

BRB (Residuary) Ltd

**Re-development of the
former South End Goods
Yard Site, off Osney Lane,
Oxpens, Oxford**

Flood Risk Report

Project Ref: 18153/002

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1 Executive Summary

This Flood Risk Report has been prepared by Peter Brett Associates LLP, to support the marketing by Lambert Smith Hampton, Property Consultants, on behalf of the site owners, BRB (Residuary) Ltd., of their former South End Goods Yard Site off Osney Lane, Oxpens in Oxford.

This report has been prepared using the available current flood risk information requested/downloaded from the Environment Agency, Oxford City Council, Oxfordshire County Council, Thames Water and Lambert Smith Hampton, on behalf of BRB (Residuary) Ltd.

The Environment Agency has provided their 4% (1 in 25), 1% (1 in 100) and 0.5% (1 in 200) annual probability OS GPS datum flood event levels from their Oxford Wolvercote Hydraulic Model.

Oxford City Council's Strategic Flood Risk Assessment for Oxford City, June 2008, confirms that these three separate flood events were used to represent the PPS25 Flood Zones 2 (0.5% 1 in 200), 3a (1% 1 in 100) and 3b (4% 1 in 25).

PBA drawing 18153/002/002 shows the land on the site that is in the 4% 1 in 25 extent, shaded green, 1% 1 in 100 extent, shaded blue and the 0.5% 1 in 200 extent, shaded pink.

The remaining area of the site is higher than the 0.5% 1 in 200 extent. Oxford City Council's Strategic Flood Risk Assessment indicates this area to be Flood Zone 1, and outside the 100 Year and 200 Year Climate Change Flood Extents.

PPS25 Annex D Table D.3 confirms that the part of the site in Flood Zone 1 is appropriate for all the PPS25 Annex D Table D.2 Flood Risk Vulnerability Classifications.

The same PPS25 Tables show what Flood Risk Vulnerability Classifications are appropriate for those parts of the site in Flood Zones 2, 3a and 3b, supported where required by the PPS25 Exception Test.

Oxford City Council's SFRA requires that PPS25 site specific Flood Risk Assessments are required for all sites over 1 hectare in size and for all sites located within Flood Zones 2, 3a and 3b.

This report is based on the current PPS25, Environment Agency and Oxford City Council flood risk guidance and information.

Future development should be in accordance with the appropriate flood risk guidance and information at that time.

2 Introduction

Peter Brett Associates have prepared this Flood Risk Report on behalf of BRB (Residuary) Ltd. The report is to support the marketing for BRB (Residuary) Ltd by Lambert Smith Hampton, of the site, the former South End Goods Yard, off Osney Road, Oxpens in Oxford.

This report has been prepared with reference to the following:

- DCLG Planning Policy Statement 25: Development and Flood Risk (referred to as PPS25) – Development and Flood Risk, Revised March 2010.
- PPS25 is supported by its Practice Guide Updated December 2009 and by The Environment Agency's Flood Risk Standing Advice FRSA (national version) 3.0 Advice issued on the 24th January 2011.
- The Environment Agency's Guide 'Living on the Edge' April 2007 supported by the Environment Agency Thames region Land Drainage Byelaws.
- CIRIA C687 – Planning for SuDS – making it happen.
- CIRIA C697 – The SUDS Manual 2007.
- Oxford City Council Strategic Flood Risk Assessment for Oxford City Council Final Report June 2008 and Groundwater Register – Addendum 1 July 2009.
- Oxford City Council West End Area Action Plan 2007-2016 Adopted June 2008.

This report is in line with the level of detail for a Level 2 Study PPS25 Practice Guide Figure 3.5 Levels of Flood Risk Assessment (FRA). Proposed development of the site will require a site specific FRA appropriate to the scale and nature of the development.

Part copies of the OS 1:50 000 scale Landranger 164 (Figure 3) and the OS 1:10 000 scale Landplan (Figure 4) showing the site location, are attached in Appendix 1.

The site is the former South End Goods Yard, off Osney Lane, in the Oxpens area to the south-west of Oxford City Centre, the local planning authority is Oxford City Council.

A copy of the BRB (Residuary) Ltd Site Ownership Boundary plan B1-DB-10-001, is attached in Appendix 1.

