not the other way around”.



## 4 Site Drainage and Site Topography

### Existing Site Drainage Regime

- 4.1 Within the Site there is an existing watercourse that flows from west of the railway line, crosses the south west corner of the site diagonally and then is culverted under the A415. There is a second watercourse that crosses the east of the Site, the majority of which is believed to be culverted. This particularly culverted water course is believed to run under the land proposed to be acquired by Oxfordshire County Council through the CPO plots affected.
- 4.2 Given the Site's age there are no formal sustainable urban drainage system in place. It is assumed that surface water is in a piped system and discharges unrestricted into the watercourses on site.
- 4.3 The exiting features identified above are illustrated on **Figure 5-3** below:

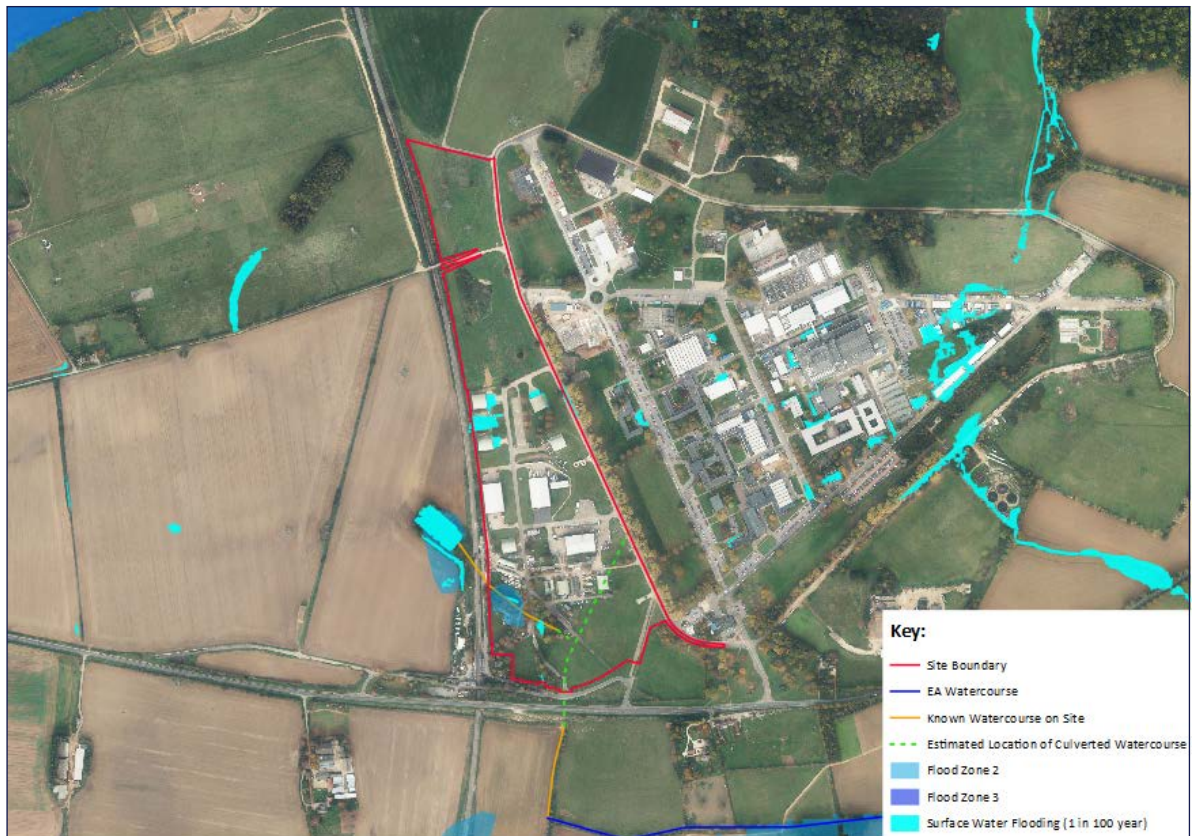


Figure 4-1: Existing Site Conditions

## Existing Topography

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the Site

- 4.4** The Site currently has several areas and plateaus which are thought to be historic piece meal and discrete constructions including the historic Airfield use, with no holistic approach taken to design, levels and drainage.

