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SOUTH WEST BICESTER

NPPF: Flood Risk Assessment and Drainage Strategy
Addendum

Countryside Properties (Bicester) Ltd.

16/08/2012

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	DRAFT	REV 1		
Date	08 August 2012	16 August 2012		
Prepared by	J Tang	J Ward		
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Signature				
Project number	50400187	50400187		
Report number				
File reference		NPPF_FRA_Addendum_South West Bicester.docx		

SOUTH WEST BICESTER

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16/08/2012

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1 Introduction

1.1 Background

- 1.1.1 The Flood Risk Assessment for the South West Bicester project was prepared by WSP in January 2007. As part of the consultation process the Environment Agency were contacted and information relating to known and predicted flood sources were obtained.
- 1.1.2 The Flood Risk Assessment, submitted in January 2007, was prepared using the best available information at the time. The development proposals for South West Bicester was granted outline planning application in June 2008. However, Countryside Properties are seeking to provide an additional 100 dwellings over and above those already approved under the outline consent.
- 1.1.3 The previous Flood Risk Assessment, was prepared in accordance with “Planning Policy Statement 25: Development and Flood Risk Guidance” (PPS25). This Addendum report takes account of the “National Planning Policy Framework” (NPPF) published in March 2012, which supersedes PPS25.
- 1.1.4 This Addendum assesses the impacts the additional dwellings proposed would have on the drainage strategy outlined in the previous Flood Risk Assessment. This report should be read in conjunction with the previous Flood Risk Assessment completed in January 2007.

2 Existing Site

2.1 Site Location

- 2.1.1 Countryside Properties (Bicester) Ltd. is developing 119 ha of land, which is located along the south west edge of Bicester in Oxfordshire.
- 2.1.2 Three main watercourses, Pingle Brook to the north, Whitelands Farm Brook in the centre and Gagle Brook to the south, run within or in the vicinity of the site area. Refer to Figure 1 in Appendix A for the Key Features Plan.
- 2.1.3 The NPPF guidance released in March 2012, supersedes that of PPS25, and requires that developers making planning applications for sites that are potentially at risk of flooding, or cover an area of greater than one hectare, should consult with the Environment Agency and produce a flood risk assessment for their proposals.
- 2.1.4 During the production of the January 2007 Flood Risk Assessment, the Environment Agency had stated that part of the site appeared to lie within Flood Zone 3 associated with the Pingle Brook, according to their coarse hydraulic modelling in the area.
- 2.1.5 As part of the previous FRA report, WSP carried out a more detailed hydraulic model of the Pingle Brook, using Infoworks RS and found that the extent of flooding up to and including the 1 in 100 year plus 20% climate change event does not encroach onto the proposed site. Refer to Section 3 of the South West Bicester Flood Risk Assessment issued in January 2007.
- 2.1.6 The current Environment Agency's Flood Mapping Website has since incorporated the modelling undertaken by WSP and indicates that the South West Bicester site lies wholly within Flood Zone 1 (little or no risk), which is outside of the flood plain. Refer to Figure 2 in Appendix A of this report.

2.2 Site Description

- 2.2.1 Table 2.1 describes the general site characteristics.

Table 2.1 Characteristics of the site

Area	119.4 ha
General Topography	Overall Site generally slopes from the north-west to the south-east. <i>Highest point of the site is located to the north-west at 82.76m AOD and the lowest point is located to the south-east, at the boundary with Oxford Road at a level of 65.19m AOD.</i>
Existing surfacing	Partially developed
Current use	Development site
Boundaries	North Middleton Stoney Road (B4030) South Greenfield Areas north of Gagle Brook East Oxford Road (A41) West A4095
Access	Vehicular: Vehicular Access available via Oxford Road (A41) and Middleton Stoney Road.

3 Proposed Development

3.1 Proposed Development Description

- 3.1.1 The original development proposals were for a mixed-use development, which consisted of the construction of 1585 residential properties, B1 and B2 employment uses, 2 primary and a secondary school, a hotel, a sports pavilion and a local centre consisting of shops, offices and a community centre with possibly a pub/restaurant and children's nursery. A link road between the A41 and Middleton Stoney Road was also included to provide access into the new development.
- 3.1.2 This report is to support an Section 73 application for an additional 100 residential dwellings over and above the 1585 dwellings already approved under the outline consent. It is intended that the additional dwellings will be spread across the land parcels.

