Hampshire County Council

LAND AT SHEPHERDS SPRING SCHOOL, SMANELL ROAD, ANDOVER

FLOOD RISK ASSESSMENT

Prepared by:	Robin Dooley	Signed: R.J.Dooley	Date: 30/11/11
Checked by:	Simon Fryer	Signed:	Date: 30/11/11
Approved by:	David Devenish	Signed:	Date: .....

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engineering CONSULTANCY

Stuart Jarvis, BSc DipTP FCIHT MRTPI, Director of Economy, Environment and Transport, The Castle, Winchester

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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 Flood Risk Assessment (FRA) 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 4 of this report.

1.1.3. This FRA has been prepared to support the outline planning application for the redevelopment of the site for residential uses.

1.2. Scope and Objectives

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. Site Location

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.

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 to the west by the A343 Newbury Road.

2.1.3. Re-development of Shepherd's Spring Infant and Junior schools (now the Children's and Andover Education Centres respectively) has led to the land, which was formerly used for playing fields, becoming surplus to requirements.

2.1.4. The existing impermeable area of the site is 0.18ha comprising mainly 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. Geological Setting

2.2.1. As confirmed by the Ground Investigation Report and reference to the 1:50,000 scale British Geological Survey (BGS) map for Andover, sheet 283. The site is underlain by The White Chalk Subgroup (Lewes Nodular Chalk Formation, Sleaford Chalk Formation and Newhaven Chalk Formation – undifferentiated).

2.3. Hydrogeological Setting

Groundwater Vulnerability & Aquifer Classification

2.3.1. On the 1st April 2010 the Environment Agency implemented new aquifer designations that are consistent with the Water Framework Directive. The new designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

2.3.2. The aquifer designation data is based on geological mapping provided by the British Geological Survey. Reference has been made to Aquifer Designation Maps available on the Environment Agency website (http://www.environmentagency. gov.uk).

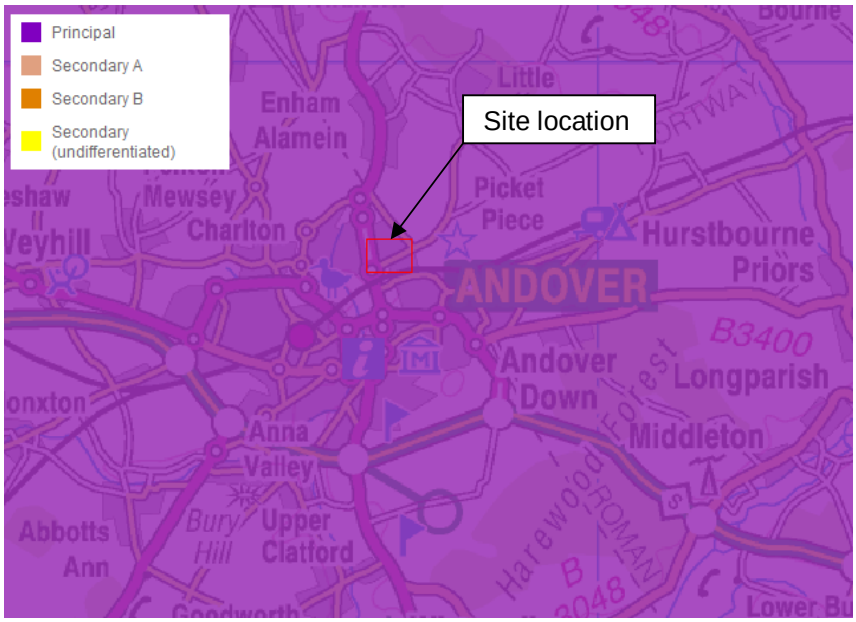


Figure 1: Bedrock Aquifer Map for Site

Source and Copyright: Environment Agency

2.3.3. The White Chalk Subgroup beneath the Site is classified as a Principal Aquifer. Refer to figure 1 above.

2.3.4. "Principal Aquifers comprise deposits that have high intergranular and/or fracture permeability, usually providing a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifers."

2.3.5. Areas designated as principal aquifers could contain water Abstraction points for public water supplies.

Source Protection Zones (SPZs)

2.3.6. The Site lies within an Environment Agency Source Protection Zone I (Inner Source Protection Zone) with regard to the protection of the quality of groundwater that is abstracted for potable supply. See figure 2.

2.3.7. All precautions must be taken to prevent pollutants and contaminants from entering the groundwater underlying the site to protect potable water supplies.

