Oxford Technology Park,
Langford Lane,
Kidlington,
Oxfordshire.

Flood Risk Assessment
And Drainage Strategy

Project Ref: GL / 8476
First Issue
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Client
Hill Street Holdings

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REPORT STATUS

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Report Title	Oxford Technology Park, Langford Lane, Kidlington, Oxfordshire
Report Type	Flood Risk Assessment
Report Number	FRA/8476
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1 Introduction

This Flood Risk Assessment has been prepared on behalf of Hill Street Holdings, as a generic FRA that could be adapted to support the planning application for a new development off Langford Lane, Kidlington, Oxfordshire.

The approximate National Grid reference to the site is 447546, 214823, with access gained to it off the Langford Lane to the north of the site.

The site is currently undeveloped greenbelt land with an approximate area of 6.5 hectares. A site location plan is included within appendix A.

Adjoining premises to the site can be indentified as follows:

- To the North of the site is the Langford Lane.
- To the East the site is bounded by Oxford Motor Park.
- To the South is open farmland.
- To the West of the site is the Campfield Detention Centre and Evenlode Crescent.

This assessment has been prepared following the guidance set out in Planning Policy Statement Note no. 25 (PPS25) / National Planning Policy Framework (NPPF).

Further guidance has been obtained from:

- EA/DEFRA R&D document W5-74/A/TR/1 “Preliminary rainfall runoff for new developments” Revision D, including figures 2.1 & 2.2.
- “Interim National Procedures” point 3, 10.2 & 10.3
- The Suds Manual (ciria c697)
- “interim Code of Practice for Sustainable Drainage Systems 2004” (ICOP SUDS)

2 Existing Site

2.1 Site Location and Receiving Watercourse / River

The existing site is currently greenbelt land and predominantly soft landscaped / grassed. There is a small area of hardstanding where the former Rugby Club pavilion has been removed, the site has not been used for 10 years. There is no known positive drainage within the site demise.

The nearest natural watercourse is the Rowel Brook with is located approximately 650 metres south of the site.

2.1.1 Topography

The topography of the existing site is shown on Ordinance Survey maps to have a nominal slope west to east of approximately 1 in 80. The existing levels over the site appear to vary between 66.0m to 70.0m AOD.

2.1.2 Description of Catchment

Initial investigation of the Environment Agency floodplain maps appears to indicate that the existing/proposed site area is not within a recognised floodplain area and as such is categorised as Flood Zone 1. A copy of the Environment Agency Flood map is included within Appendix A.

The Environment Agency website has also indicated that the site does not lie within a designated groundwater source protection zone.

2.2 Geology

A geotechnical and ground contamination site investigation has not been carried out over the site at the time of writing this report, however the British Geological Survey identifies the bedrock within the site to be a mix of limestone of the cornwash formation and mudstone of the Forest Marble formation.

The Environment Agency website also identifies the site as overlying a minor aquifer.

Although no soakaway testing has been carried out at the site at this point there is no evidence to suggest their use should be discounted.

A detailed site investigation will be carried out in due course. The results will be used to provide sustainable drainage design criteria for use in the eventual scheme drainage system.

3 Proposed Site

3.1 Description of development

The proposed development is the release of 6.5 hectares (16 acres) of greenbelt land at Longford Lane, Kidlington, to create approximately 23,200 sq.m (250,000 sq.f) of B1(b) research and development space at Oxford Technology Park.

Allowances will also been made for a new soft landscaping scheme throughout the development.

As the site is currently Greenfield and rainwater simply infiltrates into the ground, this provides some indication that infiltration should be investigated as a means of dealing with runoff from the new impermeable areas. This will therefore be explored in the first instance.

The proposed site levels will be set such that they try to (where possible) follow the contours of the existing site so as to minimise the requirement for any retaining walls and also adhere to highway design standards.

Proposed development levels will also be set such that they try to minimise any surface water flooding from the new development drainage network and ensure that should any flooding occur it is controlled and kept within the new development demise and not effect neighbouring properties or highway land. We note that; whilst a topographical survey will be required on which to base any detailed design, the existing site ground levels are approximately 1.2m below the existing road level at the boundary.