CPO plots affected

- 4.5** The CPO plots affected consist of grassed, undeveloped areas. They slope down from their south eastern corner to their North west corner.

## Conclusion on Existing Conditions

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- 4.6** The low point of the Site is in the south west corner following the watercourses through the Site. The Site falls from north to south. Gradients are shallow, with several unconnected plateaus. Site gradients also vary locally with steps and embankments at various plateau points.

- 4.7** The existing drainage regime is not holistic or sustainable and cannot be reused in any part. The lowest point in the site would not be altered through the new proposed development, as this is the natural outfall to the two water courses that drain the site.

**4.8**

Earthworks for Proposed development

- 4.9** From material testing and location, the CPO plots affected are highly suitable at present to become fill elsewhere on the site. Lowering the CPO plots affected would also be beneficial to the drainage strategy into the existing water courses.

- 4.10** An initial high level cut and fill assessment is shown in Appendix C.

## 5 Sustainable Drainage Systems

### The Outline Sustainable Drainage Strategy includes:

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- 5.3 In accordance with the Oxfordshire County Council Guidance Documentation for drainage, as a first step, Infiltration testing was completed on the Site. Infiltration rates were found not to be a viable option for a method of discharge and therefore a scheme that discharged surface water to the local existing water courses, would be the next viable solution.
- 5.4 A conceptual drainage and treatment train for the surface water to the outfalls on the proposed development looks to use various methods of storage and treatment. These would be through methods such as porous paving, rills and swales to basins for main storage, then to the outfalls.

### Surface Water Drainage Strategy

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- 5.5 In accordance with The SuDS Manual C753 and national government guidance the SuDS across the proposed development have been designed in order to store storm water for the 1 in 100 year + 40% climate change storm event.
- 5.6 Surface water in the basins has been designed to discharge at QBAR (in accordance with the SuDS Manual and national and local government guidance) into the existing unnamed watercourses on site.
- 5.7 The size of the development and the increased density on the Site will necessitate a mixed SuDS system to accommodate the volume of water created by controlling runoff from the site as described in paragraph 5.5 above. A mixture of swales, basins and permeable areas will be required to achieve an appropriate and approved design.
- 5.8 The larger final detention basins in the CPO plots affected have been placed adjacent to the water course, but outside of the identified Flood zone 2 by the Environment Agency.



## 6 Overall Conclusion

- 6.1** The above sections demonstrate how drainage on the scheme has to be considered as a whole from initial concept to first submission for planning and beyond.
- 6.2** Strategic earthworks and drainage infrastructure are constructed in the first phases of work. This would directly affect the CPO plots affected.
- 6.3** If the CPO plots affected are to be returned, it will still be necessary to construct temporary drainage measures along with unnecessary borrow pits in land that would have otherwise had been developed for employment use in the early stages of development. This will be required so that drainage is always available and that an earthwork balance can be achieved while the CPO plots affected are vested in the County Council. Once the land is returned then further works will need to be undertaken to establish development and drainage in this area akin to the original masterplan. This effectively is either abortive works and or alteration and double handing of materials which, not only have a and increased cost and viability implication for the Site, but also has safety implications due to the abortive and unnecessary works required to develop the site in two stages.
- 6.4** If the CPO plots affected are not returned and remains within the highway then the development area would be reduced from that seen today, with an unnecessary unused swathe of open land between the development and highway.
- 6.5** To lose control of over 1ha of land from the proposed development and have that land placed in effective limbo with no defined timescale for its return and without discussion with CEG or the landowners before the CPO stage, is not conducive to effective infrastructure planning and more importantly compliant drainage design. The County Council have also not demonstrated why it is necessary for the works compound to be sited in the currently proposed location. Indeed CEG have with both Brookbanks and other members of the development team, identified alternative area within the proposed development that could accommodate works compound areas which do not require holistic consideration for either infrastructure or drainage. In addition these areas that lie within land under the same ownership as the land proposed to be taken via CPO for compound purposes, and that both promoter and landowner have expressed a readiness to work with OCC and appointed contractors to essentially 'swap' these areas. This point is also made in the Carter Jonas Proof of Evidence January 2024, paragraphs 5.17 to 5.20.