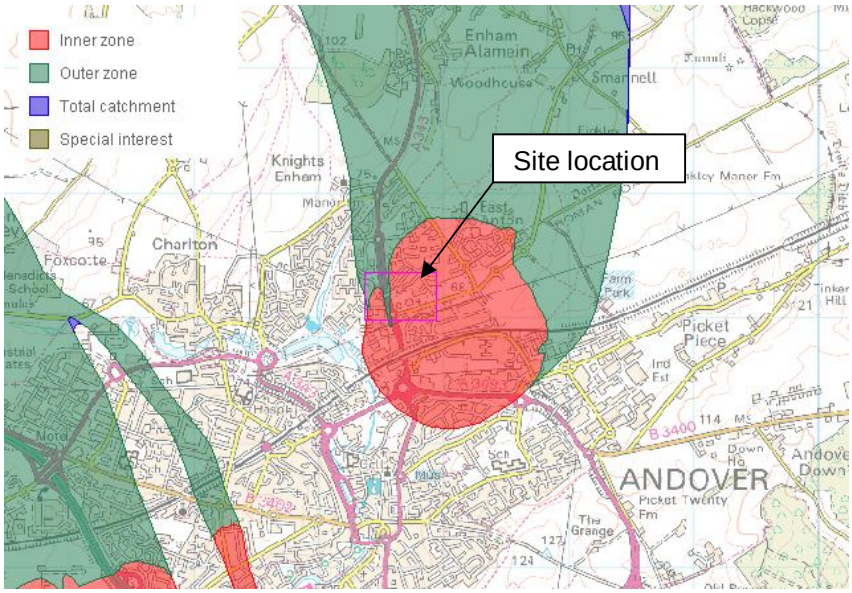


Figure 2: EA Groundwater Source Protection Zones

Source and Copyright: Environment Agency

2.4. Hydrological Setting

2.4.1. The data indicates that there are no surface water features, main rivers, or Environment Agency information on river quality within 250m of the Site.

2.4.2. The Site lies 170m from an Environment Agency Zone 2 floodplain.

2.5. Existing Drainage Regime on Site

2.5.1. Surface Water run off from existing impermeable areas 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.

2.5.2. 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.

2.6. Existing Drainage Regime off Site

2.6.1. Public sewer records received from Southern Water indicate that there are foul sewers to the north and east of the proposed site Connection to these would prove impractical however as the invert level is too high to receive run-off from the site.

2.6.2. 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.

2.7. Existing Surface Water Runoff

2.7.1. The existing peak surface water run-off rates will be calculated as a Greenfield run-off rate.

2.7.2. Greenfield run off rates for the site were calculated using Microdrainage Windes software using the ICP[1] 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 C and are summarised in Table 1 below.

	1 in 1 year	1 in 2 year	1 in 30 year	1 in 100 year
Existing Greenfield Surface Water Runoff (l/s)	0.8	0.9	2.1	2.8

Table: 1 – Summary of Greenfield Runoff Rates

2.8. Existing Flood Risk

Tidal and Fluvial

2.8.1. There are a number of key potential sources of flooding that can put sites at risk. These include fluvial (rivers), tidal (the sea), groundwater, sewer, surface water and infrastructure failure(including reservoirs, canals, industrial processes, burst water mains and blocked sewers or failed pumping stations). Each of these will now be considered in turn and the risks posed to the site considered.

2.8.2. The EA indicative floodplain maps indentify areas in England and Wales at risk of flooding by allocating them into flood risk zones.

2.8.3. The flood risk zones shown on the floodplain maps are defined in Table D1 of PPS25:

- Zone 1: Low Probability

2.8.4. Land in this zone is considered to have less than 1 in 1000 annual probability of river or sea flooding in any year.

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

- Zone 2: Medium Probability

2.8.5. Land in this zone is considered as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year

- .Zone 3a: High Probability

2.8.6. Land in this zone is considered to have a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

- Zone 3b: The Functional Floodplain

2.8.7. Land in this zone is where water has to flow or be stored in times of flood. Local planning authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

2.8.8. The indicative flood maps show that the site is located in zone 1 defined as being at low risk from flooding, refer to figure 3 below.