4 Drainage Strategy

4.1 Development of the Drainage Strategy

- 4.1.1 The FRA drainage strategy prepared for the outline planning application was developed further into a more detailed strategy (approved pursuant to condition discharge) and was also covered further in an approved Design Code. This places minimum requirements for Sustainable Drainage Systems (SuDS) for the developers of each parcel. This is set out on the latest drainage strategy drawing 1903/D/006(N) in Appendix B and in the approved Design Code for the development now known as Kingsmere.
- 4.1.2 The strategy and Design Code requires each parcel developer to carry out detailed infiltration tests and use on-parcel infiltration SuDS wherever practicable. Where infiltration is not practicable or is limited, the parcel designer must design attenuation storage to ensure the parcel discharge does not exceed greenfield runoff rates for the 1 in 10 year event. Above the 1 in 10 year event, discharges over the greenfield runoff rate are attenuated in the regional basins provided for each main site catchment.

4.2 Proposed Drainage Strategy

- 4.2.1 The calculations for the original drainage strategy assume 100% runoff from highways and 75% runoff from residential parcels. Actual percentage impermeable areas for residential areas are expected to be about 50-60% for any densities of dwellings, so actual runoff will be less than assumed whether or not a few extra dwellings per parcel are added.
- 4.2.2 Furthermore, the design criteria for the parcels will remain the same in that the greenfield runoff rate for the 1 in 10 year event must not be exceeded. This applies whatever the number of dwellings or parcel impermeable area is.
- 4.2.3 Therefore the slight increase in dwelling numbers will have no effect on discharges from the parcels and hence, there is no change to off-site discharge rates.
- 4.2.4 The regional attenuation basins provide enough storage to comply with the requirements for discharge of additional volume. This was not a requirement of the original strategy in 2007, but it has been demonstrated to comply with this current policy criteria as the volume provided assumed no infiltration on-site.

5 Conclusions

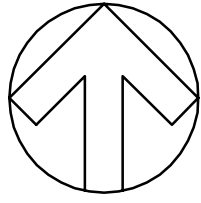
- 5.1.1 This Addendum Report addresses revisions to the Phase 1 application made since the submission of the Phase 1 South West Bicester, Flood Risk Assessment in January 2007. It also addresses the proposed increase in dwellings numbers by 100 compared to the original outline planning application in 2007.
- 5.1.2 As part of the previous FRA report, WSP had carried out a more detailed hydraulic model of the Pingle Brook, using Infoworks RS and found that the extent of flooding up to and including the 1 in 100 year plus 20% climate change event does not encroach onto the proposed site.
- 5.1.3 The current Environment Agency's Flood Mapping Website, has since incorporated the modelling undertaken by WSP and indicates that the South West Bicester site lies wholly within Flood Zone 1 (little or no risk), which is outside of the flood plain.
- 5.1.4 It has been shown that the increase in dwelling numbers will have no effect on the discharge rates offsite as the Design Code for the site requires parcel designers to limit parcel runoff rates based on the 1 in 10 year greenfield runoff. This is not related to the number of dwellings on the parcel. Furthermore, impermeable areas for the site wide strategy are based on 75% impermeable area, which will be much higher than the actual percentages even with the extra 100 units spread across the site.
- 5.1.5 The revised development proposals are therefore robust and compliant with NPPF in terms of flood risk and surface water drainage strategy.

