



SURFACE WATER DRAINAGE CALCULATIONS

for

**Proposed Residential Development
at
Villa Maria
Campbell Road
Bognor Regis**

Client:
SCG Properties Ltd

Architect:
Vivid Design Studio
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Issue		A	B
Issued By	Daniel Waddup		
Date	June 2017		
Purpose	Information		
Approved By			

Project No: VIV 024

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1.0 Introduction

The following calculations have been used to size the soakaway required for the proposed scheme.

It is assumed that building roofs would be drained to a local soakaway constructed using a modular crate system. Parking and access would be constructed in permeable paving.

The following calculations are provided in accordance with the site ground conditions and SuDS criteria.

2.0 Surface Water Drainage Design

Ground investigations were carried out on the site on 7th February 2017.

Infiltration testing during these investigations has recorded an infiltration rate of 1.8×10^{-5} m/s which will be adopted for the soakaway design.

The soakaway will be designed to contain surface water runoff for the 1 in 100 year storm + 40% climate change allowance. In accordance with the SuDS Manual Ciria 753, a factor of 1.5 will be applied.

3.0 Proposed Surface Water Drainage

Due to the constraints of the site layout it is not possible to locate the required 8.5m x 2.0m x 0.8m deep (below incoming invert) soakaway the necessary 5m from adjacent structures and a reasonable distance from the highway.

It is proposed that, subject to authorisation by the relevant authorities, surface water run-off from roofs of the development will be discharged into the local sewer in Campbell Road via the existing connection.

APPENDICES

- A.** Site Plan
- B.** Drainage Calculations

APPENDIX A

Site Plan



PROPOSED SITE PLAN
(1:100)

Notes

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DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORK AND ANY DISCREPANCIES SHALL BE REPORTED TO THE DESIGNER. FIGURED DIMENSIONS MUST BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS.

Rev:-	Description:-	Date:-	Chkd by:-

Schedule of Areas

Total Site Area
= 760sqm/0.08hectares/0.2acres

Existing Ground Floor NFA
= 262sqm/2820sqft
Existing First Floor NFA
= 185sqm/1991sqft
Existing Second Floor NFA
= 137sqm/1475sqft

Total Existing NFA = 584sqm/6286sqft

Demolition NFA = 48sqm/517sqft

Proposed Ground Floor NFA
= 366sqm/3940sqft
Proposed First Floor NFA
= 212sqm/2256sqft
Proposed Second Floor NFA
= 149sqm/1604sqft

Total Proposed NFA = 727sqm/7825sqft



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Project:-

Proposed Conversion
Villa Maria
Campbell Road
Bognor Regis

Title:-

Proposed Site Plan

Client:-

SCG Properties Ltd

Scale:-

1:100 (@A1)

Drawn By:-

PJD

Checked By:-

Date:-

27/09/16

Date:-

Job.No:-

160035

Drg.No:-

03

Rev:-

APPENDIX B

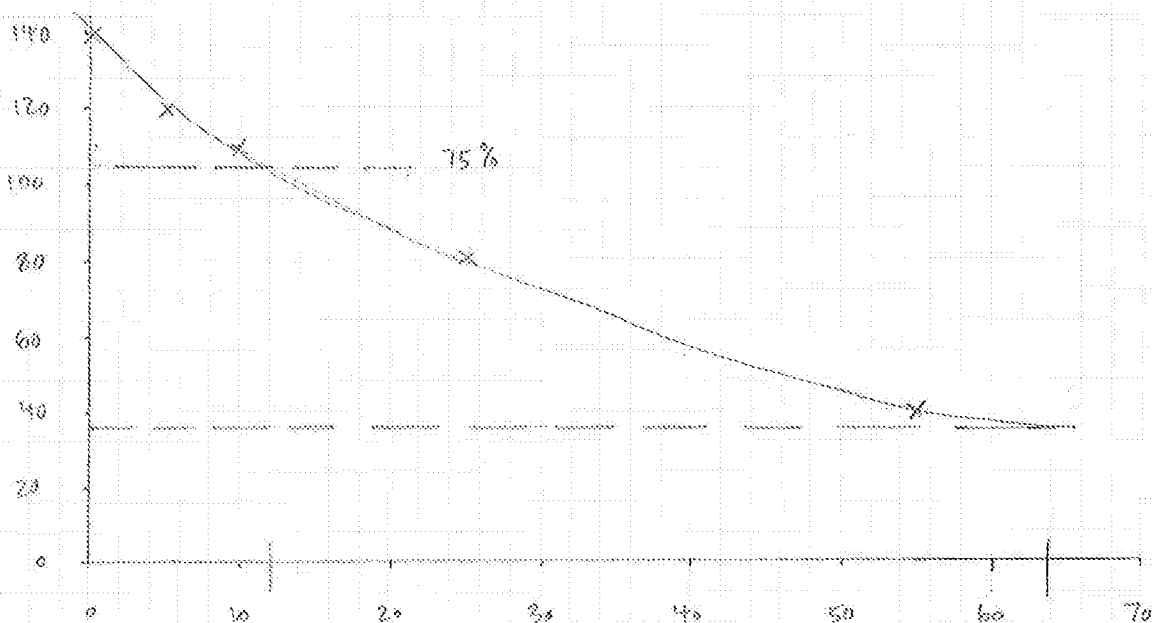
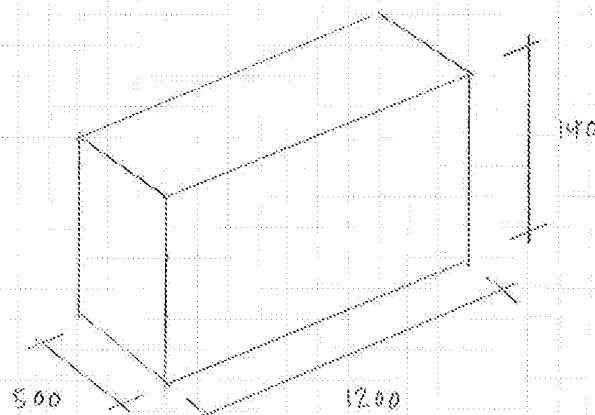
Drainage Calculations