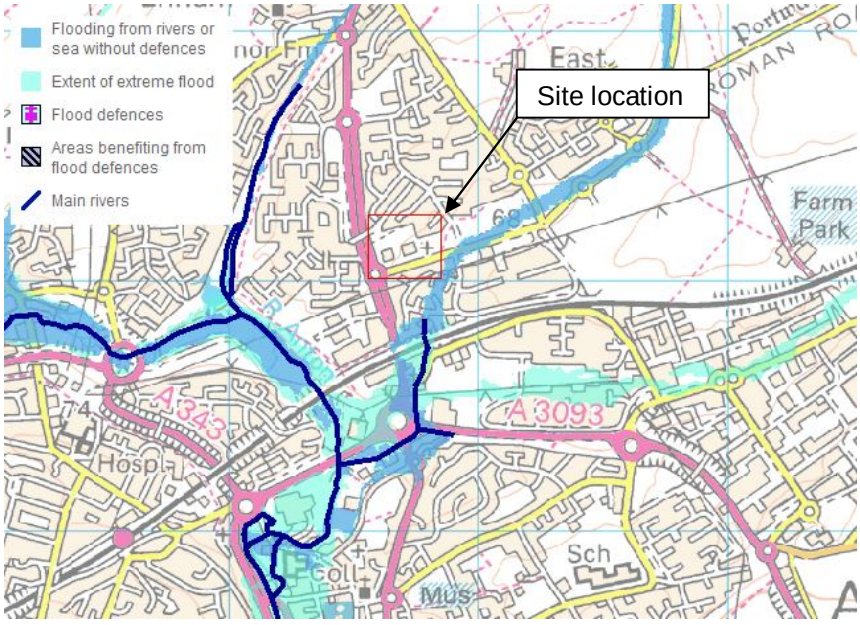


Figure 3: EA Indicative Flood Zone Map

Source and Copyright: Environment Agency

Groundwater

2.8.9. As noted in section 2 the site is underlain by a principal aquifer.

2.8.10. There are no historical record of incidents of flooding from groundwater. Reference to the SFRA for Andover confirms that the site is not located in areas at risk from groundwater flooding.

2.8.11. The ground investigation encountered no water ingress into the trial pits which were taken down to depths of between 3.0m and 4.0m AOD . The investigation took place in August 2010 so is unlikely to show a maximum groundwater level.

2.8.12. The risk of flooding on site from groundwater sources is considered to be low

Infrastructure Failure

2.8.13. The site is not located near to any significant reservoirs or other water related infrastructure and there are no records or information available to indicate the site has suffered any incidents of flooding in the past.

2.8.14. The risk of flooding on site from infrastructure failure is therefore considered to be low.

Sewer Overload

2.8.15. Public sewer records indicate foul sewers located to the north of the site but there are no surface water sewers in the vicinity of the site.

2.8.16. The risk of flooding on site from sewer overload is therefore considered to be low.

Flooding Source	Potential			Comments
	High	Med	Low	
Tidal / Fluvial			***X***	Site is located in Flood Zone 1
Sewer Overload			***X***	No surface water sewers close by
Groundwater			***X***	Groundwater levels are over 4.0m below ground level
Infrastructure Failure			***X***	None in the direct vicinity of the site

Table: 2 – Summary of Flood Risk to Development Site

3. ASSESSMENT FOR PROPOSED DEVELOPMENT

3.1. Description of Proposed Development

3.1.1. The development proposals contained within the outline planning application are to build a residential development of 50 units plus roads and parking areas on the 1.43ha site with a proposed impermeable area of 0.63ha or approximately 44% of the site.

3.2. Flood Risk Vulnerability

3.2.1. Table D2 'Flood Risk Vulnerability Classification' within Annex D of PPS 25, classifies various land uses according to their vulnerability to flooding. The vulnerability classes can the be used in the sequential test to asses which types of development are appropriate in each flood zone. Vulnerability type is assessed by classifying developments into five categories:

I. Essential Infrastructure

II. Highly Vulnerable

III. More Vulnerable

IV. Less Vulnerable

V. Water-Compatible Development

3.2.2. According to Table D3 'Flood Risk and Flood Zone Compatibility' of PPS25. all of the five categories listed above are suitable for development within Flood Zone 1. The proposed development is therefore compatible.

3.2.3. As the site is located in an area at low risk of flooding then the sequential test is deemed to be passed and the exception test is not required.

3.3. Surface Water Runoff

3.3.1. Peak flows for the proposed development have been calculated using the Modified Rational Method developed by HR Wallingford.

3.3.2. PPS25 recommends that future rainfall intensities are increased to allow for the effects of future climate change. An additional 30% has therefore been added to the rainfall intensities to take this into account.

3.3.3. 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.

3.4. Drainage Strategy

Surface Water

3.4.1. Ashford Site Investigation Limited carried out a site investigation and reference should be made to their report no. LW21195. Extracts of the report are included as Appendix A. Their site investigation included soakaway testing the results summarised in table 3, indicated that ground conditions were not suitable for infiltration drainage ruling out soakaways as not a viable option for this site.

