



Hampshire
County Council

LAND AT SHEPHERDS SPRING SCHOOL, SMANELL ROAD, ANDOVER

PRELIMINARY DRAINAGE STRATEGY REPORT

Prepared by: Robin Dooley

Signed: 

Date: 30/11/11

Checked by: Simon Fryer

Signed: 

Date: 30/11/11

Approved by: David Devenish

Signed:

Date:

Revision Record

Rev.	Date	By	Description	Chk'd.	Aprv'd.

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1. INTRODUCTION

1.1. General

- 1.1.1. Engineering Consultancy (EC) have been commissioned by Hampshire County Council Property Services (HCCPS) to prepare a Drainage Strategy Report for the redevelopment of a parcel of surplus land adjacent to Spring Meadow Children's Centre.
- 1.1.2. The Area of land under consideration is referenced on the Location Plan in Figure 1 of this report.
- 1.1.3. This report has been prepared to support the outline planning application for the redevelopment of the site for residential uses.

1.2. Scope of Report

- 1.2.1. This report outlines the drainage proposals for the development site with regards to surface water and foul water flows generated by the proposed the development.
- 1.2.2. This document considers the following:
 - Existing drainage regime for the site;
 - Drainage design options considered for the site;
 - Design parameters and considerations;
 - The outline drainage strategy for the site;
- 1.2.3. This document has been prepared based on the following information:
 - Site Visits;
 - Preliminary FRA prepared by Engineering Consultancy;
 - Ground Investigation Report no. LW21195 prepared by Ashdown Site Investigation Limited.
 - Correspondence with Southern Water.

2. SITE CONTEXT

2.1. Existing site

- 2.1.1. The proposed development site is located to the rear of Spring Meadow Children's Centre off of Smanell Road to the north east of Andover at approximately National Grid Reference 436657E, 147150N. A location plan is included as Figure 1.
- 2.1.2. The development site covers an area of 1.43ha and is bound to the north and east by well established residential housing developments. To the south by Spring Meadow Children's Centre and Andover Education Centre and the A343 Newbury Road forms the western boundary.
- 2.1.3. Re-development of Shepherd's Spring Infant and Junior schools, now the Children's and Andover Education Centres respectively, led to the land which was formerly used for playing fields becoming surplus.
- 2.1.4. The existing impermeable area of the site is 0.18ha comprising mainly of hardstanding areas and playgrounds. The remaining area of the site is permeable and is mainly laid to grass with some mature trees around the site perimeter.
- 2.1.5. The topography of the existing site is relatively flat and level with a slope from the north west corner to the south east corner with an approximate gradient of 3%.

2.2. Existing infrastructure

- 2.2.1. Public sewer records received from Southern Water indicate that there are possible connections points for the foul to the north and east of the proposed site however due to the existing fall of the ground towards the south a connection at these points would prove impractical.
- 2.2.2. Records indicate there are no surface water sewers within the existing residential areas to the north and east of the site. There are however public surface water sewers to the south which are located within the later Swallowfields development.

2.3. Existing drainage regime

- 2.3.1. Surface Water run off from the existing impermeable areas currently drains into the drainage system of the two former school buildings which ultimately discharges to ground via soakaways. Original record drawings indicated that the soakaways were fitted with an overflow connected to a private 150mm dia surface water sewer which ran in an easterly direction along Smanell Road. Subsequent CCTV surveys and investigations failed to find evidence of this however.
- 2.3.2. The existing foul flows from both buildings connect to a private 150mm dia. foul sewer which runs in an easterly direction along Smanell Road before connecting into the public foul sewer at manhole ref. 8102. This sewer also serves the adjacent St Paul's Church Centre. This pipe is known to be of pitch fibre construction and has suffered with blockages in the recent past. CCTV survey footage confirms that the pipe is blistered and is in poor condition.

3. DRAINAGE DESIGN DEVELOPMENT

3.1. Surface water

- 3.1.1. The discharge of surface water is generally preferable at source where possible. Where this is not possible flows should be attenuated on site and in the case of greenfield sites discharged at or near greenfield rates to a nearby watercourse or if not available, a public surface water sewer.

- 3.1.2. Ashford Site Investigation Limited carried out a site investigation and reference should be made to their report no. LW21195. Their site investigation included soakaway testing however, the results summarised below as table 1, proved that ground conditions were not suitable for infiltration therefore soakaways were not a viable option at this site.

Table 1 – Soil Infiltration Results

Trial Pit Ref.	Derived Infiltration Rate
TP1	1.4 x 10 ⁻⁶ m/s
TP2	3.4 x 10 ⁻⁶ m/s
TP3	3.3 x 10 ⁻⁶ m/s

- 3.1.3. Although capable of some infiltration the rates proved to be too low to rely on infiltration alone. Therefore a mix of infiltration and attenuation prior to discharging to the public sewer system is proposed.
- 3.1.4. A copy of the trial pit logs and extracts from the site investigation report are included as Appendix A.
- 3.1.5. Southern Water were consulted on the possibility of indentifying a suitable connection point within close proximity of the site however their report (Appendix B) concluded that there was no viable solution for connection to the public sewer system. Accordingly, it was agreed that the only alternative was to discharge directly into Shepherd's Spring drain at the junction of Smanell Road and Cricketer's Way.
- 3.1.6. The Environment Agency (EA) had been consulted at pre-planning stage and it was their view that as the site had no significant prior construction then any surface water discharge from the site should be limited to greenfield run off rates. A copy of the EA response is included in Appendix C.
- 3.1.7. Greenfield run off rates for the site were calculated using Microdrainage Windes software using the ICP¹ Suds methodology. This method is currently favoured for small development sites with an area less than 50ha. A copy of the results are included as Appendix D.
- 3.1.8. The resultant run off rates were extremely low which resulting in large amounts of attenuation. Half drain times also exceeded the maximum of 24 hrs as recommended by current building regulations.
- 3.1.9. Vortex flow control devices are to be used to restrict the offsite discharge to the agreed limits. Designs using the greenfield run off rates resulted in orifice sizes of 56mm. It was felt this would be prone to blockages. The orifice size was therefore increased to 75mm thus giving an equivalent discharge rate of 5 l/s. The increased rate was agreed with Rob Sheehan of the EA and was used as the basis for the preliminary design and storage sizing. Refer to the correspondence with the EA included as Appendix E.

3.2. Foul water

- 3.2.1. Capacity checks carried out by Southern Water established that there was sufficient capacity within the local public foul sewer network at manhole 8101 to receive the additional 2.3 l/s produced by the proposed development.

¹ Interim Code of Practice for Sustainable Drainage Systems – CIRIA July 2004

- 3.2.2. Referring to section 2.3.2 the existing foul flows from both the existing buildings discharge to a 150mm dia. private sewer running eastwards along Smanell Road. The pipe will need to be replaced in order to bring it up to adoptable standards. Flows from the school and the adjacent church centre will also be connected into the new sewer.

4. DRAINAGE PROPOSALS

4.1. General

- 4.1.1. To support the outline planning application for the redevelopment of the site it is proposed to discharge the surface water at a restricted rate offsite, via attenuation tanks, to the Shepherds Spring Drain located to the east of the development site at the junction of Smanell Road and Cricketer's Way.
- 4.1.2. An adoptable gravity system is proposed for the discharge of the foul water from the site into the local public sewer network.

4.2. Surface water

- 4.2.1. The site covers an area of 1.43ha of which 0.18 ha are impermeable with the remainder laid to grass. The proposed development of 50 units will increase the impermeable area to 0.63 ha or 44% of the site area including estate roads, footways and driveways.
- 4.2.2. The agreed rate of 5 l/s was used in the subsequent calculations to size the underground attenuation. Microdrainage Windes software was again used to calculate the storage volumes for the 1 in 30 year and the 1 in 100 year return + 30% periods. Refer to appendix F. A summary of the results are shown in Table 2 below.

Table 2 – Summary of storage volumes

Return Period	Storage Volume (m ³)	Resultant Tank Size (L x W x D)
1 in 30 year	223.6	15m x 8m x 2m
1 in 100 year + 30% for climate change	404.3	22m x 10m x 2m

- 4.2.3.
- 4.2.4. Sewers for Adoption 6th Edition (SFA) requires that storage should be provided up to the 1 in 30 year event and that beyond this the network is allowed to surcharge or flood for short periods of time. Any flooding is to be routed away from properties but should be contained within the site boundary. Traditionally storage for the excess surface water run off would be provided above ground in the form of dry detention basins or swales.
- 4.2.5. The currently proposed layout however has limited space for above ground storage features so it is therefore proposed to provide underground attenuation for the 1 in 100 year + 30% storm event.
- 4.2.6. A new surface water sewer will be provided beneath the existing school access road and will then run in an easterly direction along Smanell Road where it will discharge into the Shepherds Spring drain.
- 4.2.7. Surface water will discharge from the attenuation tanks at a rate of 5 l/s as agreed with the EA.
- 4.2.8. Flow control is to be achieved using a Hydrobrake or equivalent proprietary vortex flow control device.