The information presented in this report has been obtained from the Environment Agency, Oxford City Council, Oxfordshire County Council, Thames Water and the site owner, BRB (Residuary) Ltd

3 Definition of the Flood Hazard

3.1 Site Description

The site is located off Osney Lane in the Oxpens area to the south-west of Oxford City Centre, OS grid reference 450678m E, 205975m N (nearest postcode OX1 1XX). Copies of the Site Location Plans, Figure Numbers 3 and 4, are attached in Appendix 1.

The BRB (Residuary) Ltd. site ownership boundary is shown on drawing reference B1-DB-10-001 provided by Lambert Smith Hampton, and confirms the site as 3.202 hectares, a copy is attached in Appendix 1.

Copies of photographs of the site taken in February 2011 by Sterling Surveys, are attached in Appendix 2. A further photograph, taken in 2006, of where the site adjoins the River Thames, is part of Section 4

The site covers a corridor of land approximately 100 metres wide, running from its northern limit off Osney Lane, 400 metres southward to the River Thames. The site boundary runs around the Post Office Sorting Office and petrol filling station in the north-east corner.

Further south, the eastern side of the site is limited by the recreational ground to the rear of the ice rink, down to the banks of the River Thames. The western boundary is with The Oxford Business Centre, and the railway. The southern boundary is the River Thames.

The part of the Sterling Surveys Check Survey Report March 2011, a copy is attached in Appendix 2, describes the site.

The River Thames is the predominant watercourse in the area. Upstream of the site, the Thames passes through Osney Lock before the confluence with the Bulstake Stream immediately upstream of the railway crossing (at the south-west corner of the site).

The River Thames flows eastward across the southern boundary of the site, the Castle Mill Stream enters the River Thames downstream of the site, before the Thames passes under Folly Bridge. After the confluence with the River Cherwell, the River Thames heads southwards through New Hinksey, Iffley and out of Oxford.

3.2 Survey Data

An OS GPS Newlyn datum survey of the site had been carried out by Sterling Surveys originally in August 2006 and up rated in March 2008, by adding the area of the Recreation Ground to the east of the site.

In April 2011 BRB (Residuary) Ltd commissioned Sterling Surveys to re-level the site only. A copy of the Sterling Surveys drawing Osney Lane, Oxford Level Survey 1 of 1 Revision B Job Number S6960 April 2011, is attached in Appendix 2.

Sterling Surveys prior to carrying out the re-levelling of the site, visited the site on the 22nd February 2011 and provided a Check Survey Report (dated the 9th March 2011), with photographs. A part copy of the report with the photographs, is attached in Appendix 2.

3.3 Existing Flood Defences

The Environment Agency in their e-mail of the 24th February 2011, copy attached in Appendix 4, confirm that there are no formal flood defences in this area of the site, and currently nothing is planned. This is also confirmed in section 2.5.2, copy attached in Appendix 6, of the Oxford City Council Strategic Flood Risk Assessment for Oxford City June 2008.

4 Existing Information on Flood Risk

The main risk of flooding to the site is from the River Thames, which runs eastwards across the southern boundary of the site. However, the Castle Mill Stream also flows southwards to its confluence with the Thames, just downstream of the site (see Figure 4 in Appendix 1).

River Thames along southern boundary of site, view upstream (Photo taken by PBA September 2006)



Requests for information were made to a number of organisations, and their responses were as follows.

4.1 The Environment Agency

Information was obtained in February and March 2011, as detailed below:

4.1.1 Flood Zone Map

Planning Policy Statement 25 Development and Flood Risk (PPS25) Annex D Table D.1, copy attached in Appendix 3, defines the Flood Zones.

A request to the Environment Agency (EA) for their flood risk data and information, was made on the 20th January 2011, a copy of PBA's e-mail to the EA is part of the EA e-mail to PBA (1 of 2) of the 24th February 2011, a copy is attached in Appendix 4.

A copy of the EA's Flood Zone map is attached in Appendix 4.

The EA's map shows Flood Zone 3 as the darker blue areas, Flood Zone 2 as the lighter blue areas, and the Flood Zone 1 as the uncoloured areas.

