

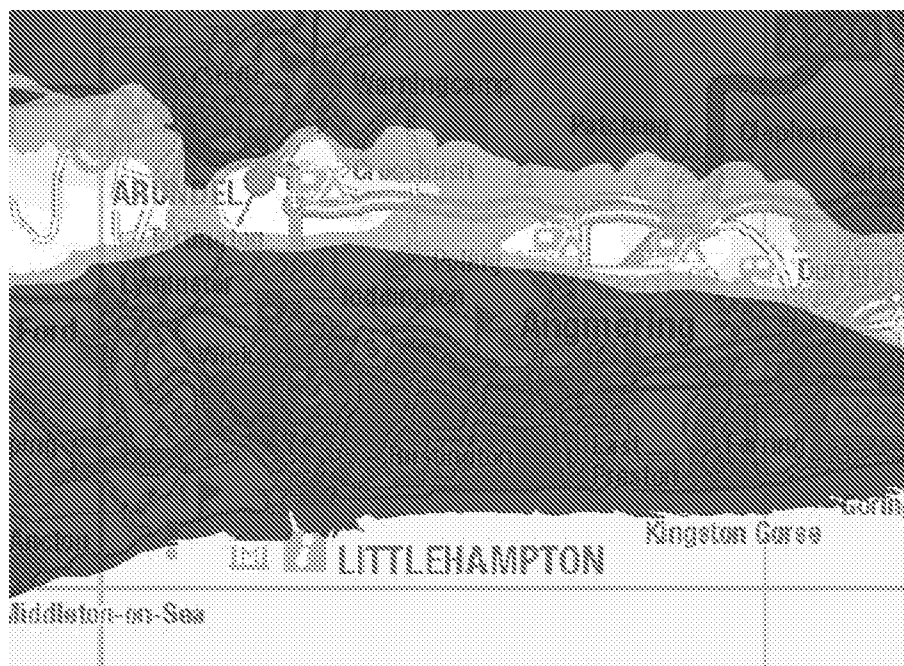


Figure 7: EA Aquifer Bedrock Designation Map

3.20. BGS Borehole TQ00SW181 terminated at a maximum depth of 35.0 metres below ground and groundwater encountered at 10.2 metres Below Ground Level (BGL) with final standing level at 0.8m BGL. BGS Borehole TQ00SW60 terminated at a maximum depth of 61.0 metres below ground and groundwater encountered at 19.2 metres BGL with final standing level at 3.2m BGL.

Baseline Hydrology Calculations

3.21. Pre-development run-off rates for the site have been calculated for different Annual Exceedance Probabilities using the IH124 method as follows:

Table 1: Pre-development Run-off Rates (l/s)

Rainfall AEP	Qbar Rural	Qbar Urban	1	2	30	100
Catchment	10.6	15.8	13.4	14.6	32.3	41.4

3.22. Q_{bar} is the mean annual flood flow from a catchment.

3.23. Urban area is 0.75ha (25% of 3.0ha site area).

3.24. A copy of the calculations are provided in **Appendix D**.

Existing Surface Water Drainage

3.25. Southern Water records indicate a surface water drainage system exists along the Hendon Avenue. It is assumed that this system outfalls to the Boating Lake and from the Boating Lake through the 450mm Cast Iron (CI) pipe towards South to the English Channel.

3.26. No other public surface water sewers are shown to exist in the vicinity of the site.

3.27. Southern Water sewer records mapping is provided in **Appendix E**.

3.28. A CCTV drainage investigation was carried out by Cloaca Surveys Ltd on the 15th October 2014.

3.29. There are existing private surface water sewers on-site. It is anticipated that these sewers discharge to the Boating Lake, but the survey was not possible due to debris.

3.30. For on-site surface water drainage location refer to the Existing Foul and Surface Water Layout drawing provided in **Appendix K**.

3.31. There is evidence of the existing private surface water drainage at The Martlets to east of the site.

Foul Water Drainage

3.32. Southern Water records show a number of foul sewers to be located within the site as follows:

- 225mm Concrete Pre-Cast / Vitrified Clay (CP / VC) sewer along the Hendon Avenue from its junction with Sea Road towards the North,
- 750mm Concrete Pre-Cast (CP) sewer along the Sea Road from the East to the West,
- 150mm Bonded Asbestos Cement (BAC) sewer from The Martlets towards the North.

3.33. The depth of sewers varies from 2.19m at the Hendon Avenue (near Boating Lake) to 5.42m at Sea Road (opposite the entrance gates to Rustington Convalescent Home).

3.34. The results of the drainage investigation / CCTV of Foul & Surface lines survey carried out by Cloaca Surveys Ltd shows existing on-site private foul sewers on the northern side of the Rustington Convalescent Home.

3.35. A number of the existing private foul sewers will need to be diverted and connected to the proposed foul sewer system.

3.36. For the CCTV drainage investigation report, refer to **Appendix K**.

4.0 DEVELOPMENT PROPOSALS

4.1. The development proposals include the retention of the existing care home, demolition of some existing buildings, redevelopment of other existing buildings to form seven new homes and the construction of 26 new dwellings for residential use.

4.2. The housing mix is to include 29 market sales (private) houses and 4 'flexible tenure' bungalows.

4.3. The outline Masterplan is provided in **Appendix F**.

5.0 THE SEQUENTIAL TEST AND THE EXCEPTION TEST

5.1. The NPPF requires the Local Planning Authority (Arun District Council) to undertake a Sequential Test for proposed development at risk of flooding. The Sequential Test aims to steer development to areas of lowest flood risk.