4.3. Foul water

- 4.3.1. The 150mm dia private foul sewer will be replaced with a new foul sewer suitably designed to adoptable standards. All foul water flows from the development will be discharged via an adoptable gravity system into the new sewer laid in the existing school access road. The new foul sewer shall be sized to take foul water flows from the new development but also collect foul flows from the existing school buildings and the adjacent church and church hall.
- 4.3.2. The new foul sewer will connect into the existing public sewer system at a new connection just downstream of manhole ref. 8101.
- 4.3.3. Southern Water have confirmed that there is sufficient capacity within the existing network at manhole 8102 to take the additional 2.3 l/s foul discharge generated by the proposed development. Foul flows from the existing school buildings and the church are assumed to remain as existing.

4.4. Contamination

- 4.4.1. A full Phase 1 and Phase 2 contamination assessment of the Site was beyond the brief of the soil investigation, however limited contamination testing was undertaken on selected samples.
- 4.4.2. Two soil samples were tested for a range of commonly occurring contaminants. The levels of contaminants determined are not considered to be significantly elevated and do not exceed typical residential Soil Screen Values and Generic Assessment Criteria.
- 4.4.3. The Site lies within an EA Groundwater Source Protection Zone I (Inner Source Protection Zone) for the Smanell Road abstraction and the Andover Public Water Supply. All precautions must be taken to prevent pollutants from entering the groundwater underlying the site to protect potable water supplies.
- 4.4.4. It is proposed that private driveways and car parking areas could utilise porous paving and underground storage to reduce the size of the attenuation tanks. Due to low infiltration rates it is likely that the overflow from the attenuated surface water run-off will have to be connected into the adopted drainage system. Adequate pollution prevention measures will therefore need to be incorporated in to the final drainage design. The risks of using infiltration should be assessed and agreed with the EA.

5. CONCLUSIONS

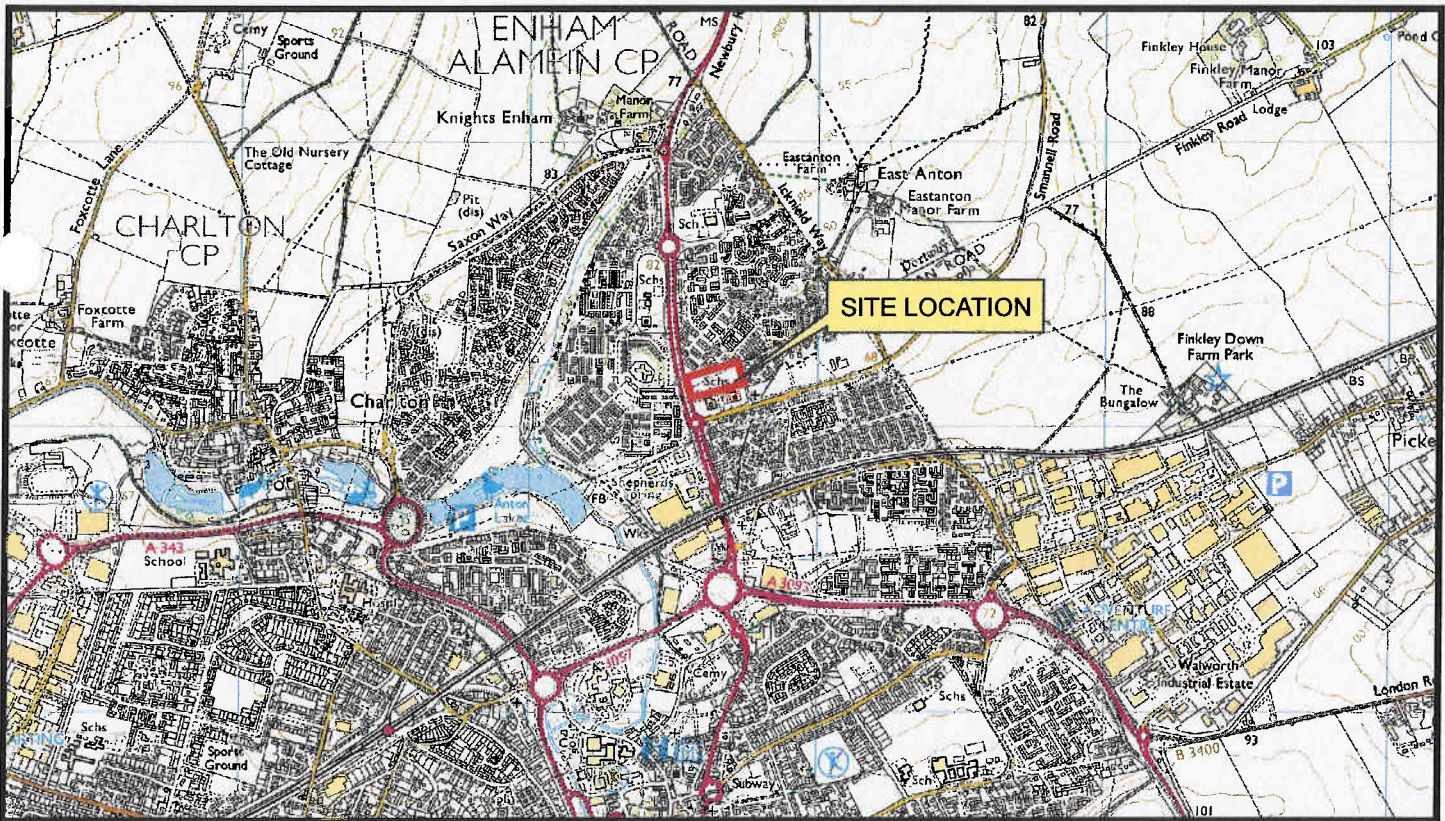
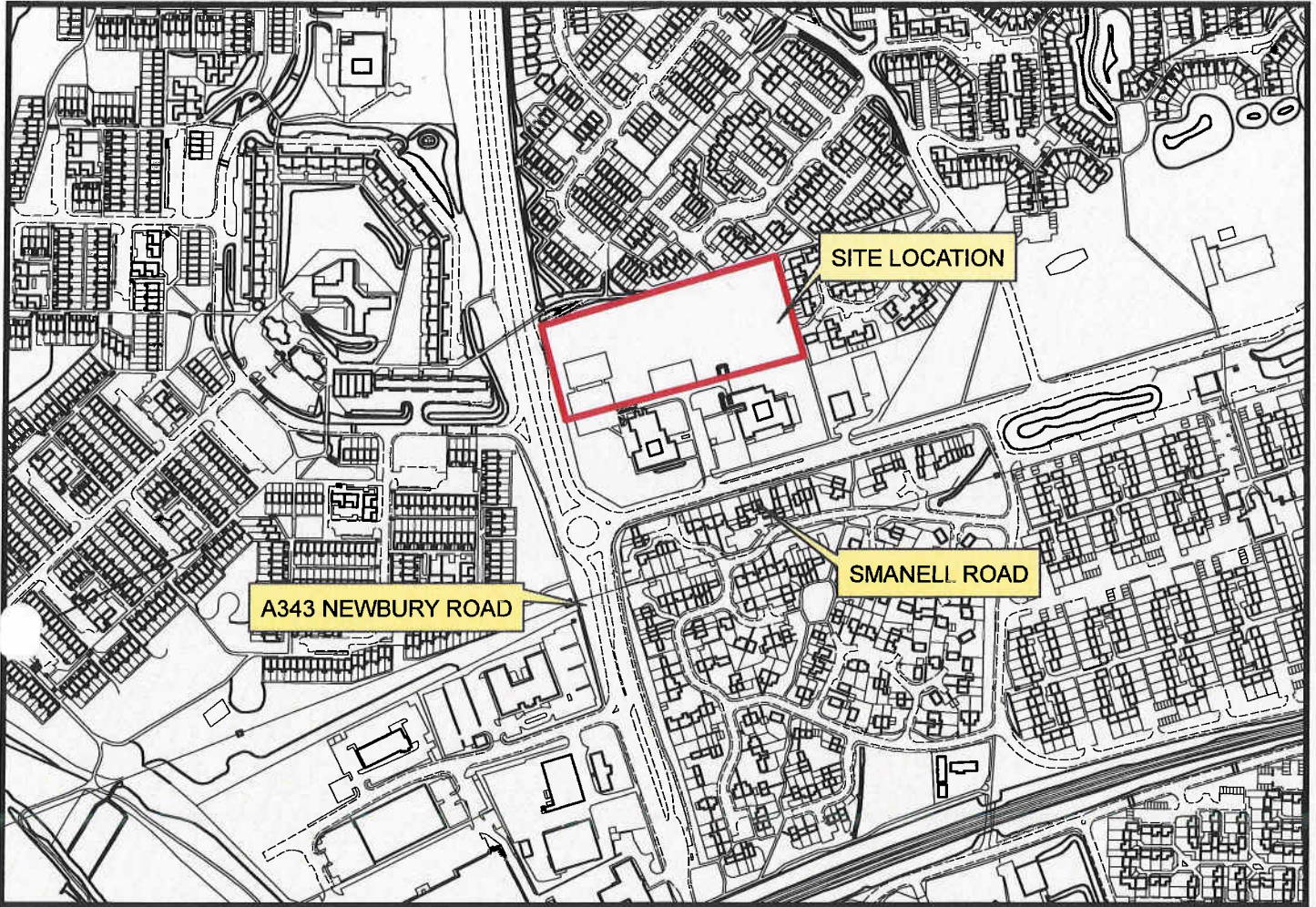
5.1. Surface Water

- 5.1.1. The offsite run off rate has been agreed with the EA as 5 l/s
- 5.1.2. Surface water flows are to be conveyed to on site attenuation tanks located within the public open space via an adoptable gravity drainage system.
- 5.1.3. Attenuation tanks have been sized to store up to and including the 1 in 100 year + 30% for climate change event . The storage volume can be reduced to the 1 in 30 year event if the development layout is revised to allow the storage or safe routing of flows in excess of the 1 in 30 year event.
- 5.1.4. A new adoptable sewer is to be laid in the school access road which is then to run eastwards along Smanell Road before discharging into Shepherds Spring Drain at a point just downstream of the existing culvert headwall.
- 5.1.5. A consent to discharge approval from the EA will be required.