## 7 References

<sup>1</sup> SOC CEG Statement of Case, PINS reference M.3

<sup>2</sup> JSOC County Council Statement of Case, PINS reference M.10

<sup>3</sup> CEG Objection J.22

<sup>4</sup> JSOC, paragraph 16.102 of the Council's Statement of Case Core Document M.10



## Appendix A –OCC COP Plan



KEY:

Red Line Boundary

Land to be Acquired Permanently

Land to be Acquired Temporarily

Rights to be Acquired Permanently

P01	First Issue	21/1/22	AH	JD	SR
Rev	Description	Date	By	Check	Approved

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THE OXFORDSHIRE COUNTY COUNCIL  
(DIDCOT GARDEN TOWN HIGHWAYS  
INFRASTRUCTURE – A4130  
IMPROVEMENT (MILTON GATE TO  
COLLETT ROUNDABOUT), 4197 DIDCOT  
TO CULHAM LINK ROAD, AND A415  
CLIFTON HAMPDEN BYPASS)  
COMPULSORY PURCHASE ORDER 2022

LAND OWNER LAND PLAN -  
LEDA PROPERTIES LIMITED

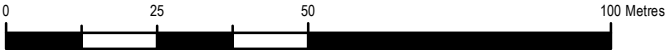
SHEET 1 OF 2

Drawn	Checked	Approved	Date
AH	**	**	11/07/23

GH Project Number	Scale at A3
132861.001	1:1,250

Drawing Number	Revision
GH-132861001-LOLP-LEDA-1	P02.2

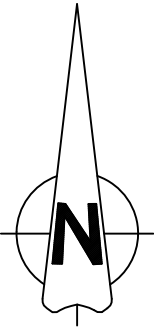
Plot Number	Landowner	Land Take Requirement	Plot Area (SQM)
16/6a	LEDA Properties Limited	Land to be Acquired Temporarily	9788
16/6aa	LEDA Properties Limited	Land to be Acquired Temporarily	344
16/6b	LEDA Properties Limited	Land to be Acquired Temporarily	2757
16/6bb	LEDA Properties Limited	Land to be Acquired Temporarily	91
16/6c	LEDA Properties Limited	Land to be Acquired Temporarily	329
16/6cc	LEDA Properties Limited	Land to be Acquired Temporarily	243
16/6d	LEDA Properties Limited	Land to be Acquired Permanently	346
16/6e	LEDA Properties Limited	Land to be Acquired Permanently	3157
16/6f	LEDA Properties Limited	Land to be Acquired Permanently	45
16/6g	LEDA Properties Limited	Land to be Acquired Temporarily	78
16/6h	LEDA Properties Limited	Land to be Acquired Permanently	761
16/6i	LEDA Properties Limited	Land to be Acquired Permanently	1540
16/6j	LEDA Properties Limited	Land to be Acquired Temporarily	1603
16/6k	LEDA Properties Limited	Land to be Acquired Permanently	88
16/6l	LEDA Properties Limited	Land to be Acquired Permanently	14
16/6l	LEDA Properties Limited	Land to be Acquired Temporarily	249
16/6m	LEDA Properties Limited	Land to be Acquired Permanently	61
16/6m	LEDA Properties Limited	Land to be Acquired Temporarily	688
16/6n	LEDA Properties Limited	Land to be Acquired Permanently	15
16/6n	LEDA Properties Limited	Land to be Acquired Temporarily	221
16/6o	LEDA Properties Limited	Land to be Acquired Temporarily	1631
16/6p	LEDA Properties Limited	Land to be Acquired Temporarily	380