5.2. As the proposed development buildings are classified as less vulnerable and located outside Flood Zone 3 as shown on the site specific flood map in **Appendix H**, the requirements for the Sequential Test are met and the Exception Test is not required.

6.0 FLOOD RISK ASSESSMENT

6.1. To assess flood risk it is essential to consider all sources of flooding. Flooding can be divided into a number of sources as follows:

- **Flooding from Rivers and Sea:** As indicated, the EA flood mapping for planning indicates the site to be located within Flood Zones 1, 2 and 3, however the proposed development buildings predominantly will be in Zone 1 with a small number in the Zone 2 at the northern side of the area. Refer to Flood Extents map shown in **Appendix H**.
- **Flooding from Surface Water:** The EA mapping for flooding from the surface water shows very low risk to the proposed site with low risk at the border with the Boating Lake.
- **Flooding from Ground Water:** The Lead Local Flood Authority (West Sussex County Council) have stated that, based on the current Environmental Simulations International (ESI) Ground Water Flood Risk Map (as shown in **Appendix J**), the northern part of the site is at 'Moderate Risk' from ground water flooding and the southern part of the site is at 'High Risk' from ground water flooding.
- **Flooding from Sewers:** The Southern Water existing sewer records map (as shown in **Appendix F**) shows sewers at The Martlets to the east side of the proposed development. Southern Water investigation is required to determine if the existing foul sewer system does contain sufficient capacity to serve the proposed development. Both the foul and surface water drainage system will be required to be designed to current national standards to ensure adequate capacity is provided within the development drainage system. Once the required upgrades are completed, the site will have a low risk of flooding from sewers.
- **Flooding form Reservoirs, Canals and Other Artificial Sources:** The EA flood mapping shows the site is not at risk from flooding from reservoirs and there are no other known sources of flooding in the vicinity of the site.

7.0 FLOOD RISK MITIGATION

7.1. The above assessment shows that the most probable risk of flooding may occur from the Rivers and Sea, and possibly groundwater. To ensure property is protected from possible overland flow paths identified above, the following measures should be implemented:

- The proposed surface water drainage system is to be designed in accordance with all national standards and EA requirements with capacity for the 1 in 100 year event plus 30% climate change allowance.
- The proposed surface water drainage system is to accommodate both onsite and offsite contributing catchments.
- Foul water sewers to be designed to Southern Water requirements to ensure adequate capacity.
- Location of the proposed buildings is in Low Risk areas.

Mitigation Against Residual Risk

7.2. It is essential to assess any residual risk which may occur following implementation of the above mitigation measures. The flooding assessment above identifies flooding from overland flows to be the most probable source of flooding to the development in extreme cases of failure of the surface water drainage system. To mitigate against this residual risk the following measures are proposed:

- Set floor levels to a minimum of 300mm above finished ground level or above the 1:200 year event with appropriate freeboard as advised by EA in the preliminary opinion in **Appendix G**.
- Where practicable, grade gardens and public open space away from buildings towards highways or watercourses to convey overland flows away from buildings.

- Design the highway system to convey surface water away from buildings towards watercourses, including the use of kerb upstands to contain flows within the carriageway.
- Ensure a Drainage maintenance system is implemented for all aspects of the system (below and above ground) to minimise the residual flood risk of drainage system blockage through adoption agreements or private management companies.

8.0 SURFACE WATER DRAINAGE STRATEGY

8.1. A preliminary drainage plan has been prepared based on the preliminary Masterplan and in accordance with Sewers for Adoption 7th Edition and CIRIA C697, 2007, 'The SuDS Manual'. The two drainage strategy options presented in **Appendix H** includes:

- Option 1 - Discharge into the ground (infiltration) through soakaways; and
- Option 2 - Controlled discharge to the existing Boating Lake at calculated Pre-development run-off rate.

8.2. The Arun District Council has advised, that where infiltration is proposed, investigation will need to include winter groundwater monitoring, and winter percolation tests at an appropriate depth depending on the results of the groundwater monitoring.

8.3. Based on the borehole records, the site overlies a thick layer of clay which may not support infiltration on a large scale. It is therefore more likely that Option 2 will be implemented.

8.4. The drainage system should be designed to cater for the 1 in 100 year event plus an allowance of a 30% increase in rainfall intensity to allow for climate change. The EA advise no increase of the run-off rate compared to the existing Pre-development run-off rate should be allowed.

8.5. An assessment has been carried out utilising a soakaway at a soakage rate indicative of clay/silty sand (5.6×10^{-6} m/s). This option is shown on drawing 14-185-202.

8.6. The drainage strategy has been designed to incorporate a variety of SuDS to enhance the aesthetic appeal and amenity of the development while minimising the impacts from the quantity and quality of the rainwater run-off.

8.7. To achieve the required flow rates the drainage system incorporates several attenuation structures spread throughout the site. These drainage structures include pervious pavements and underground cellular storage units, as shown on the plans, or open water features if the site layout permits. The location and size of these components are shown on the Preliminary Drainage Plan (14-185-203) in **Appendix H**.

8.8. The following section provides an overview of SuDS devices that may be implemented within the site. Including some, or all of the SuDS devices will help minimise the attenuation volume required. It should be noted that the geology of the site is considered to have a low permeability which suggests infiltration type devices (Option 1) may not be suitable, however soakage tests will be required to confirm rates.