5.2. Foul Water

- 5.2.1. An adoptable gravity drainage system is to be utilised to discharge the foul water flows into the public foul sewer.
- 5.2.2. The proposed development will produce an estimated 2.3 l/s additional foul water discharge.
- 5.2.3. The existing 150mm private foul sewer located in Smanell Road, which currently serves both the existing school buildings and the adjacent church, is to be abandoned. Foul flows from the existing school buildings and the church are to be re-directed into the new foul sewer and allowance must be made for this in the final design.
- 5.2.4. A new connection is to be made to the existing 300mm dia foul sewer located at the junction of Cricketer's Way and Smanell Road just downstream of manhole ref. 8101. Records indicate the invert level of this manhole to be 64.07m therefore a gravity connection should be achievable.

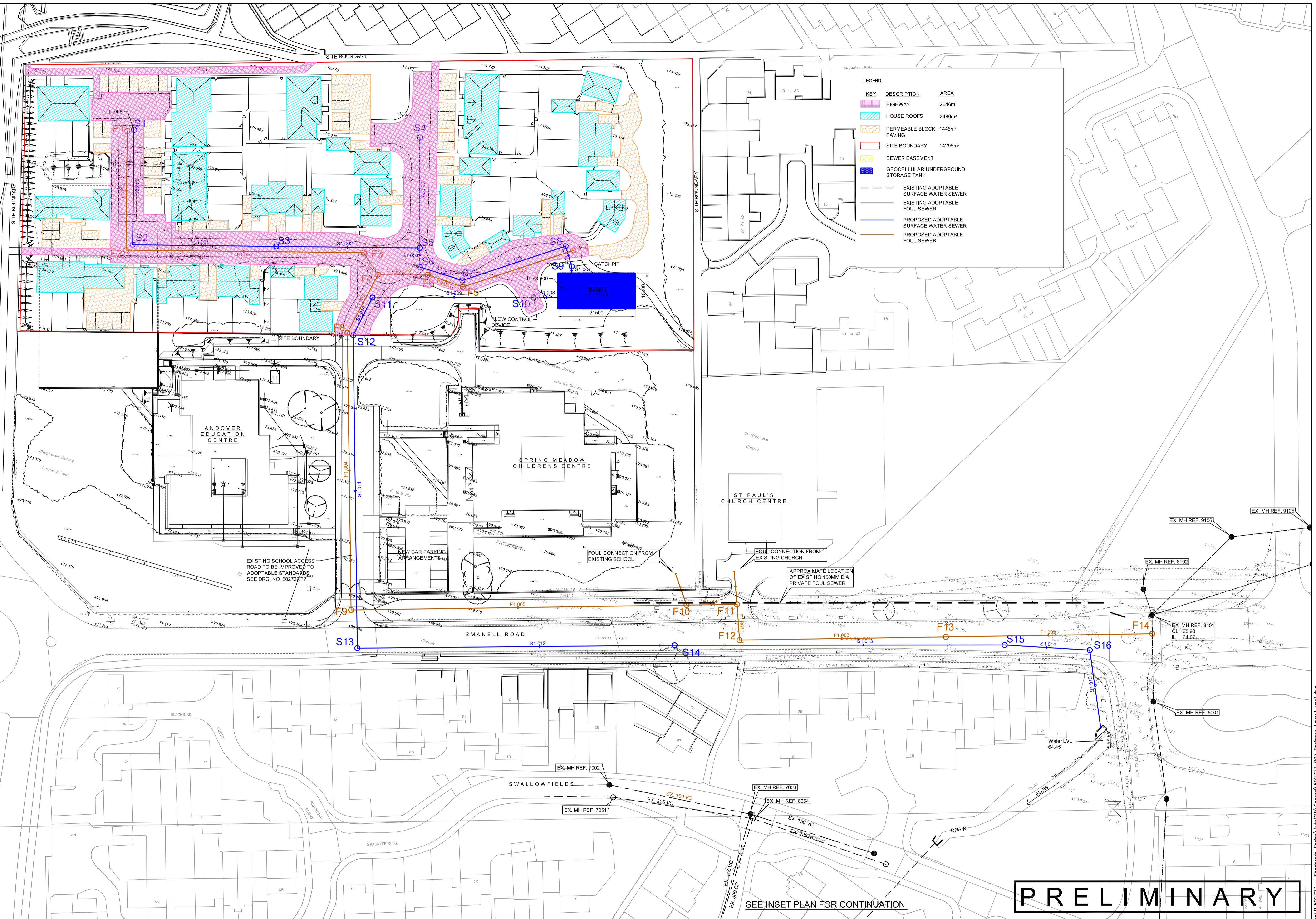
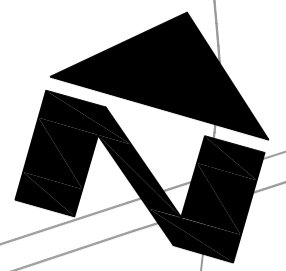
FIGURE 1 - LOCATION PLAN.



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FIGURE 2 - INDICATIVE DRAINAGE LAYOUT.



KEY	DESCRIPTION	AREA
[Pink hatched]	HIGHWAY	2646m ²
[Blue hatched]	HOUSE ROOFS	2480m ²
[Orange hatched]	PERMEABLE BLOCK PAVING	1445m ²
[Red outline]	SITE BOUNDARY	14298m ²
[Yellow hatched]	SEWER EASEMENT	
[Blue rectangle]	GEOCELLULAR UNDERGROUND STORAGE TANK	
[Dashed line]	EXISTING ADOPTABLE SURFACE WATER SEWER	
[Dotted line]	EXISTING ADOPTABLE FOUL SEWER	
[Solid blue line]	PROPOSED ADOPTABLE SURFACE WATER SEWER	
[Solid orange line]	PROPOSED ADOPTABLE FOUL SEWER	

PRELIMINARY

SEE INSET PLAN FOR CONTINUATION

CLIENT HAMPSHIRE COUNTY COUNCIL PROPERTY BUSINESS AND REGULATORY SERVICES ASSETS AND DEVELOPMENT				CONSULTANT STUART JARVIS BSc DipTP FCIBT MRTPI, DIRECTOR OF ENVIRONMENT, THE CASTLE, WINCHESTER.				DRAWN RD CAD RD CHECKED SF APPROVED DD		SCHEME FORMER SHEPHERDS SPRING INFANT SCHOOL DISPOSAL SITE		DRAWING TITLE INDICATIVE DRAINAGE LAYOUT	
JOB No. R.J 502727.01				HCC CADplot: 30.Nov.2011 at 10:42am		SCALE @ A1 1:500		DATE FEB 2011		SHEET No. 1 OF 1			
REV. AMENDMENT				DATE DRAWN CHKD APPD				REV SUFFIX		502727/007			

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APPENDIX A. – TRIAL PIT LOGS AND SI REPORT EXTRACTS

ASHDOWN SITE INVESTIGATION

L · I · M · I · T · E · D

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

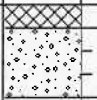





Trial Pit No.: TP1

Site Name: Shepherds Spring School and Andover Education Centre

Job No.: LW21195

Start Date: 07/07/2010

End Date: 07/07/2010

Samples and Testing				Strata		
Sample Type	Depths		Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
	From (m)	To (m)				
					0.00	Ground Level
					0.10	Topsoil.
J B P	0.05 0.15 0.15	0.60	60		0.40	Light orange grey sandy silty fine to coarse GRAVEL of flint. (Head)
J D	0.50					Orange brown slightly gravelly slightly silty sandy CLAY with iron staining. Gravel is fine to coarse flint. Sand is fine. (Head)
J D	1.00				1.50	
D	1.60					Structureless CHALK composed of clayey gravelly silt. Gravel is weak low to medium density off white. Matrix is light brown. With occasional cobbles of flint. (White Chalk Subgroup, Grade Dm)
D	2.20					becoming composed of silty gravel (Grade Dc) with depth.
D	3.10				3.20	
						End of Pit

Remarks:

Trial pit dry and stable on completion.