6 Appendices

APPENDIX A

Figure 1 – Key Features Plan

Figure 2 – EA Flood Map



KEY
 SITE BOUNDARY

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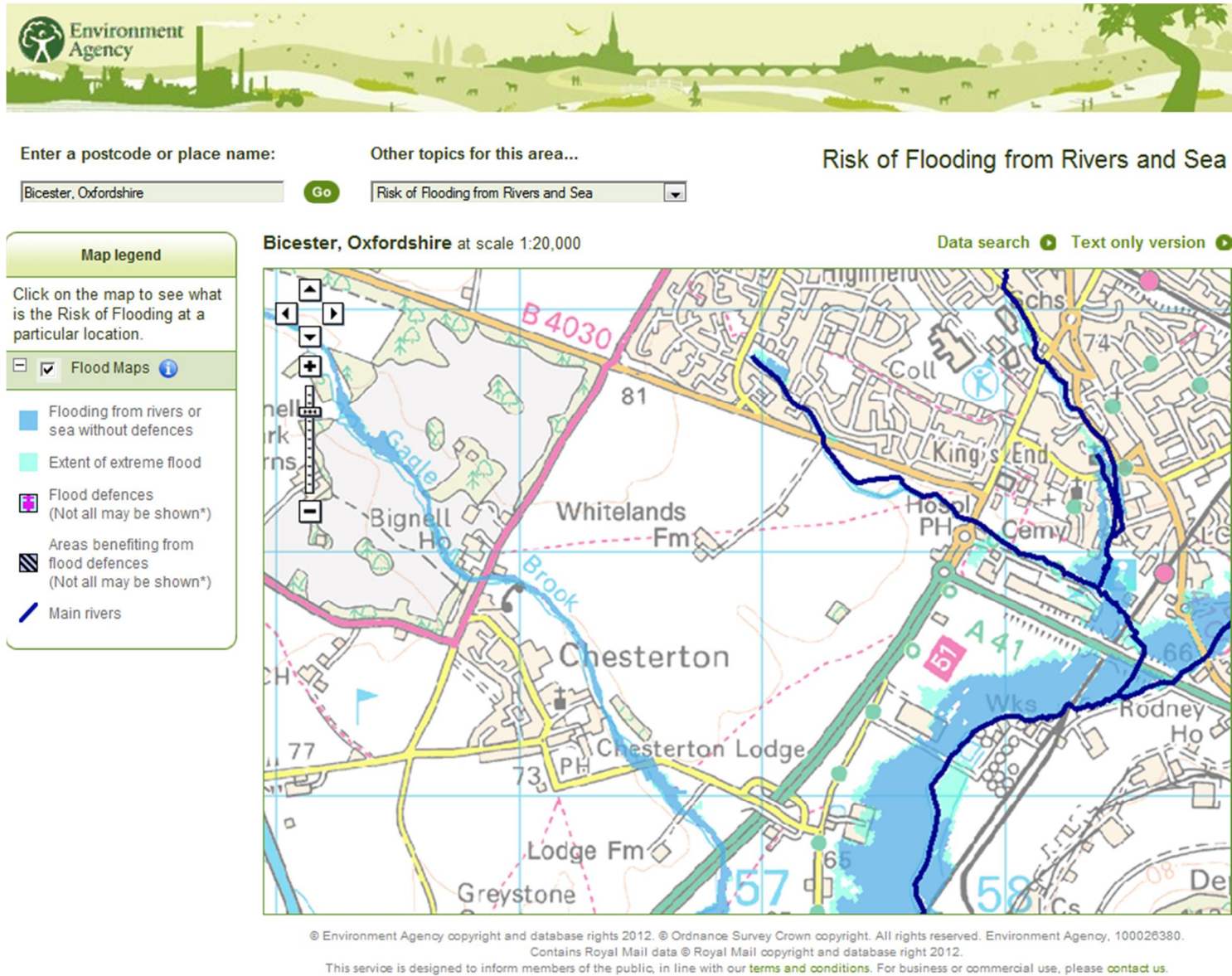


TITLE: SOUTH WEST BICESTER
 KEY FEATURES PLAN

FIGURE No: FIGURE1

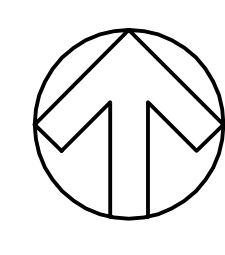
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FIGURE 2 – ENVIRONMENT AGENCY FLOOD MAP_ SOUTH WEST BICESTER