Proposed development levels will also need to respect any future earthworks operations in relation to the development to try and balance cut and fill quantities thus re-using as much of the on site material as possible minimising cart off.

4 Drainage Strategy

4.1 Existing Drainage

The site is currently not positively drained and as such rainfall permeates naturally into the ground over the course of any rainfall event. During recent times there have been no reported incidences of any surface water flooding at the site of the proposed development.

Existing site levels over the development boundary vary between 66.0 to 70.0m AOD.

4.2 Proposed Surface Water Drainage Strategy and SUDS Measures

The information currently available at the time of writing this report suggest that there is no evidence to prevent the use of infiltration drainage techniques. This will be considered in the first instance for the surface water drainage strategy of the development.

In line with current standards and guidance should infiltration techniques prove infeasible, a positive surface water discharge rate from the proposed new system into expected existing surrounding public sewers will be limited to greenfield run-off values.

For the purpose of the design Windes design software has been used to derive Greenfield discharge rates for the 2, 30 and 100 year plus climate change storm events, which is included within appendix B.

It is proposed that the foul water discharge from the development is discharged to the expected existing public sewers within Longford Lane or Evenlode Crescent via a separate on-site foul water drainage system.

In the case of infiltration drainage proving infeasible other sources of underground sustainable drainage techniques will be considered in arriving at the proposed drainage strategy. These are listed below:

Cellular Storage Tanks - Although these units provide a very high percentage of storage volume given the space they acquire they are deemed to not provide any form of treatment in the form of hydrocarbon capture and are generally not favoured

by the Environment Agency from past experience. This will be reviewed again at the time of detailed design.

Oversized Pipes – Surface water attenuation in the form of oversized drainage pipes will be provided. It however needs to be noted that the size of the pipes may be limited given the constraints associated with the depth of the outfall, the depth on plot foul drainage and the necessary clearances required between the two.

Although initial record information would suggest that the use of soakaway drainage techniques that allow direct infiltration into the ground may be feasible this is to be confirmed after site investigation works have been concluded.

Should infiltration rates prove to be low and unsuitable this should not preclude the incorporation of tanked sustainable soakaway drainage techniques such as permeable paving to car parking areas and land drainage / swales to soft landscaped areas.

New parking facilities may also be made of permeable surfacing comprising of an appropriate block paving construction and will be designed with a suitable free draining subbase material that will enable surface water run-off to be attenuated. This design will help attenuate peak design flows from the development by utilising the volume available within the permeable stone (type 1 material with no fines) within the structural layers of the construction.

This method of surface water interception / collection will also avoid the need to provide formal by-pass oil interceptor units to these areas as the stone media under the permeable block paving will naturally capture hydrocarbon contaminants.

Surface water flows will be controlled by the use of a Hydrobrake flow control unit at the outfall from the on-site system.

4.3 Allowable Surface Flooding

Additional storage of peak storm water can be facilitated by allowing car-parking areas to flood at the extreme 1 in 100 year + 30 % year event up to 100mm, provided this will not put the buildings, or neighbouring properties at risk of flooding. The proposed site levels will be set such that any minimal flooding that does occur should be routed to central car parking areas and away from buildings.

4.3.1 Filtration / Cleaning

There will be a natural filtering/cleaning out of any hydrocarbon pollution form the effect of surface water passing through the stone media underneath and permeable car parking surfacing. The use of a petrol interceptor is not proposed in this instance.

4.3.2 Maintenance

The complete drainage system will have a detailed maintenance regime in place prior to occupation. This regime will involve an inspection after 3 and 6 months, and any maintenance required will be carried out. A further inspection will be carried out after 12 months, after which the maintenance schedule will be reviewed and adjusted to suit the circumstances and maintenance requirements of the development. In any case following severe storm events, the system will be inspected to ensure that all elements are performing satisfactory.

4.4 Drainage Design Summary

Taking onboard some of the techniques discussed above we therefore propose to incorporate the following features within our drainage design system:

- Utilising infiltration drainage in the first instance to deal with all proposed surface water drainage

Should infiltration prove infeasible:

- Introduce nominal oversizing of surface water pipes within the plot to provide for the underground storage volume.