Excavation Method: JCB

Dimensions: 2.9m x 0.6m

Made By: SS

ASHDOWN SITE INVESTIGATION

L · I · M · I · T · E · D

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF


Trial Pit No.: TP2

Site Name: Shepherd Spring School and Andover Education Centre

Job No.: LW21195

Start Date: 07/07/2010

End Date: 07/07/2010

Samples and Testing				Strata		
Sample Type	Depths		Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
	From (m)	To (m)				
					0.00	Ground Level
					0.10	Topsoil.
J D B P	0.20 0.20	0.65	74		0.50	Brown slightly gravelly silty CLAY. Gravel is fine to coarse flint and occasional chalk. (Head) becoming gravelly with cobbles of flint below 0.2m depth.
J D	0.50					Orange brown gravelly CLAY. Gravel is fine to coarse of chalk and flint. With occasional cobbles of chalk. (Head)
D	1.00				1.30	stratum continuing to 2.3m depth at eastern end of pit.
D	1.50					Structureless CHALK composed of gravelly silt. Gravel is weak low to medium density off white. Matrix is off white/ cream. With occasional cobbles of flint. (White Chalk Subgroup, Grade Dm)
						becoming composed of silty gravel (Grade Dc) with depth.
						with occasional clasts of moderately weak high density chalk below 2.6m depth.
D	3.00					
D	3.20					with some orange yellow staining below 3.2m depth.
D	4.00				4.00	
						End of Pit

Remarks:

Trial pit dry and stable on completion.

Excavation Method: JCB

Dimensions: 3.0m x 0.65m

Made By: SS

ASHDOWN SITE INVESTIGATION
L · I · M · I · T · E · D

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

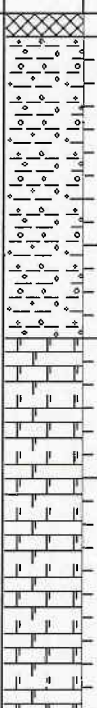
Trial Pit No.: TP3

Site Name: Shepherd Spring School and Andover Education Centre

Job No.: LW21195

Start Date: 07/07/2010

End Date: 07/07/2010

Samples and Testing				Strata		
Sample Type	Depths		Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
	From (m)	To (m)				
					0.00	Ground Level
J P B J D	0.05 0.15 0.20 0.30	0.60	47		0.10	Topsoil. Orange brown sandy very gravelly CLAY. Sand is fine. Gravel is fine to coarse flint. (Head)
D	1.00				1.40	
D	1.50					Structureless CHALK composed of gravelly silt. Gravel is weak low to medium density off white with orange staining. Matrix is light brown grey. With occasional cobbles of flint. (White Chalk Subgroup, Grade Dm) becoming composed of silty gravel (Grade Dc) with depth.
D	2.60					
D	2.90				3.00	
						End of Pit

Remarks:
Trial pit dry and stable on completion.

Excavation Method: JCB

Dimensions: 2.5m x 0.6m

Made By: SS

ASHDOWN SITE INVESTIGATION LIMITED

Site: Shepherds Spring School and Andover Education Centre

Report No.: LW21195

Sheet No.: 1 of 1

SUMMARY OF IN SITU FARNELL CONE PENETROMETER (CBR) TEST RESULTS

BH/ TP No.	Depth m	Moisture Content %	Classification	CBR Values			Cone Depth
				Test 1	Test 2	Test 3	
				%	%	%	
TP1	0.15			>10	>10	>10	Base of pit.
TP2	0.20			>10	>10	>10	Base of pit.
TP3	0.20			>10	>10	>10	Base of pit.

ASHDOWN SITE INVESTIGATION LIMITED

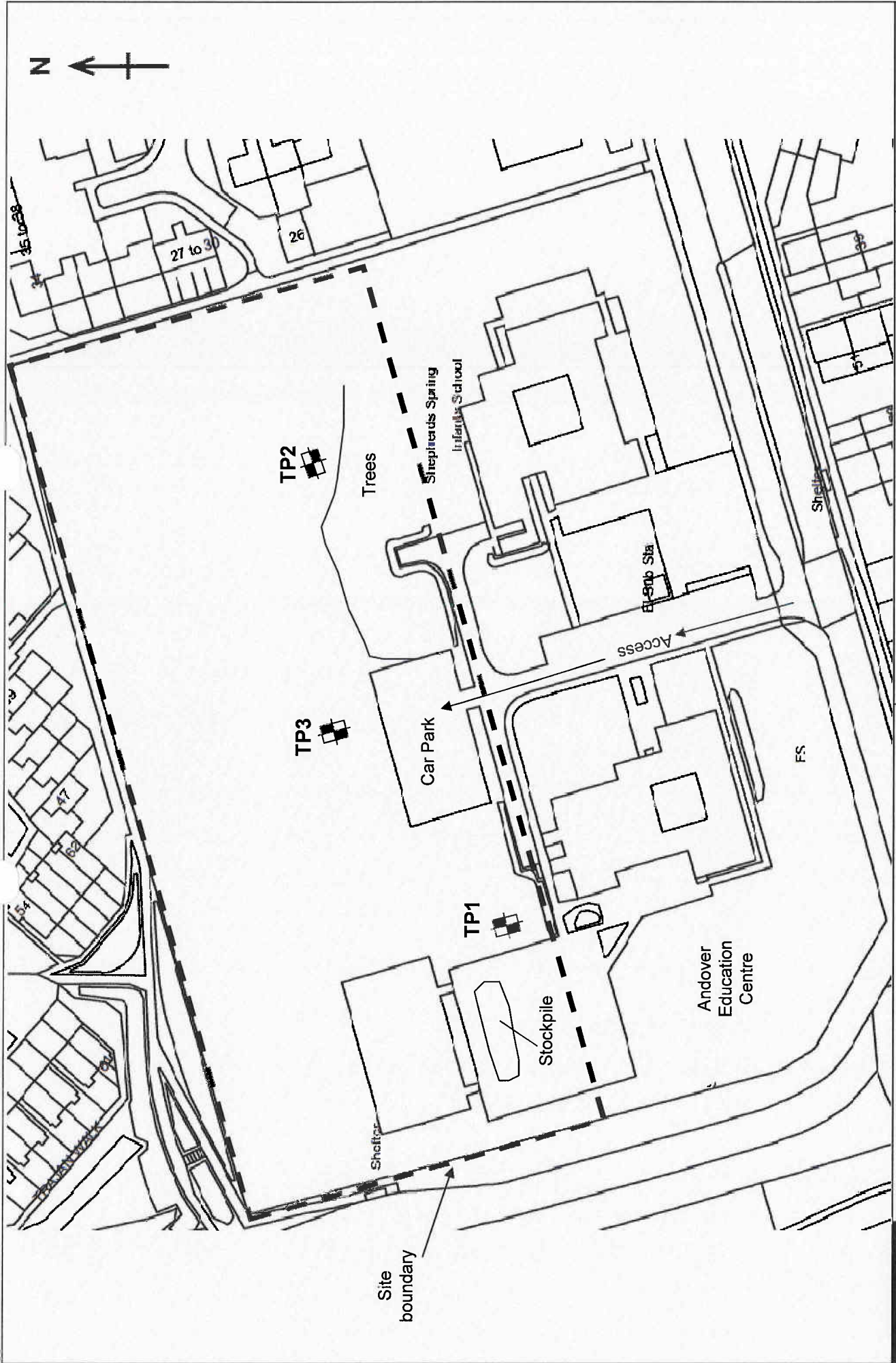
Site: Shepherds Spring School and Andover Education Centre	Report No.: LW21195
	Sheet No.: 1 of 1

SUMMARY OF TRIAL PIT FALLING HEAD SOAKAGE TEST RESULTS

Trial Pit TP1	
Time (mins)	Depth to water (m)
0	1.65
0.5	1.65
1	1.66
1.5	1.66
2	1.66
2.5	1.66
3	1.66
4	1.67
5	1.67
6	1.67
8	1.68
10	1.68
12	1.68
14	1.69
16	1.69
21	1.70
25	1.71
30	1.71
40	1.72
73	1.76
90	1.76
150	1.77
180	1.79
210	1.80
240	1.82
Pit Length - 2.90m Pit Width - 0.60m Pit Depth - 3.20m	

Trial Pit TP2	
Time (mins)	Depth to water (m)
0	2.00
1	2.01
2	2.01
3	2.02
4	2.03
5	2.04
6	2.05
7	2.05
8	2.06
9	2.06
10	2.08
15	2.09
20	2.11
25	2.13
30	2.14
40	2.17
50	2.18
60	2.20
90	2.26
120	2.27
150	2.35
180	2.40
Pit Length - 3.00m Pit Width - 0.65m Pit Depth - 4.00m	

Trial Pit TP3	
Time (mins)	Depth to water (m)
0	1.70
1	1.70
2	1.70
3	1.70
4	1.71
6	1.71
7	1.71
9	1.72
10	1.73
15	1.76
20	1.76
25	1.78
30	1.79
40	1.82
50	1.84
73	1.89
90	1.92
120	1.92
Pit Length - 2.50m Pit Width - 0.60m Pit Depth - 3.00m	



APPENDIX B.– SOUTHERN WATER CAPACITY CHECK

Dooley, Robin

From: Simmons, Bill [Bill.Simmons@atkinsglobal.com]
Sent: 16 June 2011 13:45
To: Dooley, Robin
Subject: RE: CC-000772 - Shepherd's Spring Infant School, Smannell Road, Andover, Hampshire, SP10 5PL

Robin,

I think now we have finally got this one sorted out.

As you will be aware this is the second capacity check that has been carried out for this site.