APPENDIX B

1903/D/006(N) – Surface Water Strategy and Catchment Layout

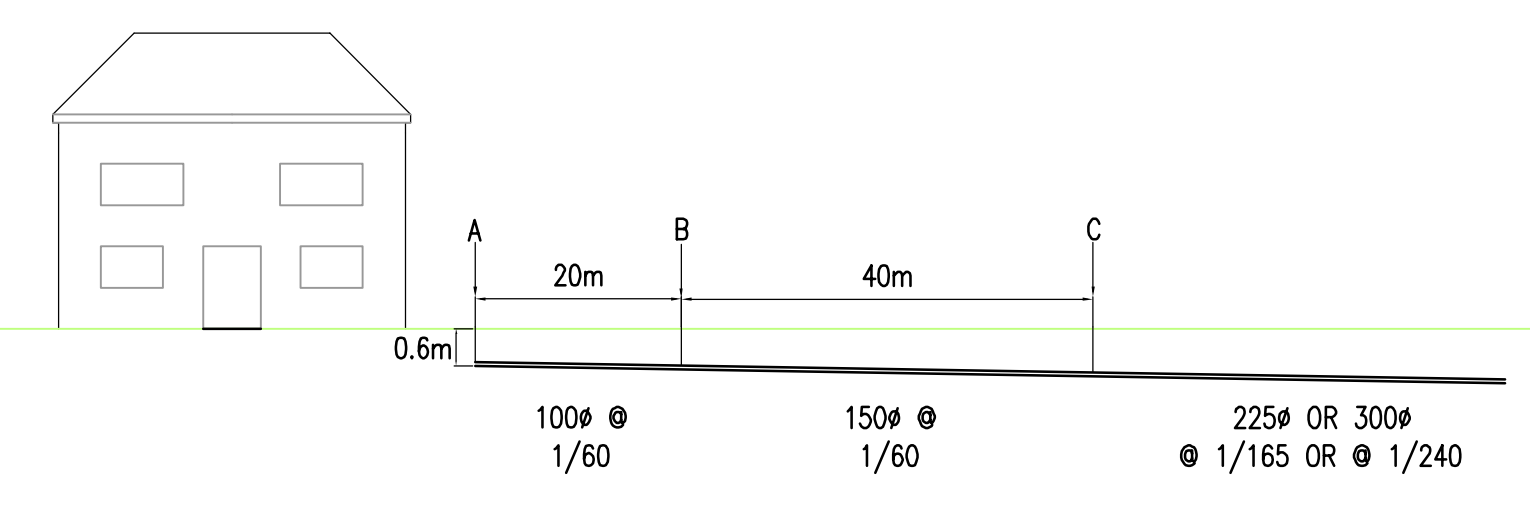


PETROL INTERCEPTOR FOR NEW ROUNDABOUT

EXISTING HIGHWAY DITCH

PETROL INTERCEPTOR FOR NEW ROUNDABOUT

DITCH DIVERTED FOR ROUNDABOUT



INDICATIVE PARCEL DRAINAGE - TYPICAL SECTION

NORTH CATCHMENT	
GROSS CATCHMENT AREA	= 38.3 HA
ENGINEERED CATCHMENT	= 25.6 HA
HARD STANDING	= 19.4 HA
ALLOWABLE DISCHARGES FROM ENGINEERED CATCHMENT:	
RETURN PERIOD	FLOW (l/s)
2	82
10	151
30	212
100+30%	388

DO NOT SCALE

KEY:

- SURFACE WATER FLOW DIRECTION
- INDICATIVE PARCEL CRITICAL DRAIN ROUTE
- RETAINED EXISTING DITCHES
- NEW OR RELOCATED DITCHES
- INDICATIVE SURFACE WATER DRAIN ROUTES
- NORTHERN CROSS CATCHMENT BOUNDARY
- NORTHERN ENGINEERED CATCHMENT AREA DRAINING TO BASINS
- SOUTHERN ENGINEERED CATCHMENT AREA DRAINING TO BASINS
- DETENTION BASINS
- PARCEL CONNECTION MANHOLE
- PARCEL BOUNDARY

NOTE 1: THE ON-FLAT STORAGE VOLUME EQUATES TO 100m³ PER HECTARE OF GROSS PARCEL AREA. THIS STORAGE IS DESIGNED TO ATTENUATE THE 1 IN 10 YEAR EVENT ON-FLAT. THE STORAGE CAN INCLUDE SOAKWAYS WHERE APPROPRIATE.

NOTE 2: INFILTRATION AND STORAGE FOR EACH PLOT SHALL ACCORDANCE AT LEAST THE 1 IN 10 YEAR EVENT. EVENTS IN EXCESS OF THE 1 IN 10 YEAR WILL OVERFLOW TO THE STRATEGIC SURFACE WATER NETWORK AND BE ATTENUATED WITHIN PROPOSED BASINS LOCATED AT THE OUTFALLS.

CHANGES SINCE THE FRM: THE PARCEL LAYOUTS AND SIZES HAVE CHANGED SINCE THE FRM WAS COMPLETED. THIS HAS THEREFORE CHANGED THE ENGINEERED CATCHMENT AREAS AND SUBSEQUENTLY THE ALLOWABLE DISCHARGE RATES FOR THE CATCHMENTS.