Trial Pit Ref.	Derived Infiltration Rate
TP1	1.4×10^{-6} m/s
TP2	3.4×10^{-6} m/s
TP3	3.3×10^{-6} m/s

Table 3 – Soil Infiltration Results

3.4.2. 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.

3.4.3. 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 small orifice sizes of 56mm.

3.4.4. It was felt this would be prone to blockages. In accordance with good practice the orifice size was therefore increased to 75mm thus giving an equivalent discharge rate of 5 l/s. The increased rate was agreed with 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 B.

Foul Water

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

3.4.6. 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 which will be moved into the highway and will become and adopted sewer under ownership of Southern Water.

4. DRAINAGE PROPOSALS

4.1. General

4.1.1. 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. An 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. A summary of the results are shown in Table 2 below.

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

Table 4 – Summary of storage volumes

4.2.2. 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. However, on this site, we do not have sufficient space within the proposed development layout for this kind of feature. It is proposed that all surface water run-off up to and including the 1 in 100 year storm event will be stored in the underground attenuation tank.

4.2.3. 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.

4.2.4. Surface water will be discharged from the attenuation tanks at a rate of 5 l/s in order to match the pre-development discharge rates.

4.2.5. Flow control is to be achieved using a Hydrobrake or equivalent proprietary vortex flow control device.

4.3. Foul water

4.3.1. The existing 150mm dia private foul sewer will be replaced with a new foul sewer designed to adoptable standards and discharging to a new manhole connected to the public sewer network. The new foul sewer shall be sized to take foul water flows from the new development, 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. Flood Risk

5.1.1. The development site is located in Flood Zone 1 so is classified as having a low risk of fluvial flooding.

5.1.2. The underlying bedrock is classified as a Principal Aquifer and the site also lies within an EA designated Groundwater Source Protection Zone. Measures will need to be taken to ensure that pollutants from contaminated runoff do not enter the groundwater. In extreme cases pre treatment may be necessary. The risk of pollution from a normal residential development however is considered to be low.

5.1.3. No groundwater was encountered during the excavation of trial pits as part of the Ground Investigation Report. The trial pit depths ranged between 3 and 4m below existing ground level. The risk of flooding from groundwater is considered to be low.

5.1.4. There are no significant reservoirs or other Water related structures within close proximity to the site which could pose a flood risk.

5.1.5. The flood risk from overloaded sewers is considered to be low.

5.1.6. No restrictions are placed on the type of development which are considered suitable for land within Flood Zone 1. A residential development of this nature is considered appropriate for this location.

5.1.7. Following attenuation the proposed development will not increase the flood risk to downstream receptors.

5.2. Drainage Strategy

5.2.1. A discharge rate of 5 l/s has been agreed with the EA in accordance with good practice. The calculated greenfield runoff rates for the site were considered to be too low to achieve a practical flow control solution.

5.2.2. Surface water will be attenuated on site in underground geocellular tanks designed for storm events up to and including the 1 in 100 year storm event.