Originally a Level 1 check was carried out, in August/September 2010, which looked at the discharge of foul drainage at an additional 2.3 l/s via the existing connection from the south of the site into manhole 8102 in Smannell Road. The discharge of surface water at 92l/s was investigated, with the nearest available surface water sewers that could be accessed from Smannell Road.

The conclusion was that the foul network could accommodate the required additional discharge into manhole 8102. The nearest public surface water sewers, at 150 to 300mm diameter, had been designed for flows from the Swallowfields estate, but even without those flows they clearly did not have capacity for your proposed flow, which on its own would have required a minimum of a 300mm pipe at 1 in 140. Accordingly you were advised that alternative arrangements should be considered for disposal, such as discharge to a local watercourse. I note that there appears to be a suitable watercourse to the east of the site at the junction of Smannell Road with Cricketer's Way.

Subsequently, in February 2011, a Level 2 request was made, repeating the additional foul flow of 2.3l/s but requesting consideration of a reduced surface water flow of 72l/s. A drainage strategy report was enclosed but as checking of this is not part of the capacity check process, it was used only to check the flow rates, as confirmed on pages 1 and 2 of the report.

As capacity in the foul network in Smannell Road had already been confirmed in the previous Level 1 response, consideration was given to alternative outlets, since your strategy report indicated in Section 1 on page 1 that the parcel of surplus land to be developed was to the north of the site. A fresh network analysis concluded that there was capacity available in the foul network to the north of the site at manhole 6201 for the requested 2.3l/s. As stated above it was already evident that the neighbouring surface water sewers did not have capacity and as there was also a possible solution, in discharging to a local watercourse, which would in fact accord better with the requirements of Part H3 of the Building Regulations, it was felt that no further assistance could be provided and your application fee for the surface water element of the Level 2 application was refunded.

Following your comments on our Level 2 report, I asked our modelling team to review the analysis in view of the indication later in your strategy report that you wished to discharge foul and surface water to connection points in Swallowfields on the local estate sewers. I note also that the proposed foul discharge to that point was stated to be 14.57l/s, rather than the 2.3l/s that was stated on the application form.

The results of the further analyses were both negative. The proposed foul flow, at 14.57l/s was almost equivalent to the pipe full capacity of the 150mm estate sewers, even without the existing estate flows, and as there was already capacity in Smannell Road as identified previously it was clearly not viable to consider enlargement of substantial lengths of estate sewer. Likewise the proposed surface water discharge would have exceeded the capacity of the estate sewers, even without the existing flows and again it was not considered viable to suggest enlargement of substantial lengths of estate sewer when an alternative solution appears to be available.

Finally, I would also advise that your proposed connection route through "open space" between Smannell Road and Swallowfields is not in compliance with the requirements of "Sewers for Adoption" due to the restricted space between properties and would not have been acceptable.

Regards
Bill Simmons

17/06/2011

Development Coordinator

Water & Environment

Atkins Limited,
Anglo St James House, 39A Southgate Street,
Winchester, Hampshire SO23 9EH, England
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From: Dooley, Robin [mailto:Robin.Dooley@hants.gov.uk]

Sent: 25 May 2011 11:56

To: Simmons, Bill

Cc: Beardon, Sarah; Thomas, Lee

Subject: RE: CC-000772 - Shepherd's Spring Infant School, Smannell Road, Andover, Hampshire, SP10 5PL

Bill,

Thankyou for your update. I look forward to receiving your response.

Reagrds

Robin Dooley

From: Simmons, Bill [mailto:Bill.Simmons@atkinsglobal.com]

Sent: 25 May 2011 11:53

To: Dooley, Robin

Subject: RE: CC-000772 - Shepherd's Spring Infant School, Smannell Road, Andover, Hampshire, SP10 5PL

Robin,

I have had responses from the network modellers regarding your queries and I am attempting to review them and prepare a response for you. However, we currently have IT communication issues with the modelling team and as you say, we are all extremely busy and it is difficult to find time to fit this in. However I appreciate your urgency and will try to get this out to you this week. If you can bear with me for a few more days that will be very much appreciated.

Regards

Bill Simmons

Development Coordinator

Water & Environment

Atkins Limited,
Anglo St James House, 39A Southgate Street,
Winchester, Hampshire SO23 9EH, England
Tel: +44 (0)1962-858688
Fax: +44 (0)1962-810296

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From: Dooley, Robin [mailto:Robin.Dooley@hants.gov.uk]

Sent: 25 May 2011 11:03

To: Simmons, Bill

Cc: David.Nuttal@atkinsglobal.com; Beardon, Sarah; Thomas, Lee

Subject: FW: CC-000772 - Shepherd's Spring Infant School, Smannell Road, Andover, Hampshire, SP10 5PL

Bill,

17/06/2011

Further to my email of 23/05/11 and your email of 21/04/11 and numerous telephone calls. Please can you respond with an update on these matters as a matter of urgency. This has been ongoing for the past 2 months and I feel that such a timescale is more than enough time to respond to my initial complaints. I appreciate that you are probably very busy, aren't we all, but we still have projects that need to be concluded. At the moment I cannot move forward without more information on the available capacity in the local sewer networks adjacent to both of these sites.

Reagrds

Robin Dooley
Senior Engineer
Engineering Consultancy
Hampshire County Council
Capital House, 48-52 Andover Road
Winchester, SO23 7BH

Tel: 01962-847201

Email : Robin.Dooley@hants.gov.uk

From: Dooley, Robin
Sent: 23 May 2011 11:42
To: 'Simmons, Bill'
Cc: Beardon, Sarah; Thomas, Lee
Subject: RE: CC-000772 - Shepherd's Spring Infant School, Smannell Road, Andover, Hampshire, SP10 5PL

Bill,

Please can you give me an update as to where we are at with these applications. Have we made any progress at all? Both these projects are now seriously delayed and I am beeing chased constantly by my clients for a resolution to this matter. Please can you get back to me as soon as possible to at least keep me in the picture.

Thanks

Robin Dooley

From: Simmons, Bill [<mailto:Bill.Simmons@atkinglobal.com>]
Sent: 21 April 2011 17:07
To: Dooley, Robin
Cc: Ben, Jeanette
Subject: RE: CC-000772 - Shepherd's Spring Infant School, Smannell Road, Andover, Hampshire, SP10 5PL

Dear Mr Dooley,

Further to your email dated 11 April I have noted with concern your disappointment with the response to your capacity check enquiry and have taken this up with our modelling team to review their response and the way that it was presented to you.

Unfortunately I have not yet received a response covering all the issues mentioned in your email. I am also away on leave from the end of today and will not be back until 3 May. I will, however, follow this up

17/06/2011

immediately upon my return when I will contact you to move this forward in more detail.

I am also aware that you have expressed similar concerns regarding the response to your capacity check enquiry for Meadowlands Junior School (our ref CC-000763). Again, I have asked our modelling team to review this and will follow it up upon my return from leave.

Yours sincerely

Bill Simmons

Development Coordinator

Water & Environment

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From: West, Max

Sent: 12 April 2011 16:36

To: Simmons, Bill

Subject: FW: CC/000772 - Shepherd's Spring Infant School, Smanell Road, Andover, Hampshire, SP10 5PL

From: Dooley, Robin [mailto:Robin.Dooley@hants.gov.uk]

Sent: 11 April 2011 11:37

To: Winchester Enquiries

Cc: Beardon, Sarah

Subject: CC/000772 - Shepherd's Spring Infant School, Smanell Road, Andover, Hampshire, SP10 5PL

Dear Sirs,

With reference to your letter of 17th March 2011 I would like to respond as follows.

General

We chose to carry out a level 2 capacity check for the above site because the level 1 check carried out prior to this failed to provide a solution for the surface water. I included with my application form a detailed report and drawing identifying our preferred connection points into the surface water and foul networks.

Unfortunately yet again I feel that the report has failed to provide sufficient detail to allow us to conclude our work.

Foul

The connection point for the foul that has been identified is to the North of the development at manhole 6201. This is completely the opposite direction to that which is shown on the drawing and different again to that identified in the level 1 check. We wish to connect into the 150 dia foul sewer which is located within Swallowfields as shown very clearly on our drawing. We therefore need to know if there is capacity at this point and if so what capacity is available. There is no mention in your report of whether there is spare capacity or not at this location, in fact, there is no mention within its one page of this location at all. If there is insufficient capacity here then replacing the private foul sewer which runs eastwards along Smanell road would clearly be a better option which would allow us to collect the foul flows from the Church Centre, Children's Centre and Adult Education Centre. In order to assess this option we would require the capacity at manhole 8102 to be provided as an alternative.

Surface Water

Our drawing shows that the surface water is to be retained on site and discharged at an agreed rate into the 225 dia surface water sewer located in Swallowfields as clearly shown on our drawing. Again there is no mention of the capacity at this location. Unfortunately the application form only allows for flows from the entire impermeable area to be assessed. We would not expect there to be 70 l/s capacity anywhere without

substantial off site upgrades being carried out. It would not be unreasonable for us to expect that for the fees being charged that your report would consider this and provide us with a lower discharge rate that could be accommodated. We could then complete our design and allow sufficient space for on site attenuation. Without this level of detail in your reports it is impossible to design a system that will be acceptable for adoption.