The EA's map shows part of the south east side in Flood Zone 3 and part in Flood Zone 2, the remainder of the site being in Flood Zone 1.

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This report includes a more detailed assessment of the flood zones (see section 6), by superimposing the EA's hydraulically modelled flood levels (see section 4.1.3), onto the topographic survey (see section 3.2).

4.1.2 Flood Defences

The EA have confirmed in their e-mail of the 24th February 2011 (1 of 2), copy attached in Appendix 4, that there are no formal defences in the area of the site, and currently none are planned.

4.1.3 Hydraulic Model Results

The EA have provided their OS GPS datum flood levels and node locations (see the e-mails and attachments from the EA dated the 24th February 2011 and the 7th March 2011, copies attached in Appendix 4), from their Oxford Wolvercote hydraulic model.

The EA flood levels and associated node locations are also set out on the PBA drawing 18153/002/002, a copy of which is attached in Appendix 5.

4.1.4 Historic Flood Data

The EA mention in their e-mail of the 24th February 2011 (2 of 2), that their records show flooding to the site in 1947, 1977, 1979 and 2003, copies of the EA maps for these events are attached in Appendix 4.

The EA also mention in the same e-mail, that flooding in the local area also occurred in 1992, 2000, 2007 and 2008, copies of these EA maps are also attached in Appendix 4.

The EA also mention, again in the same e-mail, in relation to groundwater, that there is no additional risk from groundwater flooding at the site because flooding will not occur solely from groundwater.

The Oxford City Council Strategic Flood Risk Assessment Groundwater Register – Addendum No. 1 July 2009 map Appendix A Registered Groundwater Flooding Incidents, copy attached in Appendix 6, shows that there has not been any groundwater flooding incidents on the site.

4.2 Oxford City Council

Oxford City Council (OCC) have prepared documents which address flooding, these are as follows:-

- Strategic Flood Risk Assessment (SFRA) for Oxford City Final Report June 2008. Section 1.3 of the SFRA, copy attached in Appendix 4, confirms that it includes and builds on the findings of the earlier Strategic Flood Risk Assessment for Oxford's West End Final Report June 2007.
- West End Area Action Plan 2007-2016 Volumes 1 and 2 of 2, Adopted June 2008.

4.2.1 Strategic Flood Risk Assessment

Copies of Section 2.2 Flooding Sources, Section 2.4 Historic Flood Events and Appendix A Figure Historical Flood Outlines are attached in Appendix 6. Nothing has been identified within the site. The EA historic flood data, see Section 4.1.4, provides a better scale of information for the site.

Sections 2.5.2 and 2.5.3 Formal and Informal Flood Defences, copy attached in Appendix 6, confirm that (i) there are no formal flood defences maintained by OCC or riparian landowners, (ii) that whilst there are a number of informal flood defences within the City of Oxford, they do not provide an appropriate standard of protection or are discontinuous in their defended line and (iii) the railway embankment on the west side of the site, provides protection.

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Section 2.7 and the Appendix G Figure West End Flood Zones and Proposed Development Sites, copies attached in Appendix 6, confirm that the site (part of Site 17, Oxpens), is within The River Thames Flood Warning Area.

The Appendix G Figure also indicates the Flood Zoning of the site, however this report includes a more detailed assessment of the flood zones (see section 6), by superimposing the EA's hydraulically modelled flood levels (see section 4.1.2), onto the topographic survey (see section 3.2).

Section 2.8, copy attached in Appendix 6, indicates the emergency plans in place at the time of the SFRA.

Section 3.1.1 Flood Sensitivity to Climate Change, Section and the Appendix C 100 Year and 200 Year, Climate Change, Flood Extents map, copies attached in Appendix 6, confirm that the Environment Agency's hydraulically modelled 1 in 200 flood levels that are set out on the PBA drawing 18153/002/002, copy attached in Appendix 4, are appropriate to represent the climate change up to 2050.

Copies of Sections 4.3 Flood Zone Definition and 4.4 Updating the Flood Zone Map for this SFRA, are attached in Appendix 6, confirm that the 25 year Model Return Period represents Flood Zone 3b (see section 4.1.1), the 100 year Flood Zone 3a and the 200 year Flood Zone 2.