8.9. In particular, the following SuDS have been utilised:

Pervious Pavement

8.10. Pervious Paving can be used in place of traditional hardstand surfaced such as tarmac or standard paving. Pervious Pavements allow water to infiltrate through the surface into underling layers of aggregate which allow conveyance, treatment and storage of the run-off. Where the geology allows, water on infiltration from the layer of aggregate into the ground.

Refer to **Figure 8** for Example of Pervious Pavement.



Figure 8 - Example of Pervious Pavement

Cellular Storage

8.11. Cellular storage structures are modular 'crates' with minimal internal walls which provide significant volumes for attenuation. The Cellular Storage units are buried under either trafficked or non-trafficked areas and have long term physical and chemical stability. Where the geology allows, water on infiltration from the storage unit into the ground. Cellular units can be manufactured from recycled plastics.

Refer to **Figure 9** for Example of Cellular Storage Units.



Figure 6 - Example of Cellular Storage Units

Attenuation Basins and Ponds

8.12. Attenuation Basins and Ponds provide attenuation volume to allow controlled discharge rates. Attenuation Basins are generally dry while ponds are generally wet. Both types provide some treatment via settlement of solids and pollution.

Refer to **Figure 10** for Example of Attenuation Ponds.

8.13. Basins are generally easier to maintain and can potentially be used as recreation areas when dry. Ponds require more careful design and maintenance but provide additional treatment and have high potential to improve the local ecology, aesthetic and amenity.

8.14. Where the geology allows, water in basins will infiltrate into the ground.



Figure 70 - Example of Attenuation Ponds

8.15. The use of basins / ponds is an option that can be investigated if the site layout and land use requirements permit them. This is to be confirmed on detailed design stage.

Discharge

8.16. If infiltration is not possible, the location for the surface water discharge would be into the existing Boating Lake to the northwest of the site (Option 2). This would require the surface water to be treated (using SuDS may achieve this) prior to discharge and possibly an agreement with the EA or highway authority.

8.17. The EA has requested that the development discharge surface water to the existing watercourse at Pre-development run-off rates. The calculated run-off rates are shown in **Section 3.19**. Refer to correspondence with the EA in **Appendix G**.

8.18. Calculations relating to the drainage network (for Option 2) are located in **Appendix I**. These calculations indicate a maximum discharge to the existing watercourse at the flow rates indicated in the following table.

Table 2: Design Run-off Rates (Option 2)

Rainfall Event AEP	Pre-development Run-off (l/s)	Design Discharge (l/s)
1 year	13.4	13.2
30 year	32.3	23.6
100 year	41.4	41.4

8.19. **Table 2** shows the design discharge rates are lower than the calculated Pre-development run-off rates. The flow rates are controlled by a combination of a 103mm diameter orifice at the invert of the outlet manhole with a hydro-brake placed 1.0m above the invert to allow the higher 1 in 100 year flows. These may be modified and increased during detailed design when the impermeable areas, drainage system, SuDS devices and flow controls are defined more accurately.

9.0 FUTURE MAINTENANCE

9.1. It is the intention that the foul drainage system is offered for adoption by Southern Water (in accordance with Sewers for Adoption 7th Edition) and as such, all maintenance will be carried out by Southern Water under an Asset Management Program.

9.2. The piped surface water drainage system has been designed in accordance with Sewers for Adoption 7th Edition with the intention that it will be offered for adoption by Southern Water. Particulars of the Adoption Agreements will however be dependent on future national policy and the progression of the FWMA.

9.3. Current consultation in regard to amendments to the FWMA, which is expected to come into force in Spring 2015, include several options for the ongoing maintenance SuDS. These options include:

- Service Management Companies. – This is possibly the best option for this site but will require the premises occupiers to pay for the maintenance as part of an annual service charge or equivalent.
- Water and Sewerage Companies. – The site lies within Southern Waters' drainage network area and will ultimately drain to Southern Water sewers. However, Southern Water are reluctant to adopt SuDS and would not be able to maintain parts of the system, such as the green roofs.
- Local Authority. – West Sussex County Council may adopt the drainage system as part of their wider public open space and amenity management function and/or where the sustainable drainage system provides advantages for the wider community. West Sussex County Council would have to charge to cover the cost of the maintenance.
- Private Individuals: property owners or occupiers. – Given the size and diversity of the proposed development it is unlikely the that the private owners or occupiers would be able to carry out the required maintenance.

9.4. As such, the Developer will need to consider the financial aspects of future maintenance in line with the potential buyers, marketing scheme and further discussion with Southern Water and West Sussex County Council.

9.5. To minimise the cost of maintenance, the drainage system has been developed with SuDS with reference to the SuDS Manual (CIRIA C697) which also provides advice in regard to maintenance measures.

9.6. During the detail design stage of the development, modifications will be made to the drainage system to suit the detailed plot and highway layouts.

10.0 CONTAMINATION FROM CONSTRUCTION

10.1. The construction works must be undertaken in a manner to prevent pollution to the groundwater. Contractors are to make reference to current legislation and Environment Agency guidelines in respect of construction pollution prevention.

10.2. All stocks of materials, oils and fuels are to be stored in a manner preventing spillage and seepage to ground. Wastewater will not be freely discharged to the ground or watercourses. All hydrocarbons and chemical spillages will be thoroughly cleaned by excavation of the polluted ground and disposed of to a licensed waste depot.