16/6q	LEDA Properties Limited	Land to be Acquired Permanently	338
16/6r	LEDA Properties Limited	Land to be Acquired Permanently	481
16/6s	LEDA Properties Limited	Land to be Acquired Permanently	717
16/6t	LEDA Properties Limited	Land to be Acquired Permanently	11
16/6u	LEDA Properties Limited	Land to be Acquired Permanently	200
16/6v	LEDA Properties Limited	Land to be Acquired Permanently	504
16/6w	LEDA Properties Limited	Land to be Acquired Permanently	228
16/6x	LEDA Properties Limited	Land to be Acquired Temporarily	1334
16/6y	LEDA Properties Limited	Land to be Acquired Temporarily	137
16/6z	LEDA Properties Limited	Land to be Acquired Temporarily	1274
16/11	LEDA Properties Limited	Land to be Acquired Permanently	45
18/2a	LEDA Properties Limited	Land to be Acquired Temporarily	32051
18/2b	LEDA Properties Limited	Land to be Acquired Permanently	365
18/2c	LEDA Properties Limited	Land to be Acquired Permanently	3517
18/2d	LEDA Properties Limited	Land to be Acquired Permanently	135
18/2e	LEDA Properties Limited	Land to be Acquired Permanently	3096
18/2f	LEDA Properties Limited	Land to be Acquired Permanently	356
18/2g	LEDA Properties Limited	Land to be Acquired Permanently	105
18/2h	LEDA Properties Limited	Land to be Acquired Permanently	3227
18/2i	LEDA Properties Limited	Land to be Acquired Permanently	486
18/2j	LEDA Properties Limited	Land to be Acquired Permanently	1067
18/2k	LEDA Properties Limited	Land to be Acquired Permanently	336
18/2l	LEDA Properties Limited	Land to be Acquired Permanently	1376
18/2m	LEDA Properties Limited	Land to be Acquired Temporarily	25
18/2n	LEDA Properties Limited	Land to be Acquired Temporarily	24
18/2o	LEDA Properties Limited	Land to be Acquired Temporarily	47




SCALE: 1:1,250

## Appendix B – Existing Levels Plan
















KEY:

Proposed Development Boundary 

HIF Reserved Land 

- 51.0m - 52.0m 
- 52.0m - 53.0m 
- 53.0m - 54.0m 
- 54.0m - 55.0m 
- 55.0m - 56.0m 
- 56.0m - 57.0m 
- 57.0m - 58.0m 
- 58.0m - 59.0m 
- 59.0m - 60.0m 
- 60.0m - 61.0m 
- 61.0m - 62.0m 

KEY:

Proposed Development Boundary

HIF Reserved Land

Existing Buildings

Existing Concrete Hardstanding Areas

Existing Tarmac Roads (assumed concrete below)

A First Issue		LJS DS DS 30.11.21
Status	Status Date	
Information	Nov 2021	
Drawn	Checked	Date
LJS	DS	30.11.2021
Scale	Number	Rev
N.T.S	10812-EW-01	A

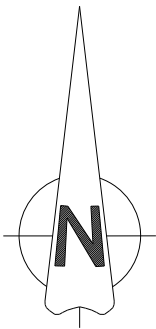
Culham No. 1 Site

Existing Land Form & Levels




6150 Knights Court, Solihull Parkway, Birmingham, B37 7WY  
T +44 (0)203 958 5400 E mail@brookbanks.com  
W brookbanks.com

## Appendix C – High Level Cut and Fill Exercise







KEY:





