

Appendix 8.4

Site-wide Drainage Strategy



Noble House, Capital Drive, Linford Wood, Milton Keynes MK14 6QP

T +44 (0)1908 669898 **F** +44 (0)1908 669899 **E** harrisjt@rpsgroup.com **W** www.rpsgroup.com/design

THE UNIVERSITY OF READING

**SURFACE WATER
DRAINAGE STRATEGY**

JULY 2008

PROJECT NO: JKK 3429

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1. INTRODUCTION

This report has been prepared to demonstrate the surface water drainage principles for the proposed development throughout the campus, namely the roads infrastructure, halls of residence and the remaining proposals (including a hotel and academic buildings). This strategy has been prepared to accompany the Environmental Impact Assessment and sets out the general drainage principles that should be incorporated to control the impact of the proposed development on the quality and rate of run-off from the site. These proposals take due consideration of concerns and principles discussed with the Environment Agency.

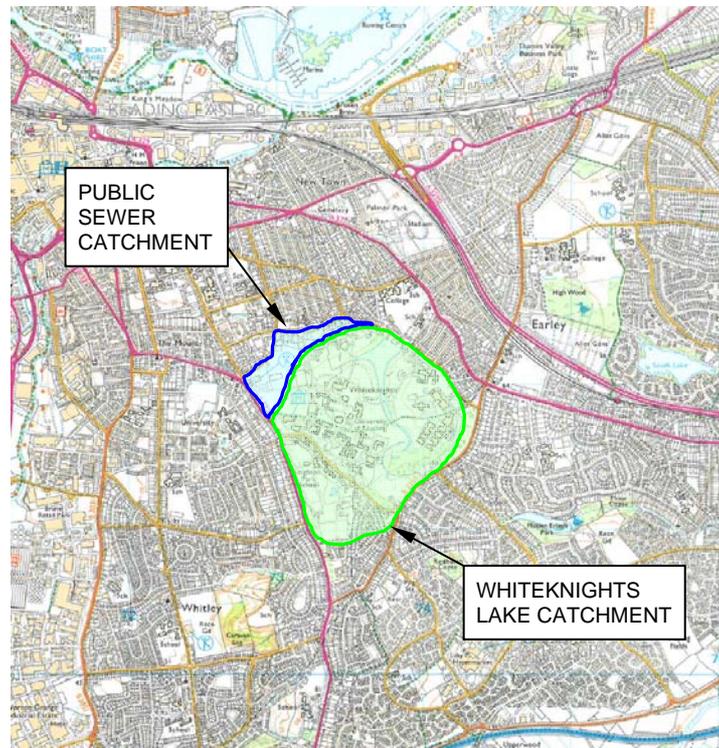
2. THE SITE

The existing campus comprises a mix of teaching, halls of residence and associated facilities together with large greenfield areas and Whiteknights Lake. The University of Reading is considering opportunities for developing the campus over the next 10 years. The proposals include demolition of some existing buildings, construction of new ones and improvements to the associated road and footpath network.

3. EXISTING SURFACE WATER DRAINAGE

The site comprises two separate catchments, as shown on Figure 1. The primary catchment drains to Whiteknights Lake, with the smaller catchment discharging to the Thames Water Public Sewer. With the exception of an area to the north of the campus the existing surface water drainage network for the site outfalls into Whiteknights Lake. The existing private drainage system serving the area to the north connects into the public sewer.

FIGURE 1 – DRAINAGE CATCHMENTS



4. DESIGN RAINFALL

Table 1 below provides a summary of the rainfall depths for different return period events; these have been derived from the DDF modelling function within the Flood Estimation Handbook. These rainfall depths are provided as guidance only, the detailed drainage design should consider the critical storm duration applicable to the proposed pipe network. Where attenuation storage is being provided, it must be demonstrated that storage is sufficient for the 6hour intensity rainfall event.

TABLE 1 – DESIGN RAINFALL DEPTHS

Return Period	15min	1 hour	6 hours
2 years	10.7mm	15.3mm	24.5mm
10 years	20.5mm	27.3mm	36.6mm
30 years	30.4mm	38.7mm	52.9mm
100 years	46.4mm	56.2mm	72.1mm
100 years +30%	60.3mm	73.1mm	93.7mm

5. PROPOSED SURFACE WATER DRAINAGE STRATEGY

The proposed drainage strategy would utilise the existing drainage locations to the Thames Water Sewer and Whiteknights Lake, together with Sustainable Urban Drainage Systems (SUDS) as appropriate.

The proposed development would lead to an increased area of impermeable surfaces, in particular those areas associated with the road infrastructure. Where new buildings are proposed, these are generally constructed over existing impermeable areas, often with no net increase of impermeable area.

SUDS comprising permeable paving, ponds, reed bed systems and swales would be provided, where possible, to ensure that the increased run-off resulting from increased impermeable areas would be attenuated and will be discharged into the receiving sewer or lake at an acceptable quality. The SUDS would be designed in accordance with CIRIA C697, the SUDS Manual.