10.3. The Groundwater Directive (80/68/EEC) aims to protect groundwater from pollution by controlling discharges and disposals of certain dangerous substances to groundwater. In the UK, the directive is implemented through the Environmental Permitting Regulations (EPR) 2010 (EA Website, 2011).

10.4. The list of guidelines below are initial recommendations and not exhaustive. It will be the responsibility of the contractor to ensure they obtain and understand the latest legislation and guidelines:

- The Groundwater Directive 80/68/EEC. Office Journal of the European Communities 1980.
- Protection of Groundwater Against Pollution and Deterioration. Office Journal of the European Union 2006.
- Environmental Permitting (England and Wales) Regulations. Draft Statutory Instruments 2010.
- Waste Management – The Duty of Care: A Code of Practice. The Stationary Office 1996.
- Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors. CIRIA Report 532. 2001.
- Waste Minimisation and Recycling in Construction – A Site Handbook. CIRIA 1999.

- Managing Materials and Components on Site. CIRIA 1998.
- Safe Storage and Disposal of Used Oils: PPG8 Environmental Alliance 2004.
- Underground, Under Threat. The State of Groundwater in England and Wales. Environment Agency 2006.
- Groundwater Protection: Policy and Practice Document GP3. Environment Agency 2013.

11.0 CONCLUSIONS AND RECOMMENDATIONS

11.1. This report is based on information received from the Environment Agency, Southern Water, British Geological Survey records and West Sussex County Council flood reports submitted in support of the application.

11.2. The information provided by the Environment Agency indicates that the site is predominantly within Flood Zone 1. Other sources of flooding, including surface water flooding, groundwater flooding, sewer flooding and flooding from artificial sources have been examined and are considered to be low risk.

11.3. Further Flood Risk mitigation measures have been recommended including raising ground floor levels above the finished surface, sloping the land away from buildings and implementing a drainage maintenance strategy.

11.4. The BGS borehole records suggest the site is located on clay and gravel material that may not allow infiltration type drainage. Therefore two options have been proposed. The second option propose the controlled discharge to the existing Boating Lake, but run-off from the site will need to be attenuated on site and released at a gradual rate.

11.5. The Pre-development run-off rate for the 1 in 1 year, 1 in 30 year and 1 in 100 year have been calculated using the IH24 method. Design calculations for Option 2 show the drainage strategy contains sufficient attenuation storage to limit the discharge flow to less than the Pre-development rates.

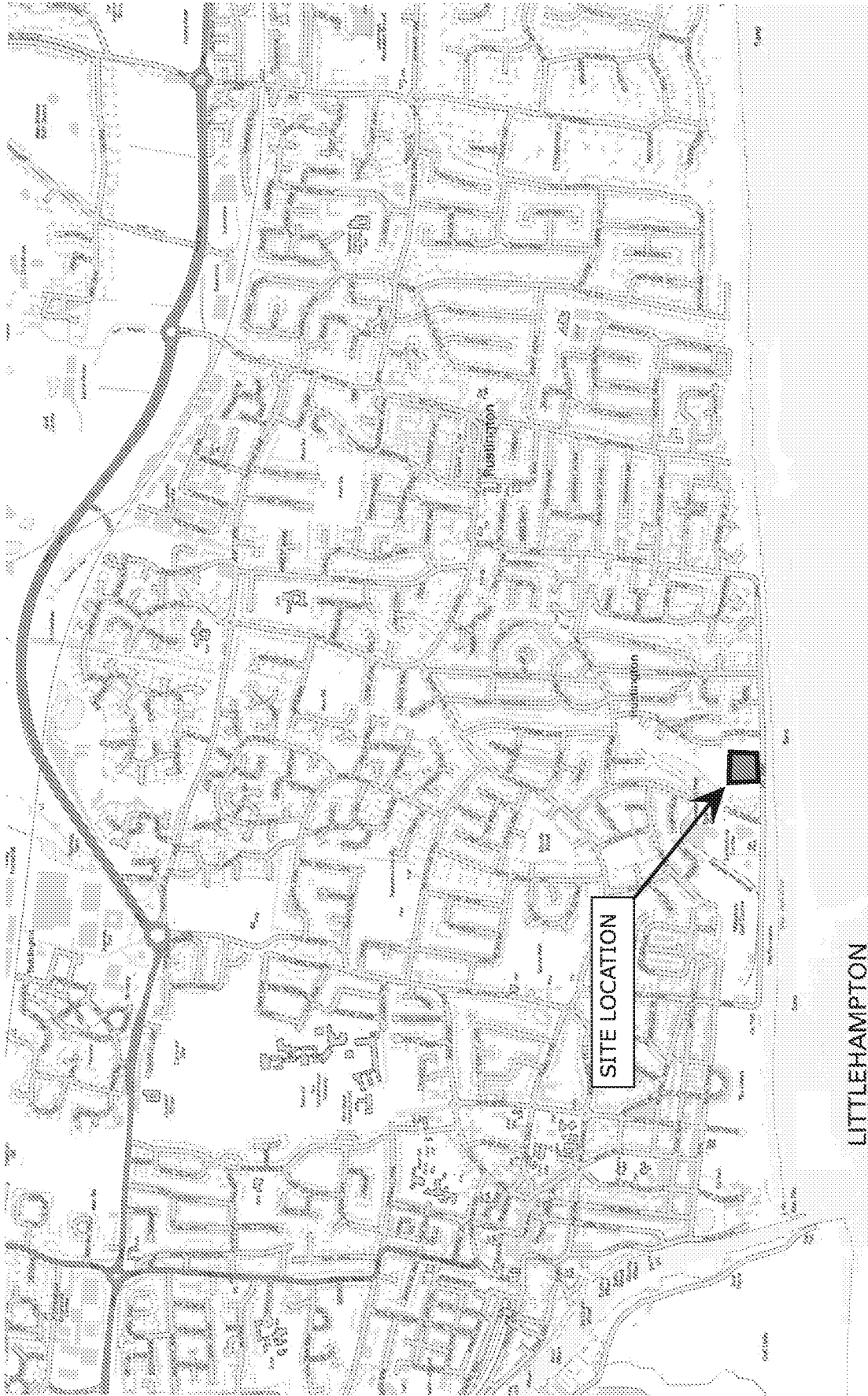
11.6. The on-site sustainable drainage system will be designed to ultimately cater for events up to and including a 1 in 100 year storm event plus 30% climate change. The system provides a number of SuDS devices to help minimise the effect of run-off volume and flow rate and to maximise the potential for improved bio-diversity, aesthetics and amenity.