Section 5.2 and Appendix E, copies attached in Appendix 6, confirm and show the PPS25 Flood Zones 1, 2, 3a and 3b for Oxford.

4.2.2 West End Area Action Plan

The site is identified as part of Identified development site 17 Oxpens, copies of pages 4 and 5 of the West End Area Action Plan (WEAAP) are attached in Appendix 6.

Appendix 5 of the WEAAP has a copy of an extract of the West End Strategic Flood Risk Assessment, now incorporated into the OCC SFRA, section 4.2.1. A copy of Appendix 5 in relation to the site is attached in Appendix 6.

4.3 Thames Water

Thames Water Property Insight, in their letter of the 3rd May 2011, copy attached in Appendix 7, have confirmed that the flooding records held by them indicate that there have been no incidents of flooding on the site as a result of surcharging public sewers.

4.4 BRB (Residuary) Ltd.

An e-mail enquiry dated the 21st April 2011 was made to BRB (Residuary) Ltd. through Lambert Smith Hampton (LSH).

LSH's response dated the 9th May 2011, a copy of which is attached in Appendix 7, says that their only knowledge is of flooding affecting the site during the July 2007 floods.

The EA's flood history map for 2007, copy attached in Appendix 4, whilst showing the impact right up to the south boundary of the site, shows that the site however was not impacted by that flood event.

4.5 Oxfordshire County Council

Information was obtained from Oxfordshire County Council (OCC) in 26th June 2006, a copy of which is included in Appendix 7, could not provide any specific details of flooding at the site, but did provide a 'floodplain map'.

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The map appeared to be based on the then Environment Agency flood zone map, again showing the south-east quadrant of the site within the floodplain. The map also showed the location of the main highways surface water drainage outfalls, which are into the Castle Mill Stream at the Oxpens Road Crossing and south-west towards the River Thames for the area to the north of the site.

An e-mail request to OCC was made on the 21st April 2011. OCC's e-mail response of the 10th May 2011, copy of which is attached in Appendix 7, confirmed that there were floods in 2007, but saying that they did not know if the floods covered the site. OCC's suggestion of speaking to the Environment Agency, is covered in Section 4.1.

5 Sources of Potential Flooding

The potential sources of flooding and the related policy guidance can be summarised as follows:

■ River flooding from the River Thames and Castle Mill Stream

Local Plan Policies NE.6, NE.7, NE.8, NE.9, NE.11 and Section 6.3 of the Oxford City Council Strategic Flood Risk Assessment June 2008 (SFRA), copies attached in Appendix 6, provide the policy framework and mention the need for routine and regular maintenance of watercourses. Section 6.3 also mentions that the Environment Agency has published a document called 'Living on the Edge' which provides information on the roles and responsibilities of the Environment Agency and riparian land owners in relation to undertaking works on or near to watercourses. This document is supported by the Environment Agency Thames Region Land Drainage Byelaws. The SFRA section also identifies that there is a need to create buffer strips.

■ Surface water flooding

Local Plan Policies NE.10 and NE.13 and SFRA Section 6.4 Surface Water Management, copies attached in Appendix 6, provide the policy framework and state that all new development must manage surface water in a sustainable way.

The re-development will need to include appropriate Sustainable urban Drainage Systems (SuDS) provision.

■ Groundwater flooding

The Environment Agency have confirmed, a copy of their e-mail 24th February 2011 1 of 2, is attached in Appendix 4, that there is no additional risk from groundwater flooding at the site because flooding will not occur solely from groundwater.

The SFRA Section 7.2.4, copy attached in Appendix 6, recommends that a groundwater flooding study is undertaken to assess the potential risk.

Generally groundwater flooding maybe a problem where there is an aquifer (permeable soils or rock) which has an extensive capacity to receive and store water from rainfall. A geotechnical investigation of the site will need to be carried out to determine the level of groundwater below the existing ground surface. As well as the potential flooding issues, this level of information is critical in assessing the suitability of the ground for surface water infiltration drainage.

■ Surface water and foul drainage system

Flooding from surcharging and blockage can be contained by good levels of design and construction, regular inspection and necessary maintenance.