- Introduce surface water controls to limit discharge rates from the new development into the surrounding Infrastructure sewers via hydrobrake and / or orifice control units.

- Permeable Paving blocks to the proposed new vehicular parking areas.

- Allowing the external car parking areas to flood in the more extreme 1 in 100 year plus climate change storm events. (Underground storage is to be designed such that no flooding occurs at the 1 in 30 year event).

4.4.1 Discharge Rates

The surface water discharge rate from the development into the existing public sewer should be restricted to greenfield run-off rates.

4.4.2 Windes Network Modelling

Windes / Microdrainage modelling software has been used to determine greenfield run-off rates based on the development area.

Design files are included within appendix B.

The storm return periods that have been simulated are:
1 in 2 year
1 in 30 year
1 in 100 year + 30% for climate change

With equivalent greenfield run-off rates determined as:
2.1 l/s (2 year)
5.7 l/s (30 year)
8.0 l/s (100 year)

These rates should be adhered to for the overall site discharge rate post development should infiltration prove unfeasible.

5 Flood Risk Assessment

5.1 Existing Information on Flood Risk

5.1.1 Tidal/Coastal

Tidal or coastal flooding is not considered a risk as the nearest coast is approximately 100 kilometres away from the site.

5.1.2 Groundwater

Groundwater flooding is not known to be an issue on this site.

5.1.3 Surface Water

There is no formal surface water drainage to the existing site and as such rainfall permeates to the ground via natural means and rates.

Should infiltration prove infeasible for dealing with proposed surface water flows, it is proposed that surface water from this new development be restricted to those of greenfield run-off rates into surrounding public sewers – subject to further consent by Thames Water.

A full site investigation will be carried out over the extent of the site that will amongst other things confirm the permeability of the ground, and suggest whether soakaway drainage will be suitable for use at the development site.

5.1.4 Rivers / Watercourses

The Environment Agency publishes floodplain maps on the internet (http://www.environment-agency.gov.uk). These maps show the possible extent of fluvial flooding for the 1 in 100-year flood (that which would have a 1% probability of being exceeded each year) or the possible extent of tidal flooding to a 1 in 200 year event. A plan showing the extent of the flooding along the nearest marked Environment Agency marked watercourse is presented in Appendix C.

This plan shows that the development under consideration is outside the area of any recognised floodplain.

6 Summary

Baynham Meikle Partnership has prepared this Flood Risk Assessment in accordance with the guidelines set out in the National Planning Policy Framework (NPPF) / Planning Policy Statement Note no.25 (PPS25), to support the Planning Application.

The Flood Risk Assessment may be summarised as follows:

- The Flood Maps have shown that the site is not identified to be at risk from fluvial flooding and does not form part of the functional floodplain.

- The proposed redevelopment will be designed such that it will not generate any extra flow and / or exacerbate any flooding that may already occur within the vicinity of the site.

- The surface water run-off from the development site will be dealt with via infiltration drainage in the first instance, but should infiltration prove infeasible, flows will be controlled such that the overall flow from the site into surrounding sewers is not more that existing greenfield rates. This will be achieved through flow attenuation and the use of SUDS techniques in the new design. The techniques to be explored will be sub-surface storage in the way of oversized pipes, permeable paving and surface water swales with flow being controlled by the use of hydrobrakes and / or orifice plates.

- External areas of car parking are to be allowed to temporarily flood by no more than 100mm in extreme storm events. Finished ground levels have been carefully considered and flood routing will be applied to ensure protection proposed buildings and of adjacent landowners, in the event of extreme conditions.

- The water quality will also be improved via of the use of SUDS drainage techniques such as permeable paving and surface water swales.

It can therefore be said that the proposed redevelopment drainage scheme will not increase the potential of any flood occurring within the vicinity of the site. This is mainly due to the peak runoff flows from the site being kept the same as the current

existing flows from the site and adoption of recommended SUDS design techniques in line with the EA guidance.