11.7. It is the intention that the foul drainage system is offered for adoption by Southern Water (in accordance with Sewers for Adoption 7th Edition) and as such, all maintenance will be carried out by Southern Water under an Asset Management Program.

11.8. This report has identified that suitable measures will be in place to prevent pollution or contamination to either the public sewers, watercourses or groundwater during the construction process.

11.9. This Flood Risk Assessment has demonstrated that the proposed development is fully compliant with the requirements of the NPPF and therefore acceptable flooding or drainage terms.

APPENDIX A



LITTLEHAMPTON

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Markides

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39 York Road
SE1 7JG
Telephone: 0207 638 2444
Fax: 0207 638 1188
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W: www.odysseymarkides.com

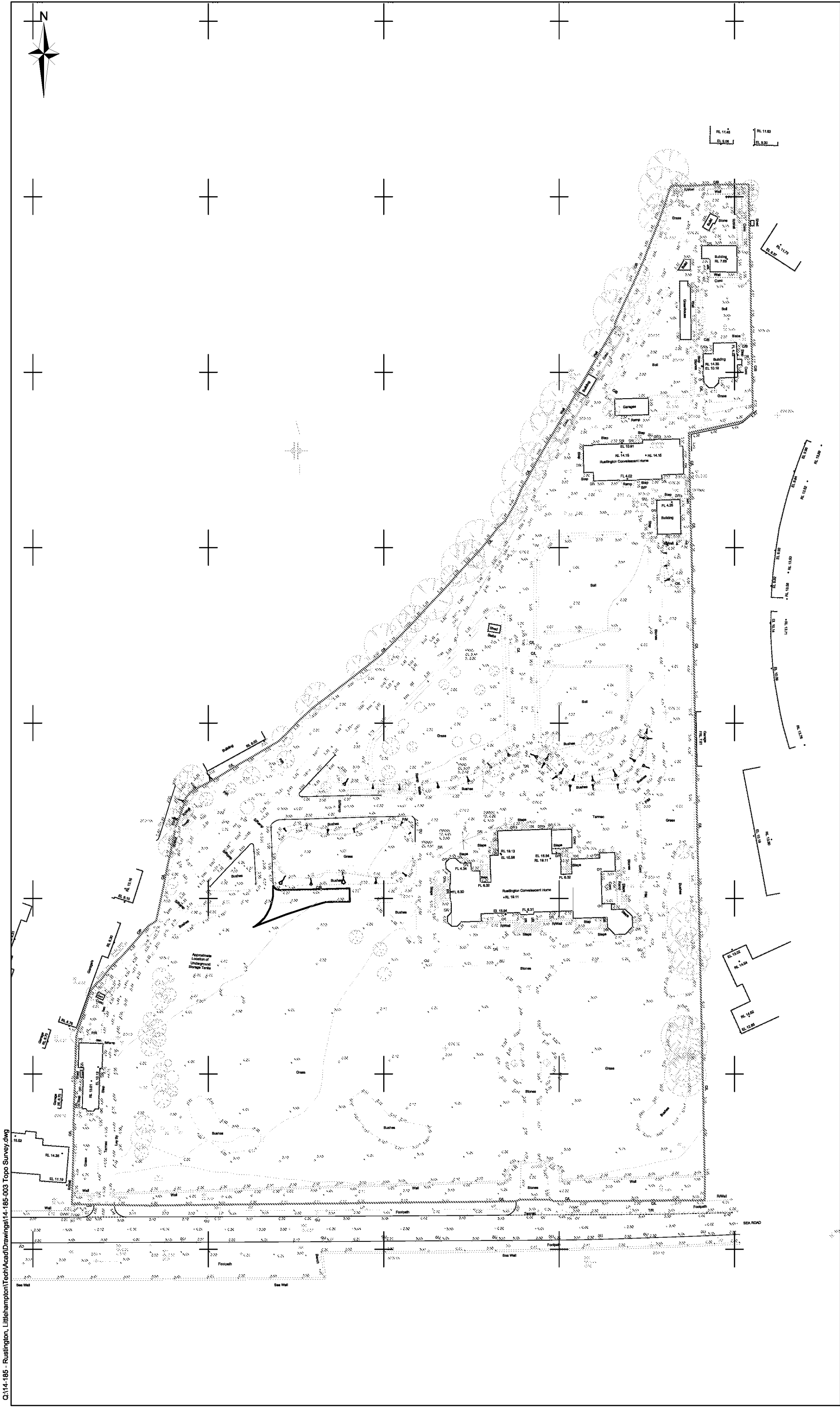
Job Title
**RUSTINGTON, LITTLEHAMPTON,
WEST SUSSEX**

Drawing Title
SITE LOCATION PLAN

Client
DANIEL WATNEY

Rev	Amendments	Scale	Date	Desig	App	Date
	NTS		AUG '14	AJ		
	AJ		PJH	Approved	SRB	
Job No	14-185	Figure No	FIGURE No.1			
						Rev

APPENDIX B



NOTES

1. DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.

2. ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES.