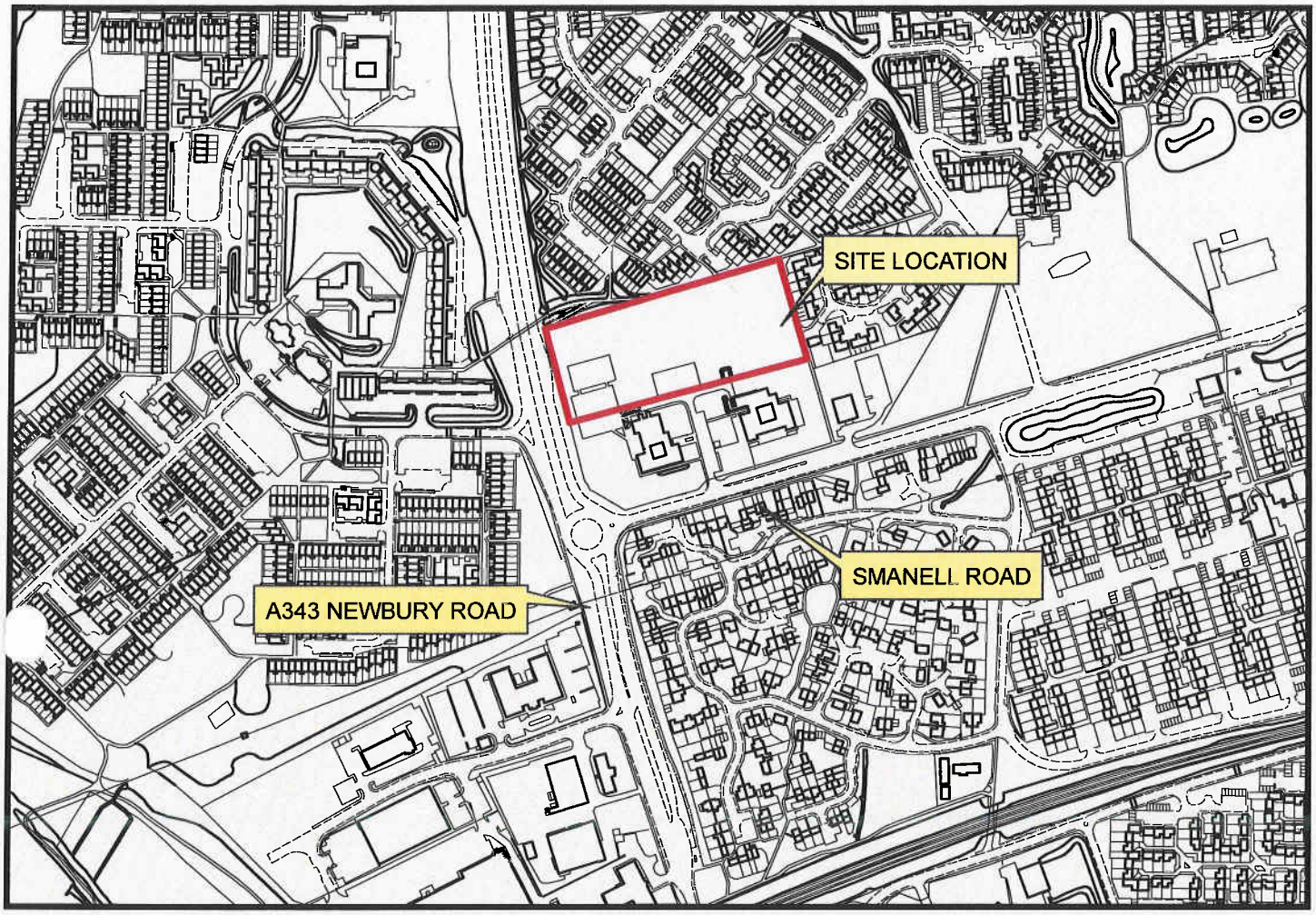
5.2.3. Flooding from storm events beyond the 1 in 100 year event shall be routed safely away from vulnerable properties. Safe overland routes such as roads shall contain and direct flows away from properties to a suitable long term storage feature if space permits or in the short term excess flooding can be stored in car parking areas.