Proposed Development Boundary 

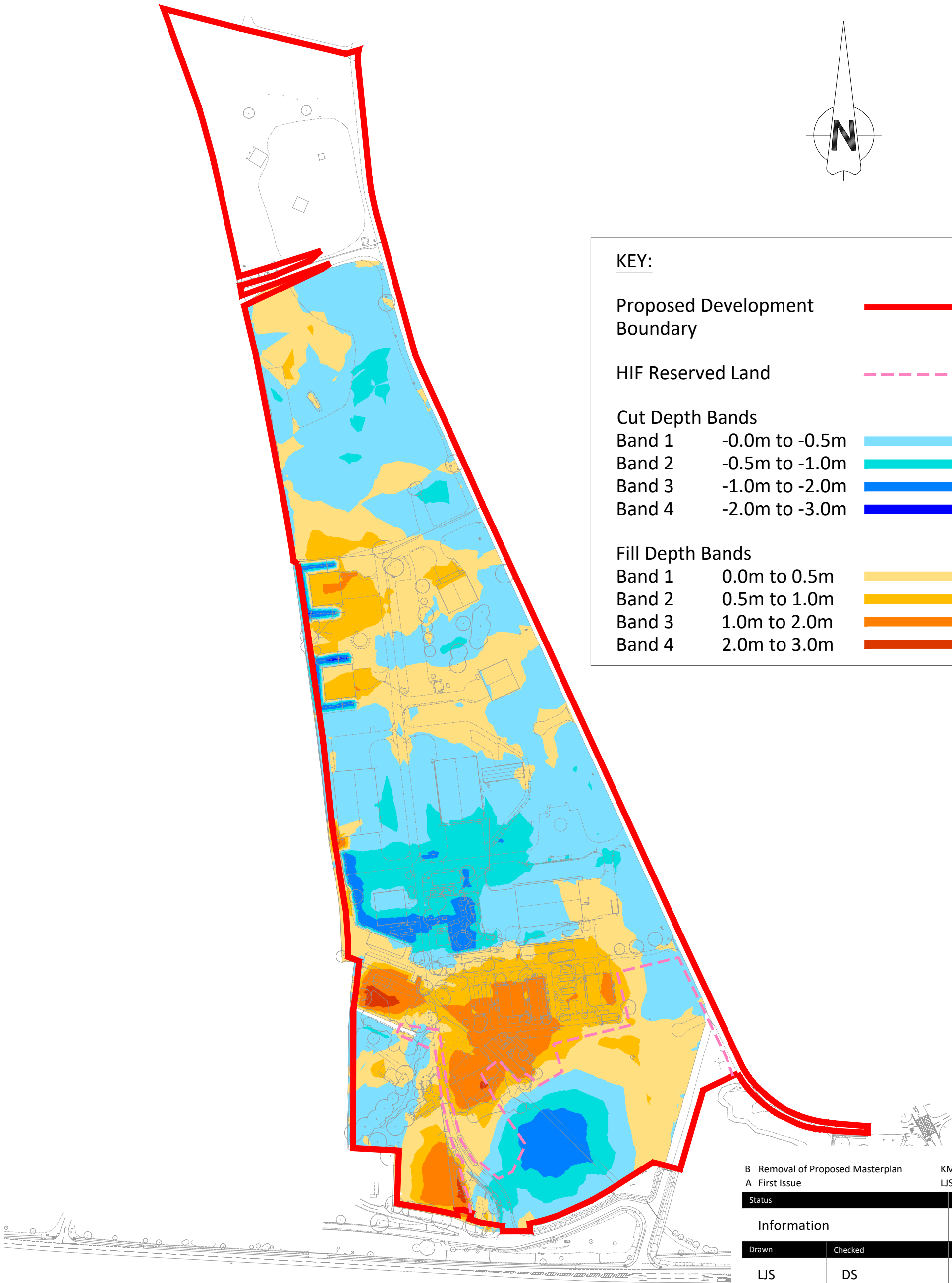
HIF Reserved Land 

Cut Depth Bands

Band 1 -0.0m to -0.5m   
Band 2 -0.5m to -1.0m   
Band 3 -1.0m to -2.0m   
Band 4 -2.0m to -3.0m 

Fill Depth Bands

Band 1 0.0m to 0.5m   
Band 2 0.5m to 1.0m   
Band 3 1.0m to 2.0m   
Band 4 2.0m to 3.0m 