CALCULATIONS

Job Title VILLA MARIA	Job No. V14024	Sht. No. 001
Element SOAKAWAY TEST	Prepared JW	Date Checked Date

TRIAL HOLE RESULTS.

DEPTH	TIME (MINIS)
140	0
120	5
110	10
80	25
40	55
0	65



$$\text{EFFECTIVE VOL} = 1.2 \times 0.5 \times 0.07 = 0.042 \text{ m}^3$$

$$\text{INTERNAL SURFACE AREA} = 1.2 \times 0.5 + 0.07(1.2 + 0.5) = 0.72 \text{ m}^2$$

$$\text{TIME 75\% TO 25\% EFFECTIVE DEPTH} = 55 \text{ mins} = 3180 \text{ s}$$

$$\text{INFILTRATION RATE, } f = 0.042 / (0.72 \times 3180) = 1.6 \times 10^{-5} \text{ m/s}$$

$$\text{WITH 1.5 F.O.S, } f = \underline{\underline{1.2 \times 10^{-5} \text{ m/s}}}$$



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CALCULATIONS

Job Title VILLA MARIA	Job No. V13024	ShL No. C02	
Element SOAKAWAY SIZE	Prepared DLW	Date	Checked Date

SIZE SOAKAWAY FOR NEW BUILDINGS ONLY, NEW PAVING ASSUMED TO BE PERMEABLE

IMPERMEABLE AREA = $(27 \times 5) + (10 \times 3) = 165 m^2$

SEE TEDDS OUTPUT, FOLLOWING SHEETS.

PER SOAKAWAY = $815m^2 \times 2.0m \times 0.8m$ (BELOW INCOMING INVERT, 50mm BELOW GRADE).

 Tekla Tedds Rushby Brewster The Town House St George's Square Bishops Waltham	Project Villa Maria, Bognor Regis				Job no. VIV024	
	Calcs for Soakaway				Start page no./Revision 1	
	Calcs by DW	Calcs date 16/06/2017	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area Brighton
 Impermeable area drained to the system $A = 165.0 \text{ m}^2$
 Return period Period = 100 yr
 Ratio 60 min to 2 day rainfall of 5 yr return period $r = 0.350$
 5-year return period rainfall of 60 minutes duration $M5_{60\text{min}} = 20.0 \text{ mm}$
 Increase of rainfall intensity due to global warming $p_{\text{climate}} = 40 \%$

Soakaway / infiltration trench details

Soakaway type Rectangular
 Minimum depth of pit (below incoming invert) $d = 800 \text{ mm}$
 Width of pit $w = 2000 \text{ mm}$
 Length of pit $l = 8207 \text{ mm}$
 Percentage free volume $V_{\text{free}} = 95 \%$
 Soil infiltration rate $f = 12.0 \times 10^{-6} \text{ m/s}$
 Wetted area of pit 50% full $a_{s50} = l \times d + w \times d = 8165868 \text{ mm}^2$

Table equations

Inflow $I = M100 \times A$
 Outflow $O = a_{s50} \times f \times D$
 Storage $S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
5	0.36	10.0	1.91	19.1	3.15	0.03	3.12
10	0.51	14.2	1.98	28.0	4.63	0.06	4.57
15	0.62	17.3	2.01	34.7	5.72	0.09	5.63
30	0.79	22.0	2.02	44.5	7.35	0.18	7.17
60	1.00	28.0	1.99	55.6	9.18	0.35	8.82
120	1.22	34.3	1.94	66.3	10.94	0.71	10.24
240	1.50	41.9	1.87	78.6	12.96	1.41	11.55
360	1.69	47.3	1.83	86.7	14.30	2.12	12.18
600	1.95	54.5	1.78	97.0	16.00	3.53	12.48
1440	2.48	69.4	1.68	116.5	19.22	8.47	10.76

Required storage volume $S_{\text{req}} = 12.48 \text{ m}^3$

Soakaway storage volume $S_{\text{act}} = l \times d \times w \times V_{\text{free}} = 12.48 \text{ m}^3$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{\text{req}} \times 0.5 / (a_{s50} \times f) = 17\text{hr } 41\text{min } 20\text{s}$

PASS - Soakaway discharge time less than or equal to 24 hours