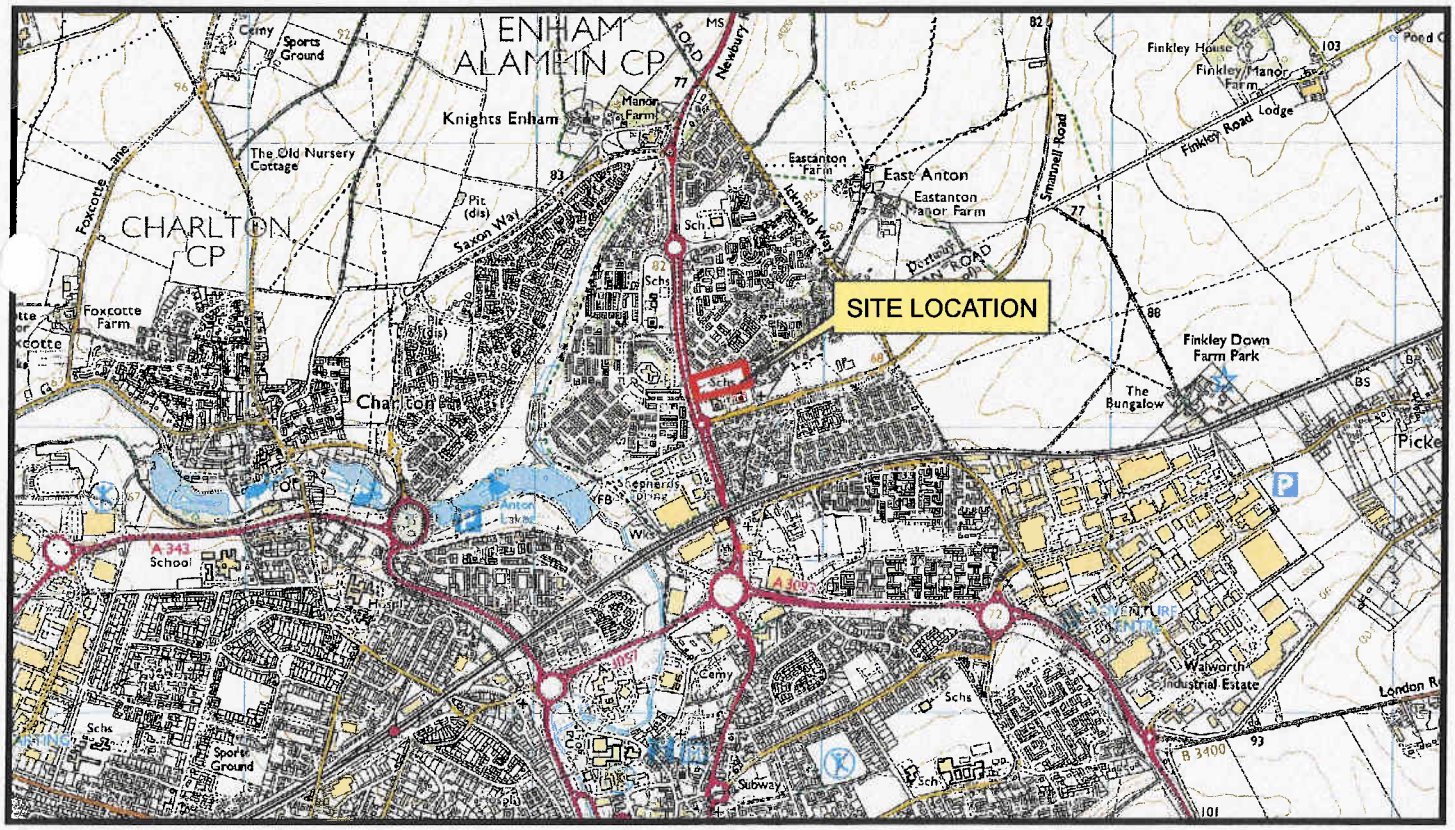
5.2.4. Surface water runoff will be discharged to a new sewer which will run eastwards along Smanell road before ultimately discharging to Shepherds Spring Drain at the Cricketer's Way junction.

5.2.5. Foul Water flows will be discharged to a replacement sewer which will run eastwards along Smanell Road before connecting into the existing public foul sewer located in Cricketer's Way.

5.2.6. All new drainage will be offered for adoption under a Section 104 agreement with the local sewerage undertaker.

FIGURE 4 - LOCATION PLAN.