6 Flood Risk and Future Development

The 4% 1 in 25, 1% 1 in 100 and 0.5% 1 in 200 annual probability flood extents are shown on the PBA drawing 18153/002/0021, a copy of which is included in Appendix 5.

Section 4.4.1 of the Oxford City Council Strategic Flood Risk Assessment June 2008 (SFRA), copy attached in Appendix 6, indicates the 4% 1 in 25 flood extent as being PPS25 Flood Zone 3b, the 1% 1 in 100 as Flood Zone 3a and the 0.5% 1 in 200 as Flood Zone 2.

The same section of the SFRA indicates land above the 0.5% 1 in 200 as Flood Zone 1.

The EA mention in their e-mail of the 24th February 2011 and attachments (1 of 2), the Bank Top E-Planning Map Tool, identifies areas of land that lie within 8m of a watercourse designated as a 'Main River'.

The EA's map, attached in Appendix 4 as part of the EA 24th February 2011 e-mail and attachments (1 of 2), shows part of the site, adjacent to the River Thames, where the prior written consent of the EA, under the terms of the Water Resources Act 1991 and the Land Drainage Byelaws 1981 (or whatever is current at the time of proposed development), is required for any proposed works or structures in, under, over or within 8 metres of the brink of the River Thames.

6.1 Local Planning Policy Relating to Flood Risk

Oxford City Council Strategic Flood Risk Assessment June 2008 (SFRA) Appendix K – guidance Notes for Planners and Developers, copy attached in Appendix 6, Local Plan forms part of the Oxford Local Development Framework.

The Local Plan sets out the policies and proposals for future development and land use within Oxford City for the period 2001 – 2016.

Within the Local Plan there are 9 policies which are relevant to flood risk through Oxford.

These policies are set out in Oxford City Council's Strategic Flood Risk Assessment Section 1.5, a copy is attached in Appendix 6.

Any future development would obviously need to accord with these policies or whatever is current at the time of the future development.

Oxford City Council's West End Area Action Plan (WEAAP) is the current basis for the determination of all planning applications in the West End. The site is part of the WEAAP Identified development site 17. Oxpens, see Appendix 6 for the appropriate part of the WEAAP.

Copies of the WEAAP Section 2.5 Green spaces and water, Policies WE8 Oxpens Field and WE9 The Thames, Section 3.4 Flooding and Policy WE14 Flooding, are attached in Appendix 6.

The WEAAP Appendix 9 Delivery, Implementation and Monitoring Frameworks, copy attached in Appendix 6, sets out how Oxford City Council will monitor the WEAAP.

6.2 PPS25 Sequential Test

Section 4.2 of the Strategic Flood Risk Assessment for Oxford City June 2008, copy attached in Appendix 6, confirms that 'The Sequential Test should be applied throughout an entire planning authority district to ensure that development sites are considered on a sequential basis in reference to flood risk. ... This SFRA provides the basis for carrying out the Sequential Test by firstly identifying the

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sequential risk flood zones as specified by PPS25 and secondly applying these flood zones to the areas of search for strategic development sites identified by the Council.'

The site is part of Oxpens, Proposed Site 17 in the Strategic Flood Risk Assessment for Oxford City June 2008 SFRA Sections 5.3 and Appendices maps B, G and H, copies attached in Appendix 6.

The site, as part of the potential development sites identified by Oxford City Council, had the sequential test methodology, section 4.5 of the SFRA, copy attached in Appendix 6, applied to it.

Table 7 of the SFRA, copy attached in Appendix 6, summarises the SFRA's appropriate development type for the site based on Flood Zone 3b – water compatible as an appropriate use, essential infrastructure requires an Exception Test, and highly, more and less vulnerable being an inappropriate use.

The PBA drawing 18153/002/002, copy attached in Appendix 5, and this report section 4.2 show that there is a substantial part of the site that is in Flood Zone 1.

PPS25 Paragraph 8 and Annex D D5 and D6, copies attached in Appendix 3, provide the steer for new development to be in Flood Zone 1 and for the highest vulnerability uses to be located on the part of the site at the lowest probability of flooding.

