

**Chequers Field  
Welwyn Garden City**

**SOAKAGE DRAINAGE REPORT**



**REUBY & STAGG LTD.**  
CONSULTING CIVIL & STRUCTURAL ENGINEERS

**Reuby & Stagg Limited**

Dewey House  
55 High Street  
Ringwood  
Hampshire BH24 1AE  
T: 01425 484400  
E: [admin@reuby-stagg.co.uk](mailto:admin@reuby-stagg.co.uk)  
W: [www.reuby-stagg.co.uk](http://www.reuby-stagg.co.uk)

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Prepared by:	R Barclay	Director		22/07/19
Approved by:	M Dewson	Associate		22/7/19
<b>For and on behalf of Reuby &amp; Stagg Ltd</b>				

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## 1.0 INTRODUCTION

This drainage soakaway report has been prepared in response to NHBC outstanding condition BC27 site reference 000612116 and Welwyn Hatfield Borough Council planning condition 7 application reference 6/2019/0715/cond.

The site is located at OS Grid reference 523630,211306, is currently existing greenfield site covering an area of approx. 0.25Ha. A topographical survey of the site has been undertaken and this can be found in appendix A.



**Fig 1** – Site location plan

The site is bounded by parkland to the north with a residential development to the south.

It is proposed to redevelop the site as residential usage totalling 30 properties with associated access road and parking, a proposed site plan can be found in appendix B.

## 2.0 ASSESSMENT OF SOAKAGE RESULTS COLLATED

Soakage tests were carried out on three constructed lined soakaways on the 23<sup>rd</sup>-29<sup>th</sup> May 2019. The soakaways were originally designed based on the original investigation rate of 1.088E-04m/sec recorded by RPS on the 13<sup>th</sup> March 2017. The as constructed results are included in appendix D.

### 2.1 Construction of soakaways

The soakaways have been constructed using precast perforated rings of 2.1m diameter within a pit filled with single sized stone 3.154m x 31.5m. All the soakaways have been constructed incorrectly at the base where the contractor installed a larger foundation than designed resulting in a 600 dia free draining base. Following a site visit on the 10<sup>th</sup> July with the client, contractor and Reuby & Stagg present the contractor was instructed to put right the over spill of concrete to ensure construction of the base is as expected and designed.

### 2.2 Soakage Test Results

Three tests were carried out by Soiltechnics on each soakaway and the results of infiltration are within Appendix D but recorded below with commentary.

LOCATION	CYCLE	RESULTS	COMMENTS
SA01	1	7.87E-05 m/s	RESULT USED FOR DESIGN CHECK
	2	5.77E-05 m/s	
	3	5.00E-05 m/s	
SA02	1	7.39E-04 m/s	RESULT USED FOR DESIGN CHECK
	2	1.41E-03 m/s	
	3	1.03E-03 m/s	
SA03	1	6.30E-05 m/s	RESULT DISREGARDED DUE TO LACK OF DATA LOGGER RESULTS
	2	1.18E-05 m/s	
	3	3.21E-05 m/s	RESULT USED FOR DESIGN CHECK

Test results were significantly lower than previous 2017 site investigation identified and the worst case result used for the design check.

### 3.0 Drainage Design

The original design of drainage and Suds was carried out by Reuby & Stagg Ltd. May 2016 based on the drainage strategy put forward at planning and on expected infiltration rates, the recent testing of the as-built soakaways has resulted in a revisit of the design philosophy and in the case of Soakaway 03 the detailing of additional online storage by means of an 1800mm dia silt trap to provide additional storage due to the given results in this location.

All soakaways as detailed on the drainage layout enclosed in appendix C now remove above ground flooding from the 100 year + 40% climate change event, the following is a summary of the effects on each soakaway using the as constructed infiltration rate.

#### 3.1 Soakaway 01

Soakaway 1 is a traditional 2.1m dia lined soakaway, within a 3.15m x 3.15m pit filled with single sized stone to provide 30% voidage. The soakaway also benefits from a permeable porous paved carpark construction above providing additional storage at a level of 80.08m AOD by means of single sized sub-base construction. The soakaway is 2.5m deep. Microdrainage results are included within appendix E and show that during the 100-year event + 40% climate change the soakaway shall fill to the level of 80.08m then utilise an area of 45m<sup>2</sup> of the porous paving voidage which has a total area of 360m<sup>2</sup>.

#### 3.2 Soakaway 02

Soakaway 2 is a traditional 2.1m dia lined soakaway, within a 3.15m x 3.15m pit filled with single sized stone to provide 30% voidage. The soakaway also benefits from a permeable porous paved carpark construction above providing additional storage at a level of 80.34m AOD by means of single sized sub-base construction. The soakaway is 2.5m deep. Microdrainage results are included within appendix E and show that during the 100-year event + 40% climate change the soakaway shall fill to a level of 78.883m therefore not requiring to utilise any of porous paved voidage.

#### 3.3 Soakaway 03

Soakaway 3 is a traditional 2.1m dia lined soakaway, within a 3.15m x 3.15m pit filled with single sized stone to provide 30% voidage. Due to the poor infiltration rate found through the as constructed testing, additional storage by means of the adjacent 1.8m dia Silt trap is required to increase the effective pit voidage to 69%. The soakaway is 3.9m deep. Microdrainage results are included within appendix E and show that during the 100-year event + 40% climate change with the additional storage the soakaway shall fill to a level of 79.610m.

#### 4.0 SuDS MAINTENANCE

The following table provides a typical maintenance strategy to be applied to each of the drainage features which will ensure that the systems operate as designed,

Drainage Element	Inspection / Maintenance	Frequency	Remedial Action	Responsible Party
Roof Drainage	Clean gutters and downpipes	Annually	Repair as necessary	Management Company
Below ground drainage runs and chambers	CCTV drain runs and jet wash.	Every 5 years	Repair as necessary	Management Company
	Inspect chambers for debris	Annually	Remove debris and sediment as required	
Permeable Paving	Sweep and vacuum paving	End of winter, mid-summer and end of autumn.	Take up defective area of block paving and replace bedding layer and geotextile	Management Company
	Inspect for evidence of poor performance	48hrs following heavy rainfall		
Soakaways	Inspect for build up of debris/leaf litter etc.	End of winter, mid-summer and end of autumn.	Remove debris and sediment as required.	Management Company

## 5.0 SUMMARY AND CONCLUSIONS

Although the as constructed tests results were significantly lower than original investigations, with the initial design including factors of safety and the construction and usage of porous paving for the extreme events and an additional storage element adjacent to soakaway 3, all the soakaway elements are proven to work within the required guidelines for the 100 year event + 40% climate change and therefore are deemed acceptable for all events up to and including this extreme event. The design check proves that no above ground flooding occurs and dwellings on-site and offsite are not affected by the development of this site.

It is concluded that the development at Chequers Field, is not at risk of flooding, will not increase surface water flood risk elsewhere, and, through the implementation of identified mitigation measures will not increase flood risk, the development therefore complies with the requirements of the relevant guidelines for construction.



## Appendix A - Topographical Survey

## Appendix B - Site Layout

**Appendix C – Drainage Layout**

## Appendix D – Soiltechnics soakage results

## Appendix E – Micro drainage, Windes Results