Conclusion

We feel that the level 2 capacity check reports for this and other sites that we have received of late are not of a sufficient level of detail to allow us to finalise our designs. We also feel that they do not provide level of detail that we would reasonably expect to receive based on the description of the level 2 check contained within your guidance notes. Hampshire County Council are in the process of trying to dispose of many sites throughout the county and as such we try to provide potential purchasers of the sites with as much information as possible in order to limit the risk to the purchasers and hence maximise the capital receipt for the site. This obviously includes providing a workable solution for the disposal of surface water and foul water. We need to agree a way forward for this and subsequent reports to ensure that the information we receive from yourselves is comprehensive enough to allow us to complete our work. This would include at a minimum an agreed discharge rate. Without this we or anyone else would not be able to carry out a drainage design for any site. We cannot keep providing lower and lower discharge rates until we find one that is acceptable. This must come from Southern Water as a starting point for all designs.

We look forward to your response.

Regards

Robin Dooley

Senior Engineer

Engineering Consultancy

Hampshire County Council

Capital House, 48-52 Andover Road

Winchester, SO23 7BH

Tel: 01962-847201

Email : Robin.Dooley@hants.gov.uk

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APPENDIX C. – EA PREAPPLICATION RESPONSE

Test Valley Borough Council
Beech Hurst Weyhill Road
Andover
Hampshire
SP10 3AJ

Our ref: HA/2011/111519/01-L01
Your ref: 11/00769/PREAPN
Date: 18 April 2011

Dear Sir/Madam

PROPOSED DEVELOPMENT FOR 50 DWELLINGS

SHEPHERDS SPRING, SMANNELL ROAD

Thank you for consulting the Environment Agency on the above pre-application which we received on 31 March 2011. We would like to make the following comments.

Flood Risk

The proposed development site at Shepherds Spring, Smannell Lane, Andover, is located within flood zone 1 defined by Planning Policy Statement 25 (PPS25): Development and Flood Risk as having a low probability of flooding.

For development proposals on sites of one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be fully investigated within a Flood Risk Assessment (FRA) to be submitted with the planning application. The FRA will need to be produced in accordance with PPS25 Annex E: The Assessment of Flood Risk. Further information on the requirements of an FRA can be obtained from the following website:

<http://www.environment-agency.gov.uk/research/planning/82584.aspx>

The FRA will need to detail how surface water runoff generated by the developed site will be managed. Surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management (SUDS). SUDS are an approach to managing surface water run-off which seeks to mimic natural drainage systems and retain water on or near the site

Environment Agency
Colvedene Court (Wessex Business Park) Wessex Way, Colden Common, Winchester, SO21 1WP.
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk
Cont/d..

as opposed to traditional drainage approaches which involve piping water off site as quickly as possible. SUDS involve a range of techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands. SUDS offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and quantity of surface water run-off from a site, promoting groundwater recharge, and improving water quality and amenity.

The variety of SUDS techniques available means that virtually any development should be able to include a scheme based around these principles.

Further information on SUDS can be found in:

- PPS25 page 33 Annex F
- PPS25 Practice Guide
- CIRIA C522 document Sustainable Drainage Systems-design manual for England and Wales
- CIRIA C697 document SUDS manual
- the Interim Code of Practice for Sustainable Drainage Systems.

The Interim Code of Practice provides advice on design, adoption and maintenance issues and a full overview of other technical guidance on SUDS. The Interim Code of Practice is available on both the Environment Agency's website: www.environment-agency.gov.uk and CIRIA's website: www.ciria.org.uk

It is noted that infiltration tests have been carried out at the site and appear to show that soakaway methods for managing surface water are unlikely to be workable. If this is the case then the next option would be to attenuate flows to a watercourse or surface water sewer.

The information provided suggests that surface water will be attenuated to a surface water sewer system located in Smannell Road, which ultimately discharges to a culverted watercourse. If this approach is taken forward the Environment Agency would expect to see the following criteria adhered to:

· The drainage system should be designed so that surface water runoff rates from the developed site are no greater than the greenfield runoff rates from the site, for a range of storms including the 1 in 2, 1 in 30 and 1 in 100 30% events (or a single rate equivalent to the Qbar runoff rate).

· Long term storage must be provided to cater for the additional runoff volume generated by the development compared to the volume that would have been contributed from the site in its Greenfield state.

· There should be no surface flooding resulting from the surcharging of the drainage system for storm events with a return period of up to 1 in 30 years.

· For storm events exceeding this surface flooding may be acceptable for short periods providing water is routed away from buildings, access ways and does not increase risk off site.

· There should be no flooding of buildings as a result of storms up to the 1 in 100 30% (climate change allowance) event.

Given the current greenfield nature of the site the Environment Agency would expect

to see surface storage features such as swales, ponds or wetlands used at the site.

If a planning application is submitted for the site the Agency is likely to request a drainage condition ensuring that the above criteria are incorporated into the development.

Groundwater & Contaminated Land

The site lies within the groundwater Source Protection Zone 1 (SPZ1) for the Smannell Road abstraction and Andover Public Water Supply. All precautions must be taken to prevent pollutants from entering groundwater underlying the site as potable supplies are at risk. Risks to groundwater must be considered and mitigated against during any construction works at the site. Risks to groundwater must be taken into consideration also in the design of the of foul and surface water disposal systems.

The enquirer has provided a copy of the drainage strategy report (reference R.J502727) which proposes to discharge highways drainage and foul sewage to mains drainage. The enquirer should provide confirmation that they are able to connect to the mains sewers with any planning application made. It is noted that permeable block paving is proposed for the car parking areas. Further information on the design of this will be required (is it proposed that the surface water drainage from these areas will infiltrate to ground or will be connected to the mains surface water sewer). If the proposal is to use an infiltration system the enquirer will need to demonstrate that adequate pollution prevention measures can be incorporated in to the design to ensure that groundwater will be protected.

The applicant should be aware that in line with Planning Policy Statement 23 (PPS 23): Planning and Pollution Control, planning applications should be accompanied by a desk study outlining the historical use of the site and a preliminary risk assessment. PPS23 states that a thorough understanding of the nature and extent of the risks of pollution is demonstrated and that suitable measures to deal with it are proposed prior to the determination of the application.

We would like to refer the enquirer to our groundwater policies in our updated Groundwater Protection: Policy & Practice (GP3) document, available from our website. This sets out our position for a wide range of activities and developments, including discharge of liquid effluents, land contamination and drainage.

Foul Drainage

The applicant or agent should ensure that the development is designed so that any wastewater arising from this development is disposed of in line with current regulations and guidelines.

Relevant requirements and guidance are contained in the following:

- DETR circular 03/99 Planning requirement in respect of the use of Non-Mains Sewerage incorporating Septic tanks in New Development,
- Building Regulations
- The Water Resources Act 1991
- Environment Agency Pollution Prevention Guidelines No 4 Disposal of sewage where no mains drainage is available

The guidelines mentioned may be freely viewed and downloaded from the Environment Agency's website:

<http://publications.environment-agency.gov.uk/pdf/PMHO0706BJGL-E-E.pdf?lang=e>

There is a presumption to connect to the mains foul sewer where it is available. Such a connection will require the permission of the sewerage undertaker. Should connection to the mains sewer not be viable then a non-mains drainage sewerage option should be considered. Typical systems are package treatment plants discharging to soakaway or surface waters and septic tanks discharging to a soakaway. The selection of the system should be made to ensure the minimum risk to the environment. For existing systems the applicant or agent should ensure that the system is in a good state of repair, regularly desludged and of sufficient capacity to deal with any potential increase in flow and loading which may occur as a result of the proposal.

Any system relying on a discharge to controlled waters, including soakaways, may require the consent of the Environment Agency. Details on how to make an application for consent to discharge can be found at <http://www.environment-agency.gov.uk/business/topics/water/32038.aspx> or by contacting the Environment Agency National Customer Contact Centre on 08708 506 506. Determination of an application may take up to 4 months and consent may not be forthcoming. You are strongly advised to make the necessary application well in advance of any construction work.

The applicant should ensure that appropriate pollution prevention measures are taken to avoid any contamination of controlled waters. Controlled waters include lakes, rivers, coastal waters and groundwater.

There should be no discharge of silty or dirty water to any water course or surface water drain during the proposed works.

The risk of pollution at construction and demolition sites can be significantly reduced by providing secondary contaminant measures for storage tanks. Oil tanks must comply with the requirements of the Control of Pollution (England) (Oil Storage) Regulations 2001.

When you are carrying out construction and demolition activities you need to identify the potential sources of pollution from your site activities and measures that can be put in place to protect the environment.

Further detailed advice can be found at the Environment Agency's pollution prevention website:

<http://www.environment-agency.gov.uk/business/topics/pollution/32252.aspx>

or by calling our National Customer Contact Centre (NCCC) on 08708 506 506.

If you have any queries regarding the information set out above please contact me on the number below.

Yours faithfully

Cont/d..