B Removal of Proposed Masterplan		KM	DS	DS	16.01.24
A First Issue		LJS	DS	DS	06.12.21
Status		Status Date			
Information		JAN 2024			
Drawn	Checked	Date			
LJS	DS	06.12.2021			
Scale	Number	Rev			
N.T.S.	10812-EW-05	B			



Culham No. 1 Site      Proposed Cut & Fill



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## Appendix D – Flood Risk Assessment and Drainage Strategy (10812-DR-01 C)





NOTES:

1. Do not scale from this drawing.
2. All dimensions are in metres unless otherwise stated.
3. Brookbanks Consulting Ltd has prepared this drawing for the sole use of the client. The drawing may not be relied upon by any other party without the express agreement of the client and Brookbanks Consulting Ltd. Where any data supplied by the client or from other sources has been used, it has been assumed that the information is correct. No responsibility can be accepted by Brookbanks Consulting Ltd for inaccuracies in the data supplied by any other party. The drawing has been produced based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.
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KEY:

- Site Boundary
- Illustrative SuDS Location (storage for 11ha)
- Illustrative Permeable Paving in ground level car parking areas (storage for 1ha)
- Illustrative Conveyance Swale
- Surface Water Flow Direction
- Existing Watercourse
- Estimated Location of Culverted Watercourse
- HIF Reserved Land
- Foul Connection

C	SuDS Basin Option	KM	DS	DS	02.09.22
B	Underground Storage	KM	DS	DS	14.02.21
A	Second Issue	KM	DS	DS	24.11.21
-	First Issue	KM	DS	DS	10.11.21

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CEG

Culham No.1 Site  
Oxfordshire

Illustrative Surface Water  
Drainage Strategy

Status		Status Date
Draft		SEP 2022
Drawn	Checked	Date
KM	DS	24.11.21
Scale	Number	Rev
1:2000	10812-DR-01	C

UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR COMMENCE SITE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT HIS OWN RISK.



## Appendix E – Constraints plan (10812-CP-001)



Construction Design and Management (CDM)

Key Residual Risks

Contractors entering the site should gain permission from the relevant land owners and/or principle contractor working on site at the time of entry. Contractors shall be responsible for carrying out their own risk assessments and for liaising with the relevant services companies and authorities. Listed below are Site Specific key risks associated with the project.