Petrol interceptors or an appropriate reed bed system would be provided where proposed car parks exceed 50 spaces or where there is an elevated risk of oil spillage. The selection of interceptors would be in accordance with the Pollution Prevention Guidelines, PPG3.

Preliminary reports suggest that the ground conditions within parts of the Thames Water catchment are free draining loamy soils which may allow surface water to discharge to a soakaway. Subject to confirmation of the ground conditions, soakaways may therefore be constructed in accordance with CIRIA C697 or BRE365 as appropriate.

The SUDS requirements for the Thames Water sewer catchment would be determined following consultation with Thames Water to establish whether any discharge restrictions are to be imposed. The outcome would have an effect on the size and type of features used.

The SUDS discharging to Whiteknights Lake would ensure that water discharging to the lake is of good quality and free from excessive sediment loading. The SUDS would perform a secondary storage function.

If required, any additional storage requirements within the Whiteknights Lake catchment could be provided in the lake by lowering the outfall level, thereby providing additional storage capacity within the lake without increasing the risk of flooding downstream. Any works to the outfall must be approved by the Panel Engineer who is responsible for the safety of the lake in accordance with the Reservoirs Act. The Panel Engineer has approved this option in principle.

Where the proposals are constructed over the site of existing buildings, it may be appropriate to re-use the existing surface water connections. However, where there are areas of new paving are proposed, a new piped network would be provided. New outfalls may be required into Whiteknights Lake. However the existing outfall locations would be utilised wherever possible.

A summary of the indicative Drainage Strategy is shown on Drawing JKK3429/ SK3.

6. CONCLUSIONS

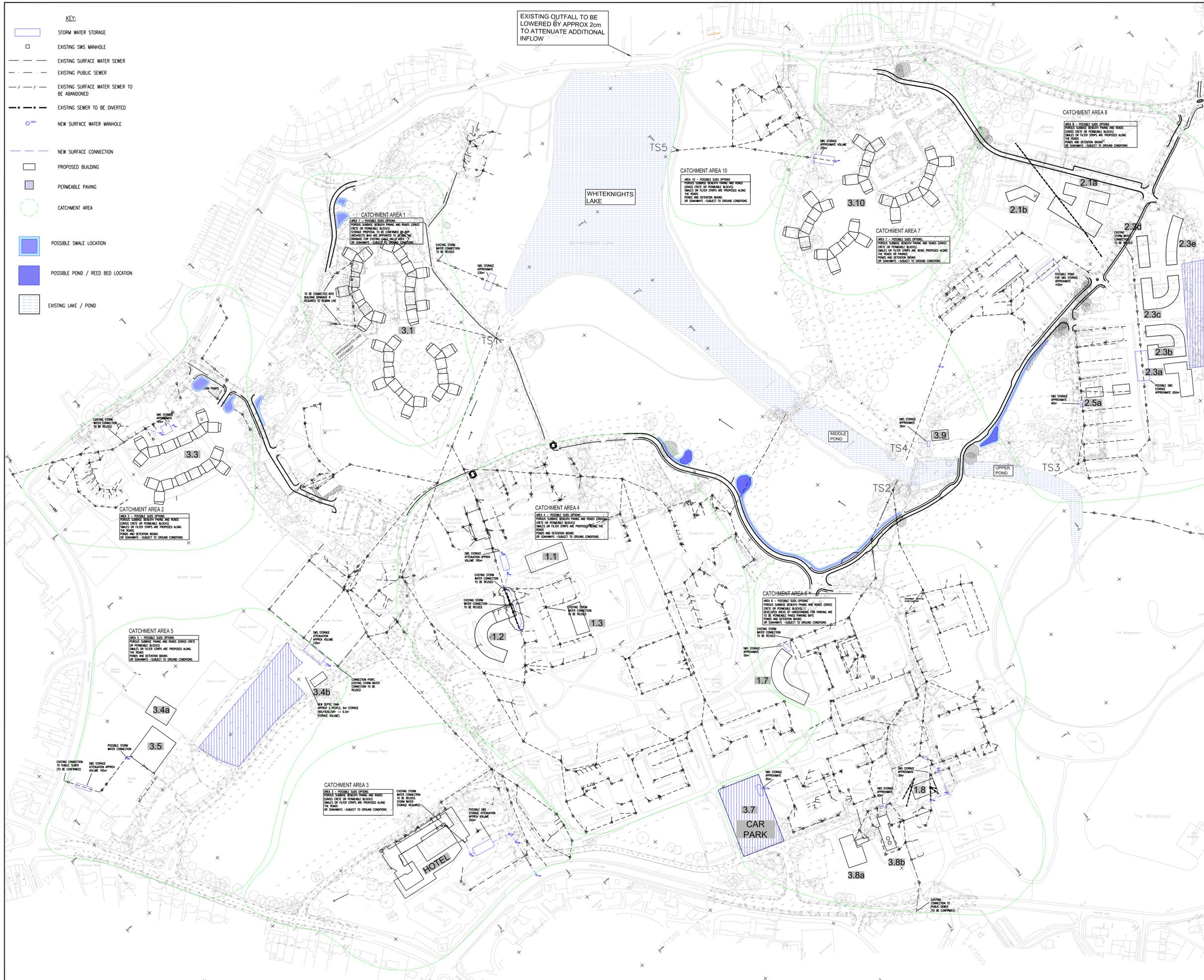
It is evident that there is sufficient scope to accommodate a sustainable drainage system, utilising above ground storage, within the Thames Water sewer catchment.