Hampshire County Council

LOCATION PLAN

Land at Shepherd's Spring School, Andover

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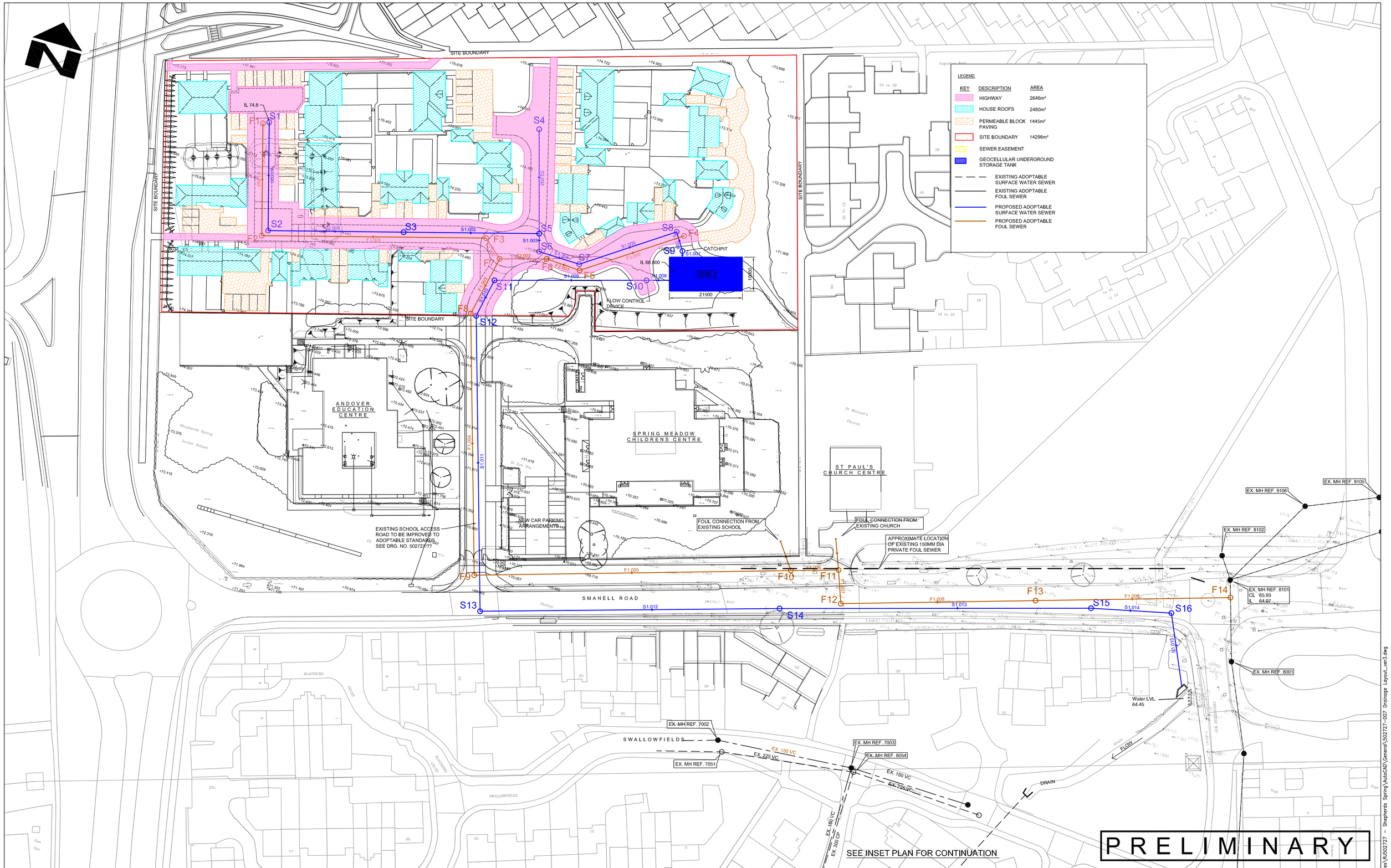
FIGURE 5 - INDICATIVE DRAINAGE LAYOUT.



PRELIMINARY

REV.	AMENDMENT	DATE	DRAWN	CHKD	APPD

CLIENT

HAMPSHIRE COUNTY COUNCIL
PROPERTY BUSINESS AND REGULATORY SERVICES
ASSETS AND DEVELOPMENT

CONSULTANT

Hampshire County Council Engineering Consultancy
Certificate No. FS 21845

STUART JARVIS BSc DipTP FCIHT MRTPI, DIRECTOR OF ENVIRONMENT, THE CASTLE, WINCHESTER.

DRAWN RD	SCHEME FORMER SHEPHERDS SPRING INFANT SCHOOL DISPOSAL SITE		DRAWING TITLE INDICATIVE DRAINAGE LAYOUT
CAD RD			HCC CADplot: 30.Nov.2011 at 10:42am
CHECKED SF	JOB No. R.J 502727.01		
APPROVED DD	SCALE @ A1 1:500	DATE FEB 2011	SHEET No. 1 OF 1
			DRG No. 502727/007 REV – SUFFIX

HCC CADfile: K:\Eng\Roads\Schemes\R.502727 - Shepherds Spring\AutoCAD\General\502727-007 Drainage Layout_ver3.dwg

APPENDIX A. – TRIAL PIT LOGS AND SI REPORT EXTRACTS

ASHDOWN SITE INVESTIGATION LIMITED
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 From (m)	Depths To (m)	Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
					0.00	Ground Level
J	0.05				0.10	Topsoil.
B	0.15					Light orange grey sandy silty fine to coarse GRAVEL of flint. (Head)
P	0.15	0.60	60		0.40	
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 LIMITED
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 From (m)	Depths To (m)	Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
					0.00	Ground Level
					0.10	Topsoil.
J D B	0.20					Brown slightly gravelly silty CLAY. Gravel is fine to coarse flint and occasional chalk. (Head)
P	0.20	0.65	74		0.50	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 LIMITED
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 From (m)	Depths To (m)	Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
					0.00	Ground Level
J	0.05				0.10	Topsoil.
P	0.15	0.60	47			Orange brown sandy very gravelly CLAY. Sand is fine. Gravel is fine to coarse flint. (Head)
B	0.20					
J D	0.30					
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 Test 1 %	Test 2 %	Test 3 %	Cone Depth
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