1) Overhead and underground services

2) Street Lighting Cables

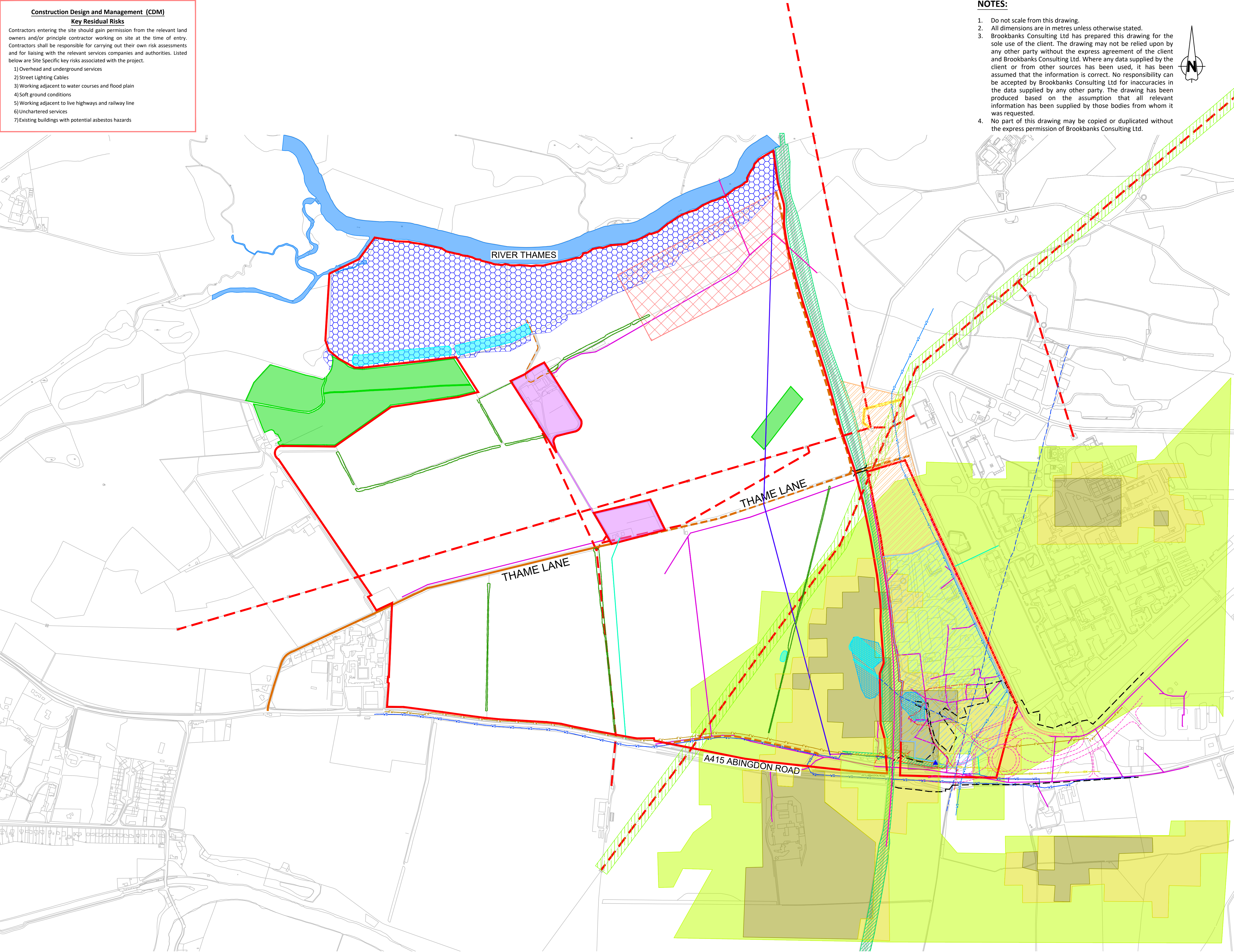
3) Working adjacent to water courses and flood plain

4) Soft ground conditions

5) Working adjacent to live highways and railway line

6) Uncharted services

7) Existing buildings with potential asbestos hazards



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KEY:

Allocation Boundary

Existing OH HV Power Line

Existing UG LV Cable

6m Wide Electricity Easement

40m Wide Electricity Easement

Existing Pond

Network Rail Land/Railway Line

River Thames

Existing Woodland

Existing Road - Thame Lane Tarmac

Unmade Road/Track

Existing Bridge over Railway line (Listed)

Existing Farm Land (Warren Farm) and Existing Housing to remain

Culham Park Motocross Track to be demolished

High risk of flooding

Historic Flooding

High Risk Groundwater Flooding

Medium Risk Groundwater Flooding

Low Risk Groundwater Flooding

Existing Foul Sewer

Existing Rising Main

Existing Trunk Main (16")

Existing Water Distribution Main

Existing Private Water Main

Pumping Station

BT Cable

Virgin Media

Vodafone

Existing Hedgerow

Clifton Hampden Bypass Site Boundaryline/Extent of Works

Clifton Hampden Bypass Proposed Road & Path Outline

Possible Route of Partial Culverted Watercourse

LEDA PROPERTIES LIMITED, under CEG Control - ON196259

LEDA PROPERTIES LIMITED, under CEG Control - ON208645

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Culham Innovation Park  
Oxford

Constraints Plan

Status		Status Date
Draft		AUG 2021
Drawn	Checked	Date
CDW	DS	19.08.2021
Scale	Number	Rev
1:5000	10812-CP-001	-
0100200300400500		
METRES		





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