Northern Catchment Details

Note 1

Engineered Catchment	Gross Area (ha)	Imp Factor	Imp Area (ha)	On-Plot Storage Vol m ³	MH No. Connection	MH Connection IL (m)	Downstream Pipe No.	Downstream Pipe Size (mm)	Q2 l/s	Q10 l/s	Q30 l/s	Q100 +30% l/s
KM1a	1.949	0.750	1.387	164.9	S726	75.298	19.003	450	5.9	10.8	15.2	27.76
KM1b	0.899	0.750	0.652	88.9	S236	74.181	19.006	450	2.8	5.1	7.1	13.05
KM2	1.782	0.750	1.337	178.2	S216	73.670	23.005	375	5.7	10.5	14.8	26.76
KM3	2.820	0.750	2.115	282.0	S233	72.817	23.007	525	9.0	16.5	23.1	42.34
KM4	3.082	0.750	2.312	308.2	S218	71.741	23.010	525	9.8	18.1	25.3	46.28
KM5	2.324	0.750	1.743	232.4	S206	73.388	19.006	450	7.4	13.6	19.1	34.89
KM6a	1.837	0.750	1.228	183.7	S268	71.144	11.002	450	5.2	9.6	13.4	24.58
KM6b	1.143	0.750	0.867	114.3	S269	70.145	11.005	450	3.6	6.7	9.4	17.18
KM7a	1.096	0.750	0.815	108.6	S268	71.144	11.002	450	3.5	6.4	8.9	16.31
KM7b	1.025	0.750	0.789	102.5	S232	70.472	11.004	525	3.3	6.0	8.4	15.39
KM7a	0.871	0.750	0.653	87.1	S212	69.465	11.007	675	2.8	5.1	7.1	13.08
KM7b	0.909	0.750	0.682	90.9	S245	69.796	16.002	375	2.9	5.3	7.5	13.65
KM8c	0.800	0.750	0.600	80.0	S803	68.574	27.002	375	1.9	3.5	4.9	9.01
Highway	0.798	1.000	0.798	--	--	--	--	--	3.3	6.0	8.4	15.34
20.763			16.764						67.1	123.3	172.8	318.6

Note 2

Engineered Catchment	Q2 l/s	Q10 l/s	Q30 l/s	Q100 +30% l/s
KM5	4.1	7.5	10.4	19.1
KM21	0.651	0.750	0.488	0.0
Health Centre	2.896	0.750	2.149	0.0
4.789			3.922	

*KM5, KM21 and the Health Centre in the east of the northern catchment will need to drain via parcel attenuation to Pingle Brook and therefore require on plot storage

Northern Catchment Totals

Engineered Catchment	25.562	Varies	19.356	On Plot	--	--	--	82.3	151.4	211.8	387.5
Retained Open Space	38.257	--	19.356	N/A	--	--	--	82.3	151.4	211.8	387.5