3. SURFACE LEVELS ARE BASED ON THE SITE TOPOGRAPHIC SURVEY PROVIDED BY MBP ARCHITECTS

KEY:-

APPROXIMATE SITE BOUNDARY

Rev	Amendments	Drn	Chk	App	Date

Odyssey

Markides

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38 York Road

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SE1 7NG

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Job Title

RUSTINGTON,
LITTLEHAMPTON

Drawing Title

TOPOGRAPHICAL SURVEY

Client

DANIEL WATNEY

Scale	Date	Designed
1:500 @A1	SEPT 14	MP
Drawn	Checked	Approved
MP	JM	SRB
Job No	Drawing No	Rev
14-185	14-185-003	

Q:14-185 - Rustington, Littlehampton\Tech\Acad\Drawings\14-185-003 Topo Survey.dwg

ARUN DISTRICT COUNCIL R/85/18/DOC

APPENDIX C

Borehole TQ00SW181 – Sheet 1 of 4

Norwest Holst Soil Engineering Ltd.						Borehole No. 2	
Contract No. F4877		BOREHOLE LOG		Sheet 1 of 4		Chainage	
Location Mewsbrook Pool, Littlehampton		Client Arun District Council		Ground Level 2.475 m.A.O.D.		Date 23/3/81	
Method of Boring Percussion		Diameter of Borehole 150 mm		TQ00SW 181			

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D. %	Daily Progress
MADEGROUND: Firm stony CLAY.		1.40	1.1		0.50	19	
Loose grey/brown sandy SILT.		1.80	0.7		2.00	13	
Medium dense grey SAND and coarse GRAVEL.		3.30	0.8		3.50	4	
Very soft grey silty CLAY.					5.00	4	
					6.50	4	
					8.00	4	
					9.50	4	

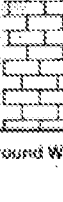
Type of Sample S.P.T. Undisturbed C.P.T. Vane Jar Water Bulk Piezometer	Remarks (Observations of Ground Water etc.) Water struck at 10.20 m. Final standing level 0.80 m.
--	--

Water level is subject to seasonal or tidal variations and should not be taken as constant.

Borehole TQ00SW181 – Sheet 2 of 4

Norwest Holst Soil Engineering Ltd. BOREHOLE LOG						Borehole No. 2	
Contract No. F4877 Location Wootton Bassett, Littlehampton Client Arun District Council Method of Boring Percussion Diameter of Borehole 150 mm		TQ00SW181 Sheet 2 of 4 Chainage _____ Ground Level 2.475 m.A.O.D. Date 23/3/81					
Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	R.Q.D. %	Daily Progress
Very soft grey silty CLAY.	[Pattern]	10.20	-7.7				
Medium dense medium to coarse chalk GRAVEL with flints.	[Pattern]				10.50	8	
					12.00	11	
					13.50	11	
					15.00	11	
					16.50	10	
					18.00	13	
Dense brown and white clayey chalk GRAVEL with flints.	[Pattern]	18.30	-12.8				
					19.50	24	
Type of Sample S.P.T. ☒ Undisturbed C.P.T. ☒ Vane Jar ☒ Water Bulk ☒ Pizzometer		Remarks (Observations of Ground Water etc.)					

Borehole TQ00SW181 – Sheet 3 of 4

Norwest Holst Soil Engineering Ltd.						Borehole No. 2	
Contract No. F4877		BOREHOLE LOG		TQ00SW181			
Location Mawsbrook Pool, Littlehampton		Client Arun District Council		Sheet of			
Method of Boring Percussion		Ground Level 2.875 m A.O.D.		Chainage			
Diameter of Borehole 150 mm		Date 23/3/81					
Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N" Y R.C.D. %	Daily Progress
Dense brown and white clayey chalk GRAVEL with flints.					21.00	50 for 140mm	
					22.50	50 for 125mm	
					24.00	24	
		25.00	~22.8				
Dense white chalk COBBLES.					25.50	50 for 140mm	
		26.10	~23.8				
Dense fine flint and chalk GRAVEL.					27.00	50 for 140mm	
		28.50	~28.0				
White CHALK with flints.							

Type of Sample

☒ S.P.T. ☒ Undisturbed

☒ C.P.T. ☒ Vane

☒ Jar ☒ Water

☒ Bulk ☒ Piezometer

Remarks (Observations of Ground Water etc.)