APPENDIX A – EXISTING DRAWINGS

- SITE LOCATION PLAN

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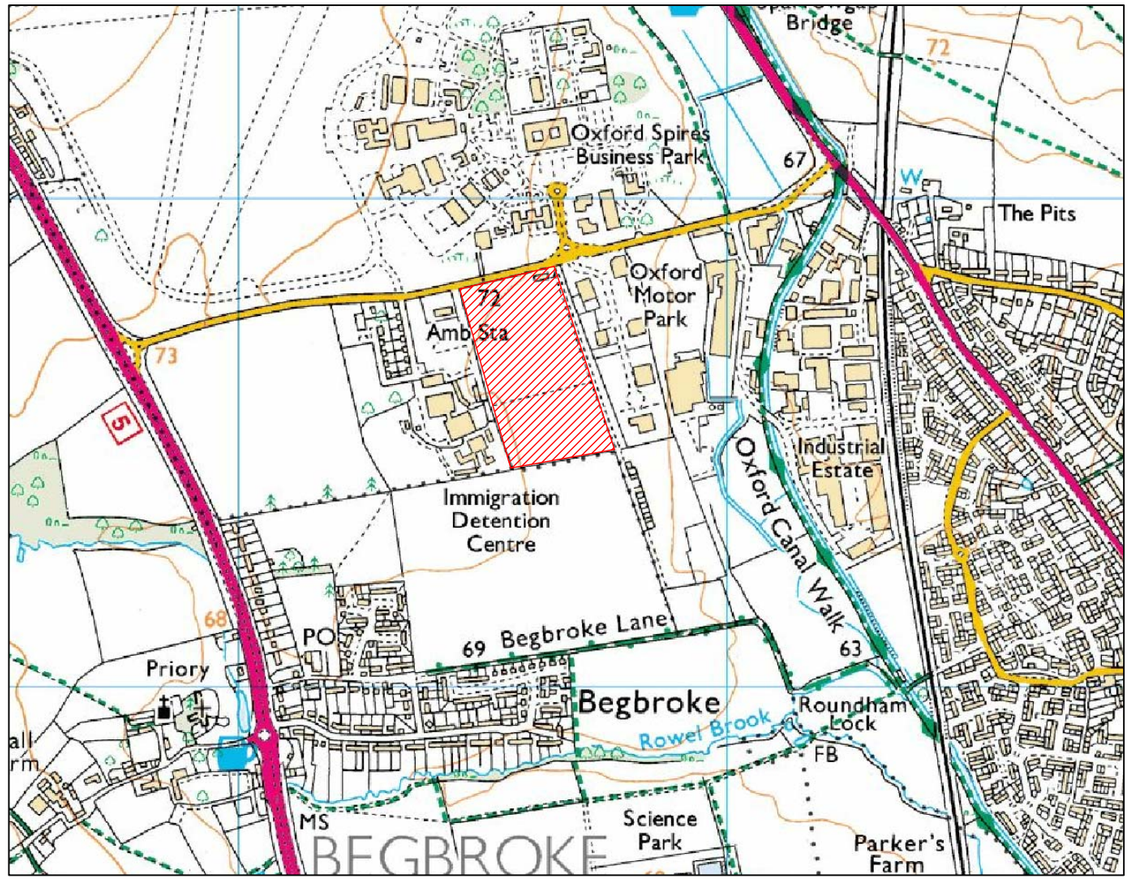

- Site Location

X: 447546
Y: 214823

Langford Lane
Kidlington
Oxfordshire
OX5 1RE

Baynham Meikle Partnership consulting structural + civil engineers		Checked by	
		Drawn by	GL
		Proj. No.	8476
Project	Oxford Technology Park, Kidlington	Date	Oct 2012
		Scale	NTS A3
Title	Site Location Plan	Dwg.No.	100 Rev. -

APPENDIX B – PROPOSED CALCULATIONS

- GREENFIELD RUN-OFF CALCULATIONS

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.150
Area (ha)	6.500	Urban	0.000
SAAR (mm)	672	Region Number	Region 6

Results l/s

QBAR Rural	2.5
QBAR Urban	2.5
Q2 years	2.2
Q1 year	2.1
Q30 years	5.7
Q100 years	8.0