Page 23 17. Oxpens Road Site of the Strategic Flood Risk Assessment for Oxford's West End June 2007 (of which Section 1.3 of the SFRA June 2008, copy attached in Appendix 6, confirms it includes and builds on its findings), copy attached in Appendix 6, confirms that 'Flood Zone 3b does not extend across the whole of the site, and indeed a large part is in Flood Zone 1, and therefore through careful planning it may be possible to steer the proposed land uses of Less and More Vulnerable uses away from this Flood Zone. This should be considered in the site specific FRA and could potentially show that the site conforms to the requirements of PPS25.'

Section 5.3.2 of the June 2008 SFRA, copy attached in Appendix 6, confirms 'The West End SFRA identified the importance of the Oxpens site for the renaissance of Oxford's West End, ...'.

Section 5.3.1 of the June 2008 SFRA, copy attached in Appendix 6, says 'All sites within Flood Zones 2, 3a and 3b require a site specific FRA to support development proposal, sites over 1 hectare in size also require an FRA. Table 8 below identifies which sites require FRAs'.

6.3 Site Specific Flood Risk Assessments (FRAs)

Section 7.0 of the June 2008 SFRA, copy attached in Appendix 6, and particularly section 7.2.2 Site Specific Flood Risk Assessments confirms 'Further guidance on the need for and the content of FRAs is contained within Appendix K, a copy of which is attached in Appendix 6.

Future development should be in accordance with the appropriate flood risk guidance and information at that time.

6.4 Climate Change

Section 3.1.1 and Appendix K of the SFRA June 2008, copies attached in Appendix 6, confirms (i) the local agreement that the EA modelled 200 year event would be appropriate to represent the climate change up to 2050 and (ii) the impact of climate change over the lifetime of the development on the flooding regime.

The PPS25 Practice Guide Paragraph 3.100, copy attached in Appendix 3, says '*For individual developments, an appropriate allowance should be included over the lifetime of each development in question. ...consider the implications of climate change for this period using the precautionary allowances and indicative sensitivity ranges in PPS25 Annex B*'.

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In relation to the final ground floor levels there will be need to agree with funders and insurers with reference to the current Association of British Insurers guidance current at the time, of the development.

7 Conclusions

The Environment Agency (EA) and Oxford City Council (OCC) current information together with the vertical level survey has part of the site as being at a high probability of flooding from the River Thames. The comparison of the EA flood level data and the survey indicate that this area corresponds to Flood Zone 3b The Functional Floodplain.

Whilst there is a small area in Flood Zones 3a High Probability and Flood Zone 2 Medium Probability, the remaining area of the site is in Flood Zone 1 Low Probability.

Future proposed development of the site will be required to meet the Flood Risk Vulnerability Classifications of the guidance and recommendations at that time. A site specific Flood Risk Assessment will be required.

OCC's SFRA June 2008 confirms the importance of the site, originally as part of the Oxpens site, for the renaissance of Oxford City's West End area. A site specific Flood Risk Assessment will need to consider through careful planning, Less and More Vulnerable Uses away from the Flood Zone 3b land.

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Appendix 1 : Site Boundary and Location Plans

BRB (Residuary) Site Ownership Boundary (ref: B1-DB-10-001)

Figure 3 – 1:50,000 Site Location Plan

Figure 4 – 1:10,000 Site Location Plan

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Appendix 2 : Survey Information

Sterling Surveys Level Survey Revision B April 2011

Part Check Survey Report March 2011 and Photographs (taken 22/02/2011)

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Appendix 3 : Planning Policy Statement 25 and its Practice Guide

PPS25 Paragraph 8, Annex D D5, D6 and Table D.1: Flood Zones

PPS25 Practice Guide Paragraph 3.100

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Appendix 4 : Environment Agency Correspondence and Data

Environment Agency e-mail 1 of 2 dated 24th February 2011

Environment Agency e-mail 2 of 2 dated 24th February 2011

Environment Agency e-mail dated 7th March 2011

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Appendix 5 : PBA Drawing 18153/002/002

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Appendix 6 : Oxford City Council SFRA and West End Area Action Plan

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Appendix 7 : Other Correspondence

Thames Water Property Insight's letter dated 3rd May 2011

Lambert Smith Hampton e-mail dated 9th May 2011

Oxfordshire County Council e-mail dated 10th May 2011

Oxfordshire County Council letter dated 26th June 2006

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