Borehole TQ00SW181 – Sheet 4 of 4

Norwest Holst Soil Engineering Ltd.						Borehole No. 2	
Contract No. F4877		BOREHOLE LOG		TQ00SW181		Sheet 4 of 4	
Location <u>Newbrook Pool, Littlehampton</u>				Chainage			
Client <u>Arun District Council</u>				Ground Level <u>2.475</u> m.A.O.D.			
Method of Boring <u>Percussion</u>				Date <u>23/3/81</u>			
Diameter of Borehole <u>150 mm.</u>							
Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.O.D. %	Daily Progress
White CHALK with flints.					30.00	50 for 40mm	
					31.50	50 for 60mm	
					33.00	50 for 50mm	
					34.55	50 for 100mm	
		35.00	-32.5				

Type of Sample

Is S.P.T. ☒ Undisturbed

Ic. C.P.T. ☒ Vane

O Jar ☒ Water

● Bulk ☒ Piezometer

Remarks (Observations of Ground Water etc.)

Borehole TQ00SW60 – Sheet 1 of 3

RECORD OF WELL or BORING

DEATH COTTAGE,

Village, &c. **Peterborough** County **Lincs.** Survey No. **160**
N.S. **22a**
O.S.
Sheet **A**
one-inch map
Scale

Part site below a rising from a soap is
of which, after discussion and direction from parish
church, it was decided to place at least one depth.

TQ 0448 014-1

surface level of ground ft. above Ordnance Datum. Well or Bore commenced at ft. below surface level of ground.
Sink ft. diameter ft. Bored ft.; diameter of boring; at top in., at bottom in.
Details of lining tubes (diameters preferred) **188 x 2"**

Water struck at depths of (feet) **63, 15, 90 & 180**

Rest-level of water below top of well or bore **16.2** ft. Pumping level ft. Time of recovery hours.
Section at ft. depth. Yield: (i) on test galls. per (ii) normal galls. per
Quality (attach copy of analysis if available)

Made by **C. A. J. ...** for Mr. **...** Date of boring **1.11.17**
Information from **...**

For Survey use only:
GEOLOGICAL CLASSIFICATION.

NATURE OF STRATA.
(and see additional remarks)

U.C.R. **clay + stones 11'** - Bricks etc. on Brighton Road
Marl " - U. Chalk

THICKNESS DEPTH
Feet. Inches Feet. Inches

22 (6 1/2) **24 (6 1/2)**
118 (30 1/2) **205 (52 1/2)**

Mr. James Home
Lea Farm, Littlehampton, Kentington.

In Series LXXV.III.(E). O.D. + E. 20. Sites of W (all) and B (fresh)
indicated by D. and Q. at Littlehampton
Office
S.E.A. 24.10.41.

14' x 10'. D's end - ? under (as on B -
K.W.L. 11' x " from battop. Batt-top 2' at
above ground level.

found = O.D. + 16'
21.10.17. R.E.T.

Checked by R. H. Gault (L.H.B.)

Geological Survey and Museum,
South Kensington,
London, S.W.7.

Date received **9/1/41** G.S.M. **6417** M. of H. notified. Site marked on 1" map. **②**

(24582) Wt 2000/2000 K.100 11/06 N. 1, 2 & 2.2.2 On 224

Borehole TQ00SW60 – Sheet 2 of 3

332/77 Bench Cottage, Rustington. (Disused)

TQ00814+3

(a) Surface +16. Lining tubes: 138 x 2 in from 2 above. Water struck at -47, -59, -74 and -164. R.W.L. -%. Saline. Bando, 1914.

R.W.L. +6%. Oct. 1957.

(b) Surface +c.20. Bore 35. Lining tubes: 35 x 3 in. R.W.L. +c.6. Bando, 1914.

(a) Drift	...	...	...	22	22
Uck	...	...	...	178	200

(a)	Drift	clay & stones	11	11
	22'	Marl	11	22
	Uck	Chalk	178	200
	178'			

(b)	Drift	Clay and stones and		
	15'	Marl	15	15
	Uck	Chalk	20	35
	20'			

RECORD of WELL or BORING		332	Survey No. <u>332</u>		
<u>BEACH COTTAGE</u> <u>M' Cleaves House</u> (1746)		TNS <u>332</u> FOS <u>332</u>			
Town, Village, &c. <u>Beckington</u> County <u>Essex</u>		500 ft. map <u>1:100,000</u> Popular Edition <u>1:100,000</u> Sheet <u>A</u>			
Exact site (unless a tracing from a map is supplied, give distance and direction from parish church, manor house, or other object shown on map.) <u>TQ00B1A</u>		one-inch map <u>1:100,000</u> Square <u>A</u>			
Surface level of ground <u> </u> ft. above Ordnance Datum. Well or Bore commenced at <u> </u> ft. below surface level of ground.					
Sunk <u> </u> ft., diameter <u> </u> ft. Bored <u> </u> ft.; diameter of boring: at top <u> </u> in., at bottom <u>2</u> in.					
Details of lining tubes (national dimensions preferred) <u>188 x 2"</u> <u>TQ 0048</u> <u>0141</u>					
Water struck at depths of (feet) <u>63, 75, 90 & 180</u>					
Rest-level of water ^{below} <u> </u> top of well or bore <u>162</u> ft. Pumping level <u> </u> ft. Time of recovery <u> </u> hours.					
Suction at <u> </u> ft. depth. Yield: (i) on test <u> </u> galls. per <u> </u> (ii) normal <u> </u> galls. per <u> </u>					
Quality (attach copy of analysis if available) <u>Salt</u>					
Made by <u>Duke & Stephenson Ltd.</u> for <u> </u>		Date of boring <u>1917</u>			
Information from <u>Duke & Stephenson Ltd.</u>					
(For Survey use only.) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA (and any additional remarks)	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
U.Ck.	<u>Druff</u> { <u>clay & stones</u> } <u>Chalk</u> { <u>Marl</u> }	22		22	
		178		200	
<u>M' Cleaves House</u> <u>Sea Front, Beckington, Ruxington.</u> <u>in Square LXXV.NW.(C). O.D. + 6.20. Site of (W) and (H) (both)</u> <u>indicated by D. and O. at Beckington</u> <u>Office</u> <u>SSAR. 26.10.41.</u> <u>Visited. Discussed - ? whether (a) or (b) -</u> <u>Rich. 11' 6" from base-top. base-top 2 feet</u> <u>above present level.</u> <u>found - O.D. + 16'.</u> <u>21.10.57. H.S.</u>					
Geological Survey and Museum, <u>Source Kenton House, London, S.W.7.</u>					
(For Survey use only.)					
Date received.	G.S.M.	M. of H. notified.	Site marked on 1" map.		
9/7/41	647	[initials]	[initials]		
(22786) W. 1000/1000 1:100,000 N. 1:100,000 1:100,000					