Within the existing Whiteknights Lake catchment the overall impermeable area would increase as a result of development proposals. To mitigate this, SUDS would be provided to attenuate flow. If required, the natural level of the lake could be lowered whilst ensuring the existing peak discharge is not exceeded. A new drainage system would be provided with measures included within the carriageway design to intercept contaminants.

APPENDIX A

Drawings

JKK3429/SK3



- KEY:**
- STORM WATER STORAGE
 - EXISTING SWS MANHOLE
 - EXISTING SURFACE WATER SEWER
 - EXISTING PUBLIC SEWER
 - EXISTING SURFACE WATER SEWER TO BE ABANDONED
 - EXISTING SEWER TO BE DIVERTED
 - NEW SURFACE WATER MANHOLE
 - NEW SURFACE CONNECTION
 - PROPOSED BUILDING
 - PERMEABLE PAVING
 - CATCHMENT AREA
 - POSSIBLE SWALE LOCATION
 - POSSIBLE POND / REED BED LOCATION
 - EXISTING LAKE / POND

EXISTING OUTFALL TO BE LOWERED BY APPROX 2cm TO ATTENUATE ADDITIONAL INFLOW

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The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work starts. The Contractor is to comply in all respects with current Building Legislation, British Standard Specifications, Building Regulations, Construction (Design & Management) Regulations, Party Wall Act, etc. whether or not specifically stated on this drawing. This drawing must be read with and checked against all relevant Engineers and Architects drawings and all other specialist documentation provided.

This drawing is not intended to show details of ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor. Any suspect or fluid ground, contaminants on or within the ground, should be further investigated by a suitable expert.

Sketch proposals are for illustrative purposes only & as such are subject to detailed site investigation including ground conditions / contaminants, drainage, design & planning / density negotiations. Sketch proposals may be based upon enlargements of OS sheets & visual estimations of existing site features, accuracy will therefore need to be verified by survey. Sketch proposals have not been considered in respect of CDM Regulations.

Do not scale. Work to given dimensions only.

CDM Notes:

Notes:

1. Do not scale this drawing.
2. All proposals are subject to approval by Thames Water, the Environment Agency and the University of Reading.
3. All proposed connections to the public sewer to be constructed in accordance with Sewer for Adoption 6th Edition.
4. All new private drainage to comply with Building Regulation Part H 2002.
5. Site layout and proposals based on Stride Tregown Development Plot Analysis.
6. Existing drainage information taken from University of Reading record drawing W099/B/345 Rev H and 346 Rev F.
7. Storage calculation based on 1 in 100 years + 20% for greenfield runoff.
8. Foul drainage subject to confirmation of the population.
9. All pipe routes indicatively only subject to confirmation of route, level and coordination with services and features upon receipt of further site information.
10. Building drainage by others.
11. Storage location and volume are based on conventional drainage does not incorporate SUDS.
12. Sewers to be abandoned are not shown on the drawing.
13. Storage depths and pumping requirements to be confirmed.
14. Halls and catering drainage details taken from Faber Mounsell drawing number 60043816/C/SK100.
15. Roads drainage taken from RPS drawing numbers JKK3429/SK1 and JKK3429/SK2.

A	18.07.08	FIRST ISSUE	SJW	JH
Revisions:	Date:	Amendment:	Name:	Checked:

For guidance only. Do not scale off this drawing

1:20	0	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m
1:100	0	100mm	200mm	300mm	400mm	500mm	600mm	700mm	800mm	900mm	1000mm
1:50	0	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m
1:5	0	100mm	200mm	300mm	400mm	500mm	600mm	700mm	800mm	900mm	1000mm

TO SCALE @ A1

RPS

Noble House, Capital Drive, Lintford Wood, Milton Keynes MK14 6QP
 T 01908 669 898 F 01908 669 899 E rps@rpsgroup.com W www.rpsgroup.com

Client: UNIVERSITY OF READING

Project: WHITEKNIGHTS CAMPUS

Title: SURFACE WATER DRAINAGE STRATEGY

Status: Checked: JH

Drawn: SJW Date: 18.07.08 Scale: 1/2000

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Job No: JKK3429 Drg No: SK3 Rev: A