APPENDIX C – FLOOD MAP

- ENVIRONMENTAL AGENCY FLOOD MAP

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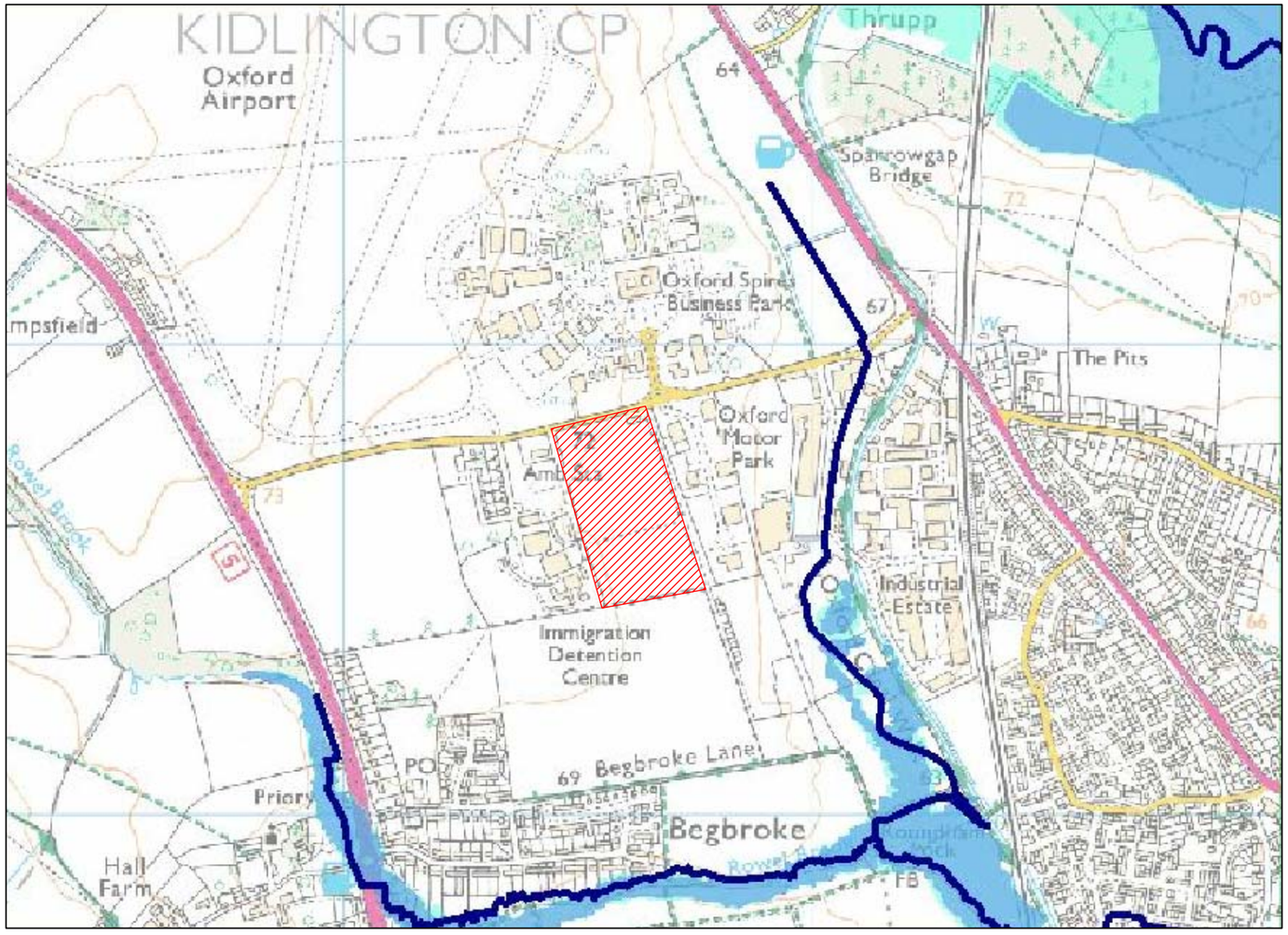
Flooding from rivers or sea without defences

Extent of extreme flood

Flood defences (Not all may be shown*)

Areas benefiting from flood defences (Not all may be shown*)

Main rivers



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