APPENDIX D

Odyssey Markides LLP		Page 1
Tuscany House White Hart Lane Basingstoke RG21 4AF	Rustington	
Date 20/10/14	Designed by MP	
File	Checked by JMurphy	
Micro Drainage		Source Control 2014.1.1
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 2 Soil 0.400 Area (ha) 3.000 Urban 0.200 SAAR (mm) 713 Region Number Region 7 Results l/s QBAR Rural 10.4 QBAR Urban 14.5 Q2 years 13.3 Q1 year 12.3 Q30 years 30.3 Q100 years 39.5		
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Odyssey Markides LLP		Page 1
Tuscany House White Hart Lane Basingstoke RG21 4AF	Rustington Convalescent Home Exisitng Runoff Rates	
Date 20-10-2014 File	Designed by S Rooth Checked by J Murphy	
Micro Drainage Source Control 2014.1.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.400
Area (ha)	3.000	Urban	0.250
SAAR (mm)	721	Region Number	Region 7

Results l/s

QBAR Rural	10.6
QBAR Urban	15.8
Q2 years	14.6
Q1 year	13.4
Q30 years	32.3
Q100 years	41.4

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APPENDIX E

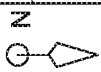


O.S. REF
TQ04
504086

Drawn by: spaceyk
Scale: 1:1250

Date: 15/09/2014

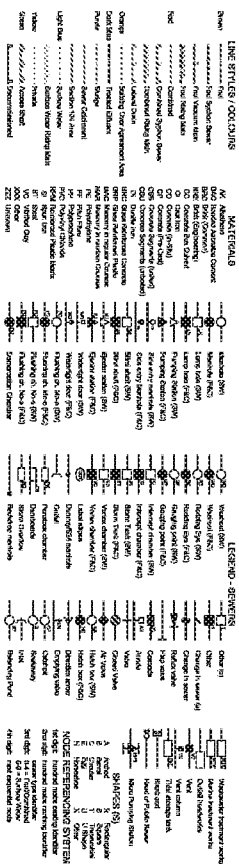
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**Southern
Water**

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
1501X	5.21	0.57	750	CP	CIRC	1501X						1501X					
1302X	4.12		150	CP	CIRC	1302X						1302X					
1303X	2.13		150	CP	CIRC	1303X						1303X					
1304X	4.57	1.32	425	CP	CIRC	1304X						1304X					
1401X	2.19	0.39	225	WC	CIRC	1401X						1401X					
1402X	2.57	0.92	225	CP	CIRC	1402X						1402X					
1403X	2.21	0.41	225	WC	CIRC	1403X						1403X					
1480X				UNK	CIRC	1480X						1480X					
1481X				UNK	CIRC	1481X						1481X					
1482X				UNK	CIRC	1482X						1482X					
1483X				UNK	CIRC	1483X						1483X					
1501X	0.74	-0.03	225	CP	CIRC	1501X						1501X					
2201X	2.21		225	WC	CIRC	2201X						2201X					
2501X	5.07	0.67	750	CP	CIRC	2501X						2501X					
2510X	2.95		300	CI	CIRC	2510X						2510X					
2501X	5.42	1.2	750	CP	CIRC	2501X						2501X					
2502X	5.08	3.08	150	CP	CIRC	2502X						2502X					
2503X	4.81	2.78	150	BMC	CIRC	2503X						2503X					
2502X	4.42	2.26	150	BMC	CIRC	2502X						2502X					
4301X	5.41	1.67	750	CP	CIRC	4301X						4301X					
4401X	5.04	3.63	150	BMC	CIRC	4401X						4401X					
4501X	2.53	3.65	150	BMC	CIRC	4501X						4501X					
4502X	4.33	2.17	150	CP	CIRC	4502X						4502X					
5301X	5.33		UNK	UNK	CIRC	5301X						5301X					
5501X	5.6	4.31	150	WC	CIRC	5501X						5501X					
5502X	5.63	4.13	150	WC	CIRC	5502X						5502X					
5503X	5.73	4.03	150	WC	CIRC	5503X						5503X					
5504X	5.84	3.88	150	WC	CIRC	5504X						5504X					
5505X		3.88	150	WC	CIRC	5505X						5505X					
5506X	6.105		150	WC	CIRC	5506X						5506X					



Drawn by: spaceyk	
Title: 181001_Rusington Convalescent	
Date: 15/09/2014	