**Miss Suzanne Greenwood
Planning Liaison Officer**

Direct dial 01962 764851

Direct fax 01962 841573

Direct e-mail suzanne.greenwood@environment-agency.gov.uk

End

5

APPENDIX D. – CALCULATION OF GREENFIELD RUN-OFF RATES

Ashburton Court West
The Castle
Winchester SO23 8UD

Shepherd Spring School
Smanell Road
Andover

Date 22nd August 2011
File

Designed by R.Dooley
Checked by



Micro Drainage

Source Control W.12.6

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.150
Area (ha)	1.430	Urban	0.150
SAAR (mm)	800	Region Number	Region 7

Results 1/s

QBAR Rural 0.7
QBAR Urban 1.0

Q2 years 0.9

Q1 year 0.8
Q30 years 2.1
Q100 years 2.8

Ashburton Court West
The Castle
Winchester SO23 8UD

Date 22/08/2011 10:34

File

Designed by Hantsnet

Checked by



Micro Drainage

Source Control W.12.6

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.340
Areal Reduction Factor	1.00
Area (ha)	1.430
SAAR (mm)	805
CWI	117.582
Urban	0.150
SPR	10.000

Results

Percentage Runoff (%)	15.20
Greenfield Runoff Volume (m ³)	144.762

APPENDIX E. – CONSULTATION WITH EA REGARDING AGREED RUN-OFF RATES

Dooley, Robin

From: Sheehan, Rob [rob.sheehan@environment-agency.gov.uk]
Sent: 23 August 2011 10:41
To: Dooley, Robin
Subject: RE: Shepherd's Spring School

Hi Robin,

A rate of 5 l/s seems sensible providing that the storage requirement of can be met for the scenario, as it would also reduce the risk of blockage and any flooding as a result of such blockage.

I can then confirm that the 5 l/s rate would be acceptable for this site as part of a drainage strategy and this series of e-mails should be included as an appendix in any such document.

The drainage strategy will also however need to include details and location of any storage and a plan for future maintenance of the drainage scheme.

Cheers,

Rob Sheehan

Development and Flood Risk Officer

Solent and South Downs Area
Environment Agency

 **Colvedene Court**

Wessex Business Park
Wessex Way
Colden Common
Winchester
Hampshire
SO21 1WP

 **01962 76 4964** rob.sheehan@environment-agency.gov.uk

From: Dooley, Robin [mailto:Robin.Dooley@hants.gov.uk]
Sent: 22 August 2011 16:23
To: Sheehan, Rob
Cc: Beardon, Sarah; Trotter, Andy
Subject: Shepherd's Spring School

Click [here](#) to report this email as spam.

Rob,

Further to our brief conversation of last week regarding the above site. It would appear that there is little scope for amending the values for the SOIL parameter as used in the IH124 method of calculating greenfield run off rates. Accordingly, I have recalculated the greenfield runoff rates using slightly more accurate data. As can be seen form the attached calculated rates the greenfield run off rates are very small. Literature and

design guidance on the subject states that due to limitations for using this method to calculate greenfield run off rates for small catchments that the results should however be viewed as a guide.

I have therefore attached two sets of Microdrainage calculations. Firstly, for the 1 in 100 year + 30% attenuation using the calculated Q100 figure of 2.8 l/s giving an attenuation volume of 464.4 m³. As we have limited options for above ground or long term storage features. I have also utilised the limited infiltration of 3.4x10⁻⁶ m/s. Unfortunately the calculated hydro brake orifice size is only 54mm dia. This is below the minimum size of 75mm dia recommended Hydro International. It is widely accepted that orifice sizes below this are prone to blockage and become a maintenance issue not to mention a flood risk in their own right.

To counter this I have run another scenario whereby I have increased the discharge rate until the orifice size is greater than 75mm. This has increased the discharge rate to 5 l/s. As can be seen from the calculations there is also a slight reduction in attenuation as a result.

I propose therefore to attenuate surface water up to and including the 1 in 100 year storm event with an allowance of 30% for climate change. Off site discharge will be limited to 5 l/s to mitigate against the potential for blockages of the smaller orifice size. Infiltration would be allowed to take place from the attenuation tanks at a maximum rate of 0.8 l/s. The half drain time for the tank is also within the 24 hour period as recommended by current building regulations. Generally, each house will be provided with water butts and all communal car parking areas and private driveways will be constructed from permeable paving.

Can you confirm if the EA would find the above drainage strategy acceptable if it was submitted as part of a planning application.

Regards

Robin Dooley

Senior Engineer

Engineering Consultancy

Hampshire County Council

Capital House, 48-52 Andover Road

Winchester, SO23 7BH

Tel: 01962-847201

Email : Robin.Dooley@hants.gov.uk

<<Greenfield run off rates.pdf>> <<SS_2.8ls_100yr+30.pdf>> <<SS_5ls_100yr+30.pdf>>

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APPENDIX F. – MICRODRAINAGE CALCULATIONS FOR SURFACE WATER ATTENUATION

Ashburton Court West
The Castle
Winchester SO23 8UD

Land at
Shepherds Spring School
30 Year Attenuation



Date 12/09/11
File SS_5ls_30yr.srcx

Designed by R. Dooley
Checked by

Micro Drainage


Source Control W.12.6

Summary of Results for 30 year Return Period

Half Drain Time : 511 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	69.325	0.425	0.5	2.3	2.7	86.7	0 K
30 min Summer	69.461	0.561	0.5	2.6	3.1	114.5	0 K
60 min Summer	69.600	0.700	0.5	2.9	3.4	143.0	0 K
120 min Summer	69.730	0.830	0.5	3.2	3.7	169.5	0 K
180 min Summer	69.791	0.891	0.6	3.3	3.8	181.9	0 K
240 min Summer	69.822	0.922	0.6	3.3	3.9	188.2	0 K
360 min Summer	69.846	0.946	0.6	3.4	3.9	193.3	0 K
480 min Summer	69.852	0.952	0.6	3.4	4.0	194.4	0 K
600 min Summer	69.852	0.952	0.6	3.4	4.0	194.4	0 K
720 min Summer	69.847	0.947	0.6	3.4	4.0	193.5	0 K
960 min Summer	69.832	0.932	0.6	3.4	3.9	190.3	0 K
1440 min Summer	69.787	0.887	0.6	3.3	3.8	181.2	0 K
2160 min Summer	69.716	0.816	0.5	3.1	3.7	166.6	0 K
2880 min Summer	69.648	0.748	0.5	3.0	3.5	152.8	0 K
4320 min Summer	69.529	0.629	0.5	2.8	3.3	128.5	0 K
5760 min Summer	69.430	0.530	0.5	2.5	3.0	108.2	0 K
7200 min Summer	69.347	0.447	0.5	2.3	2.8	91.3	0 K
8640 min Summer	69.276	0.376	0.4	2.2	2.6	76.7	0 K
10080 min Summer	69.212	0.312	0.4	2.0	2.5	63.8	0 K
15 min Winter	69.377	0.477	0.5	2.4	2.9	97.4	0 K
30 min Winter	69.530	0.630	0.5	2.8	3.3	128.7	0 K
60 min Winter	69.688	0.788	0.5	3.1	3.6	161.0	0 K
120 min Winter	69.838	0.938	0.6	3.4	3.9	191.7	0 K
180 min Winter	69.911	1.011	0.6	3.5	4.1	206.6	0 K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	72.400	26
30 min Summer	48.266	40
60 min Summer	30.811	70
120 min Summer	19.073	126
180 min Summer	14.232	184
240 min Summer	11.510	244
360 min Summer	8.534	354
480 min Summer	6.892	408
600 min Summer	5.836	470
720 min Summer	5.092	534
960 min Summer	4.104	670
1440 min Summer	3.023	946
2160 min Summer	2.224	1364
2880 min Summer	1.787	1764
4320 min Summer	1.311	2552
5760 min Summer	1.052	3304
7200 min Summer	0.887	4048
8640 min Summer	0.772	4840
10080 min Summer	0.686	5552
15 min Winter	72.400	26
30 min Winter	48.266	40
60 min Winter	30.811	68
120 min Winter	19.073	124
180 min Winter	14.232	182

Hampshire County Council		Page 2
Ashburton Court West The Castle Winchester SO23 8UD	Land at Shepherds Spring School 30 Year Attenuation	
Date 12/09/11 File SS_5ls_30yr.srcx	Designed by R. Dooley Checked by	
Micro Drainage	Source Control W.12.6	

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Outflow (1/s)	Max Volume (m ³)	Status
240 min Winter	69.951	1.051	0.6	3.6	4.2	214.6	0 K
360 min Winter	69.988	1.088	0.6	3.6	4.2	222.3	0 K
480 min Winter	69.995	1.095	0.6	3.6	4.2	223.6	0 K
600 min Winter	69.990	1.090	0.6	3.6	4.2	222.7	0 K
720 min Winter	69.985	1.085	0.6	3.6	4.2	221.6	0 K
960 min Winter	69.962	1.062	0.6	3.6	4.2	217.0	0 K
1440 min Winter	69.895	0.995	0.6	3.5	4.0	203.2	0 K
2160 min Winter	69.785	0.885	0.6	3.3	3.8	180.8	0 K
2880 min Winter	69.684	0.784	0.5	3.1	3.6	160.1	0 K
4320 min Winter	69.514	0.614	0.5	2.7	3.2	125.4	0 K
5760 min Winter	69.379	0.479	0.5	2.4	2.9	97.9	0 K
7200 min Winter	69.268	0.368	0.4	2.2	2.6	75.1	0 K
8640 min Winter	69.164	0.264	0.4	2.0	2.4	53.8	0 K
10080 min Winter	69.069	0.169	0.4	2.0	2.4	34.5	0 K
	Storm Event		Rain (mm/hr)	Time-Peak (mins)			
	240 min Winter		11.510	238			
	360 min Winter		8.534	350			
	480 min Winter		6.892	452			
	600 min Winter		5.836	490			
	720 min Winter		5.092	564			
	960 min Winter		4.104	720			
	1440 min Winter		3.023	1024			
	2160 min Winter		2.224	1460			
	2880 min Winter		1.787	1880			
	4320 min Winter		1.311	2688			
	5760 min Winter		1.052	3472			
	7200 min Winter		0.887	4256			
	8640 min Winter		0.772	5016			
	10080 min Winter		0.686	5552			