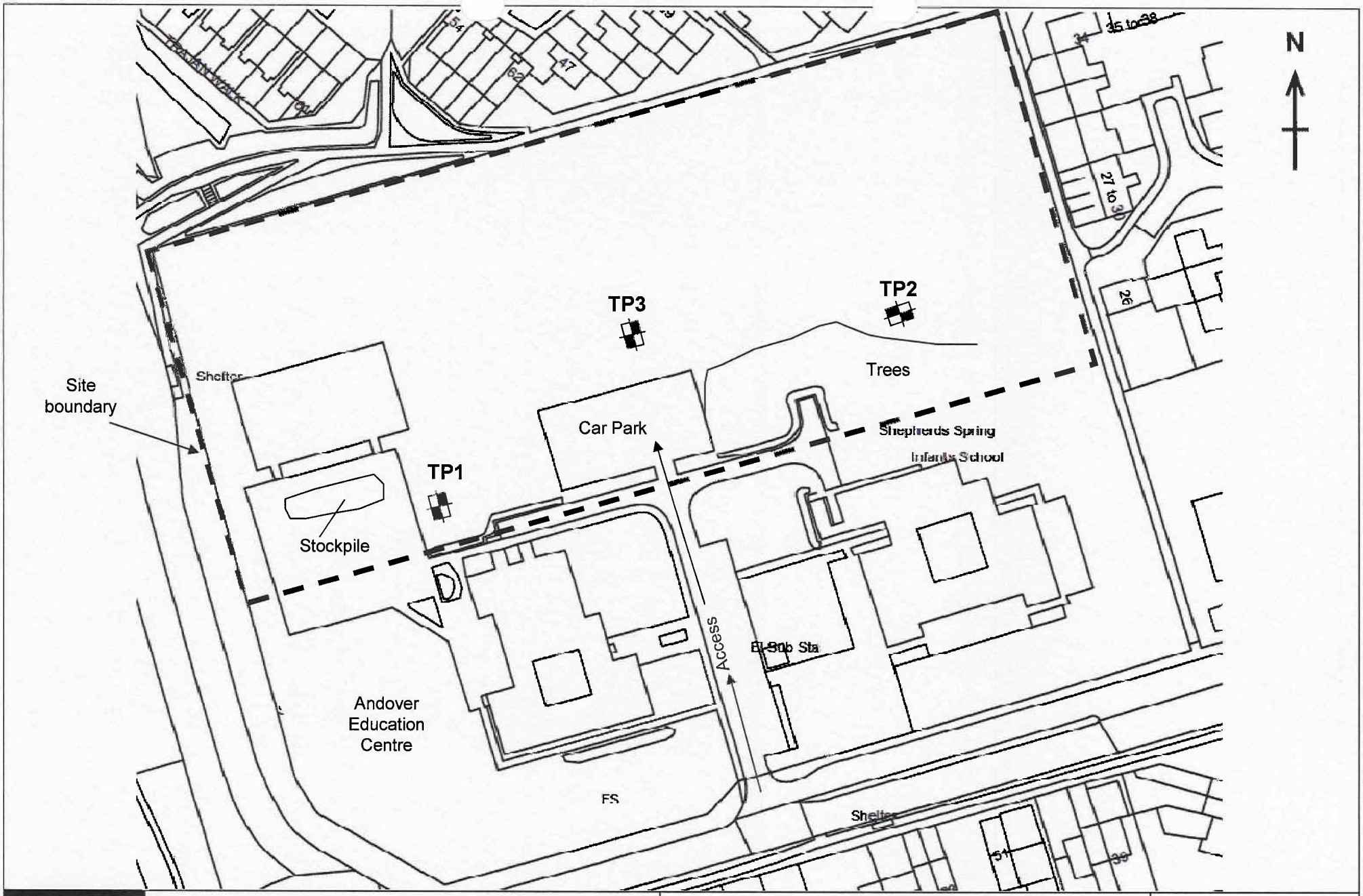
Site: Shepherds Spring School and Andover Education Centre	Report No.: LW21195 Sheet No.: 1 of 1

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	



ASHDOWN SITE INVESTIGATION L·I·M·I·T·E·D	SITE: Shepherds Spring School and Andover Education Centre	Site Plan Not To Scale
		Figure 2 LW21195

APPENDIX B. – EA CONSULTATION

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

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

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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:

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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

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 shyould 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

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 a 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>>

APPENDIX C. – CALCULATION OF GREENFIELD RUN-OFF RATES

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 l/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

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