Southern Catchment Details

Note 1

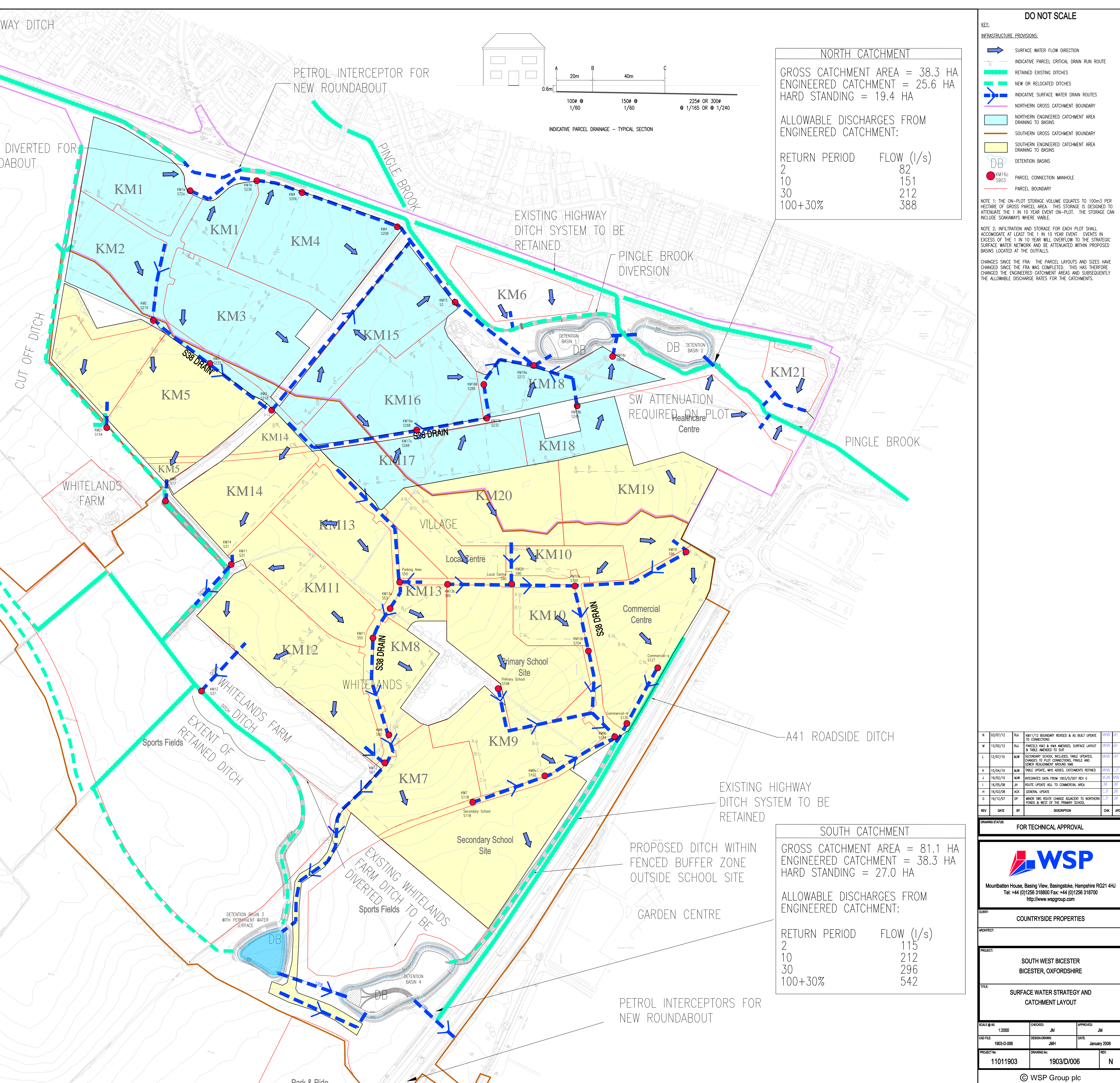
Engineered Catchment	Gross Area (ha)	Imp Factor	Imp Area (ha)	On-Plot Storage Vol m ³	MH No. Connection	MH Connection IL (m)	Downstream Pipe No.	Downstream Pipe Size (mm)	Q2 l/s	Q10 l/s	Q30 l/s	Q100 +30% l/s
KM5	2.891	0.750	2.018	289.1	S177	72.234	1.015	825	8.6	15.8	22.1	40
KM7	1.969	0.750	1.477	196.9	S116	65.975	26.002	450	6.3	11.6	16.2	30
KM8	0.821	0.750	0.601	82.1	S82	69.303	7.014	600	2.9	5.4	7.6	14
KM9a	1.503	0.750	1.127	150.3	S122	65.503	26.004	525	4.8	8.8	12.3	23
KM9b	0.889	0.750	0.660	88.9	S124	65.153	15.013	900	2.1	3.9	5.5	10
KM10a	0.846	0.750	0.600	84.6	S100	67.522	15.007	600	2.8	5.1	7.1	13
KM10b	0.890	0.750	0.668	89.0	S104	65.750	15.009	600	2.8	5.2	7.3	13
KM11	1.796	0.750	1.340	179.6	S31	70.907	4.002	450	5.7	10.5	14.7	27
KM12	3.347	0.750	2.510	334.7	S85	69.562	7.011	600	10.7	19.6	27.5	50
KM13a	2.007	0.750	1.505	200.7	S53	69.701	7.009	600	6.4	11.8	16.5	30
KM13b	0.457	0.750	0.343	45.7	S85	70.580	15.002	450	1.5	2.7	3.8	7
KM14	2.044	0.750	1.533	204.4	S31	70.907	4.002	450	6.5	12.0	16.8	31
KM19	3.106	0.750	2.330	310.6	S98	67.948	20.002	525	9.9	18.2	25.5	47
KM20	2.200	0.750	1.650	220.0	S90	70.000	15.003	450	7.0	12.9	18.1	33
KM22 (Ex-School Site)	1.895	0.750	1.271	189.5	S154	73.864	1.011	Ditch	5.4	9.9	13.9	25
Highway	2.204	1.000	2.204	--	--	--	--	--	9.4	17.2	24.1	44
Primary School	2.470	0.330	0.815	247.0	S108	68.365	23.002	300	3.5	6.4	8.9	16
Secondary School Site	3.140	0.330	1.038	314.0	S118	65.975	26.002	450	4.4	8.1	11.3	21
Commercial-a	1.529	0.750	1.147	152.9	S127	66.302	29.002	300	4.9	9.0	12.5	23
Commercial-b	1.471	0.750	1.103	147.1	S130	66.055	29.003	225	4.7	8.6	12.1	22
Local centre	1.022	0.750	0.767	102.2	S80	70.000	15.003	450	3.3	6.0	8.4	15
Parking area	0.277	1.000	0.277	--	S50	70.695	7.007	525	1.2	2.2	3.0	6
38.263			26.961						114.7	210.9	295.0	539.8