Ashburton Court West
The Castle
Winchester SO23 8UD

Land at
Shepherds Spring School
30 Year Attenuation



Date 12/09/11
File SS_5ls_30yr.srcx

Designed by R. Dooley
Checked by

Micro Drainage

Source Control W.12.6

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.346	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time / Area Diagram

Total Area (ha) 0.660

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.220	4-8	0.220	8-12	0.220

Ashburton Court West
The Castle
Winchester SO23 8UD

Land at
Shepherds Spring School
30 Year Attenuation



Date 12/09/11
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Source Control W.12.6

Model Details

Storage is Online Cover Level (m) 71.500

Cellular Storage Structure


Invert Level (m) 68.900
Infiltration Coefficient Base (m/hr) 0.00612
Infiltration Coefficient Side (m/hr) 0.01224
Safety Factor 1.0
Porosity 0.95

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	215.0	215.0	2.100	0.0	341.0
2.000	215.0	341.0			

Hydro-Brake® Outflow Control

Design Head (m) 2.000 Diameter (mm) 76
Design Flow (l/s) 5.0 Invert Level (m) 68.900
Hydro-Brake® Type Md5 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	3.8	3.000	6.0	7.000	9.2
0.200	2.0	1.400	4.1	3.500	6.5	7.500	9.5
0.300	2.0	1.600	4.4	4.000	7.0	8.000	9.8
0.400	2.2	1.800	4.7	4.500	7.4	8.500	10.1
0.500	2.5	2.000	4.9	5.000	7.8	9.000	10.4
0.600	2.7	2.200	5.2	5.500	8.2	9.500	10.7
0.800	3.1	2.400	5.4	6.000	8.5		
1.000	3.5	2.600	5.6	6.500	8.9		

Hampshire County Council		Page 1
Ashburton Court West The Castle Winchester SO23 8UD	Land at Shepherd's Spring School 100 Year Attenuation	
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Micro Drainage	Source Control W.12.6	

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 705 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	69.621	0.721	0.5	3.0	3.5	147.3	0 K
30 min Summer	69.864	0.964	0.6	3.4	4.0	196.8	0 K
60 min Summer	70.116	1.216	0.6	3.8	4.5	248.4	0 K
120 min Summer	70.356	1.456	0.7	4.2	4.9	297.4	0 K
180 min Summer	70.472	1.572	0.7	4.4	5.1	321.0	0 K
240 min Summer	70.535	1.635	0.7	4.4	5.2	333.9	0 K
360 min Summer	70.602	1.702	0.7	4.5	5.3	347.5	0 K
480 min Summer	70.620	1.720	0.7	4.6	5.3	351.2	0 K
600 min Summer	70.622	1.722	0.7	4.6	5.3	351.6	0 K
720 min Summer	70.619	1.719	0.7	4.6	5.3	351.0	0 K
960 min Summer	70.601	1.701	0.7	4.5	5.3	347.4	0 K
1440 min Summer	70.541	1.641	0.7	4.5	5.2	335.2	0 K
2160 min Summer	70.431	1.531	0.7	4.3	5.0	312.7	0 K
2880 min Summer	70.326	1.426	0.7	4.2	4.8	291.3	0 K
4320 min Summer	70.142	1.242	0.6	3.9	4.5	253.8	0 K
5760 min Summer	69.987	1.087	0.6	3.6	4.2	222.1	0 K
7200 min Summer	69.859	0.959	0.6	3.4	4.0	195.9	0 K
8640 min Summer	69.751	0.851	0.5	3.2	3.8	173.7	0 K
10080 min Summer	69.658	0.758	0.5	3.0	3.6	154.9	0 K
15 min Winter	69.709	0.809	0.5	3.1	3.7	165.3	0 K
30 min Winter	69.982	1.082	0.6	3.6	4.2	221.0	0 K
60 min Winter	70.267	1.367	0.7	4.1	4.7	279.3	0 K
120 min Winter	70.542	1.642	0.7	4.5	5.2	335.5	0 K
180 min Winter	70.678	1.778	0.7	4.6	5.4	363.2	0 K
	Storm Event		Rain (mm/hr)	Time-Peak (mins)			
	15 min Summer		121.942	26			
	30 min Summer		82.070	41			
	60 min Summer		52.662	70			
	120 min Summer		32.564	128			
	180 min Summer		24.184	186			
	240 min Summer		19.454	244			
	360 min Summer		14.332	362			
	480 min Summer		11.519	472			
	600 min Summer		9.714	522			
	720 min Summer		8.447	582			
	960 min Summer		6.768	710			
	1440 min Summer		4.944	984			
	2160 min Summer		3.603	1392			
	2880 min Summer		2.874	1816			
	4320 min Summer		2.087	2600			
	5760 min Summer		1.661	3400			
	7200 min Summer		1.393	4176			
	8640 min Summer		1.206	4920			
	10080 min Summer		1.068	5648			
	15 min Winter		121.942	26			
	30 min Winter		82.070	40			
	60 min Winter		52.662	68			
	120 min Winter		32.564	126			
	180 min Winter		24.184	184			

Ashburton Court West
The Castle
Winchester SO23 8UD

Land at
Shepherd's Spring School
100 Year Attenuation



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Micro Drainage

Source Control W.12.6

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Outflow (1/s)	Max Volume (m³)	Status
240 min Winter	70.755	1.855	0.8	4.7	5.5	378.8	0 K
360 min Winter	70.842	1.942	0.8	4.8	5.6	396.6	0 K
480 min Winter	70.875	1.975	0.8	4.9	5.7	403.4	0 K
600 min Winter	70.879	1.979	0.8	4.9	5.7	404.3	0 K
720 min Winter	70.868	1.968	0.8	4.9	5.7	401.9	0 K
960 min Winter	70.845	1.945	0.8	4.8	5.6	397.3	0 K
1440 min Winter	70.763	1.863	0.8	4.7	5.5	380.5	0 K
2160 min Winter	70.604	1.704	0.7	4.5	5.3	348.0	0 K
2880 min Winter	70.448	1.548	0.7	4.3	5.0	316.3	0 K
4320 min Winter	70.182	1.282	0.6	3.9	4.6	261.9	0 K
5760 min Winter	69.968	1.068	0.6	3.6	4.2	218.2	0 K
7200 min Winter	69.798	0.898	0.6	3.3	3.9	183.4	0 K
8640 min Winter	69.660	0.760	0.5	3.0	3.6	155.3	0 K
10080 min Winter	69.547	0.647	0.5	2.8	3.3	132.0	0 K
		Storm Event	Rain (mm/hr)	Time-Peak (mins)			
		240 min Winter	19.454	240			
		360 min Winter	14.332	354			
		480 min Winter	11.519	464			
		600 min Winter	9.714	570			
		720 min Winter	8.447	660			
		960 min Winter	6.768	748			
		1440 min Winter	4.944	1058			
		2160 min Winter	3.603	1512			
		2880 min Winter	2.874	1940			
		4320 min Winter	2.087	2772			
		5760 min Winter	1.661	3576			
		7200 min Winter	1.393	4328			
		8640 min Winter	1.206	5104			
		10080 min Winter	1.068	5856			

Ashburton Court West
The Castle
Winchester SO23 8UD

Land at
Shepherd's Spring School
100 Year Attenuation



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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.346	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.660

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.220	4-8	0.220	8-12	0.220

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Model Details

Storage is Online Cover Level (m) 71.500

Cellular Storage Structure

Invert Level (m) 68.900
Infiltration Coefficient Base (m/hr) 0.00612
Infiltration Coefficient Side (m/hr) 0.01224
Safety Factor 1.0
Porosity 0.95

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	215.0	215.0	2.100	0.0	341.0
2.000	215.0	341.0			

Hydro-Brake® Outflow Control

Design Head (m) 2.000 Diameter (mm) 76
Design Flow (l/s) 5.0 Invert Level (m) 68.900
Hydro-Brake® Type Md5 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	3.8	3.000	6.0	7.000	9.2
0.200	2.0	1.400	4.1	3.500	6.5	7.500	9.5
0.300	2.0	1.600	4.4	4.000	7.0	8.000	9.8
0.400	2.2	1.800	4.7	4.500	7.4	8.500	10.1
0.500	2.5	2.000	4.9	5.000	7.8	9.000	10.4
0.600	2.7	2.200	5.2	5.500	8.2	9.500	10.7
0.800	3.1	2.400	5.4	6.000	8.5		
1.000	3.5	2.600	5.6	6.500	8.9		