Note 2

Engineered Catchment	Q2 l/s	Q10 l/s	Q30 l/s	Q100 +30% l/s
KM5	114.7	210.9	295.0	539.8
Retained Open Space	0.0	0.0	0.0	0.0
81.110			26.961	

Southern Catchment Totals

Engineered Catchment	38.263	--	26.961	Varies	--	--	--	114.7	210.9	295.0	539.8
Retained Open Space	42.847	--	0.000	--	--	--	--	0.0	0.0	0.0	0.0
81.110			26.961					114.7	210.9	295.0	539.8



SOUTH CATCHMENT

GROSS CATCHMENT AREA	= 81.1 HA
ENGINEERED CATCHMENT	= 38.3 HA
HARD STANDING	= 27.0 HA
ALLOWABLE DISCHARGES FROM ENGINEERED CATCHMENT:	
RETURN PERIOD	FLOW (l/s)
2	115
10	212
30	296
100+30%	542

A41 ROADSIDE DITCH

EXISTING HIGHWAY DITCH SYSTEM TO BE RETAINED

PROPOSED DITCH WITHIN FENCED BUFFER ZONE OUTSIDE SCHOOL SITE

GARDEN CENTRE

PETROL INTERCEPTORS FOR NEW ROUNDABOUT

N:\Bicester New Town\BPM\INCS AUTO\CAD\Drainage\1903-0-106.dwg 03/07/2012 10:43:52 Jenkins, Ryan

REV	DATE	BY	DESCRIPTION	CHK	APP
M	18/07/12	AU	KM17/12 BOUNDARY REDRAWN & AS BUILT UPDATE	WSP	PT
M	13/02/12	AU	PARCELS AND I&M AMENDED SURFACE LAYOUT & TABLE ADDED TO DUT	WSP	PT
L	12/07/10	MW	SECONDARY SCHOOL INCLUDED, TABLE UPDATED, CHANGES TO FLOT CONNECTIONS, PINGLE AND OTHER REQUIREMENTS AREAS ARE	MHW	PT
X	15/04/10	MW	TABLE UPDATE, MFG AREAS, CATCHMENTS REFINED	MHW	PT
J	19/02/10	MW	INTERIM DATA FROM 1903/02/07 REV G	MHW	PT
J	19/05/09	JM	ROUTE UPDATE A41 TO COMMERCIAL AREA	JM	PT
D	16/02/09	ADJ	GENERAL UPDATE	ADJ	PT
U	19/12/07	DP	WORK SHE ROUTE CHANGE ADJACENT TO WORKING POND & WEST OF THE PRIMARY SCHOOLS	DP	PT
REV	DATE	BY	DESCRIPTION	CHK	APP

FOR TECHNICAL APPROVAL

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COUNTRYSIDE PROPERTIES

SOUTH WEST BICESTER
 BICESTER, OXFORDSHIRE

SURFACE WATER STRATEGY AND CATCHMENT LAYOUT

SCALE AS	1:2000	DRAWN	JM	APPROVED	JM
DATE	1903-0-006	DESIGN/CHKD	JM	DATE	January 2008
PROJECT NO.	11011903	DRAWING NO.	1903/D/006	REV	N

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