William Stokes
Consulting

Drainage Design

8a Boarsfield, Kingsland

Drainage Design

8a Boarsfield, Kingsland

GENERAL NOTES

Report ref: GPT_01_DD

Date: June 2023

Version	Date	Issued to
Original	June 23	George Thomas

Author: Bill Stokes

Introduction

The following drainage design has been developed in order to assist with a planning application on the site for a single dwelling.

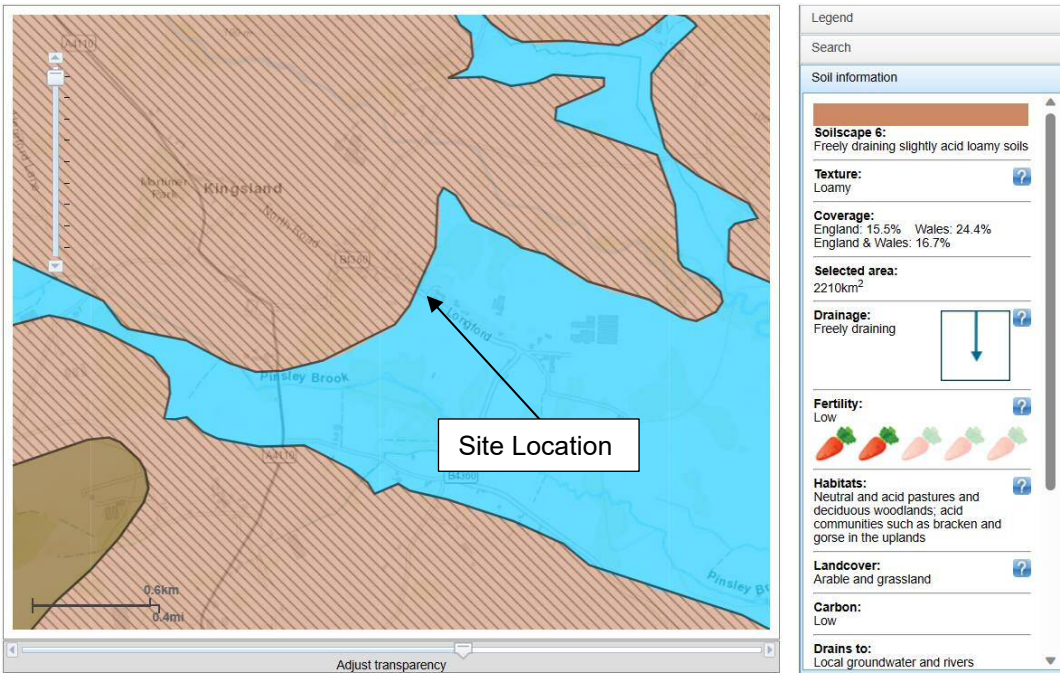
The proposal is for a 93m^2 semi detached dwelling (Design & Access Statement page 11), which requires a drainage solution for the disposal of surface water.

Site Location

The site is located at the eastern edge of the Boarsfield housing estate, on the road between Kingsland and Yarpole. The Grid Reference for the site is: SO445617. The test location was a level site.

Characteristics

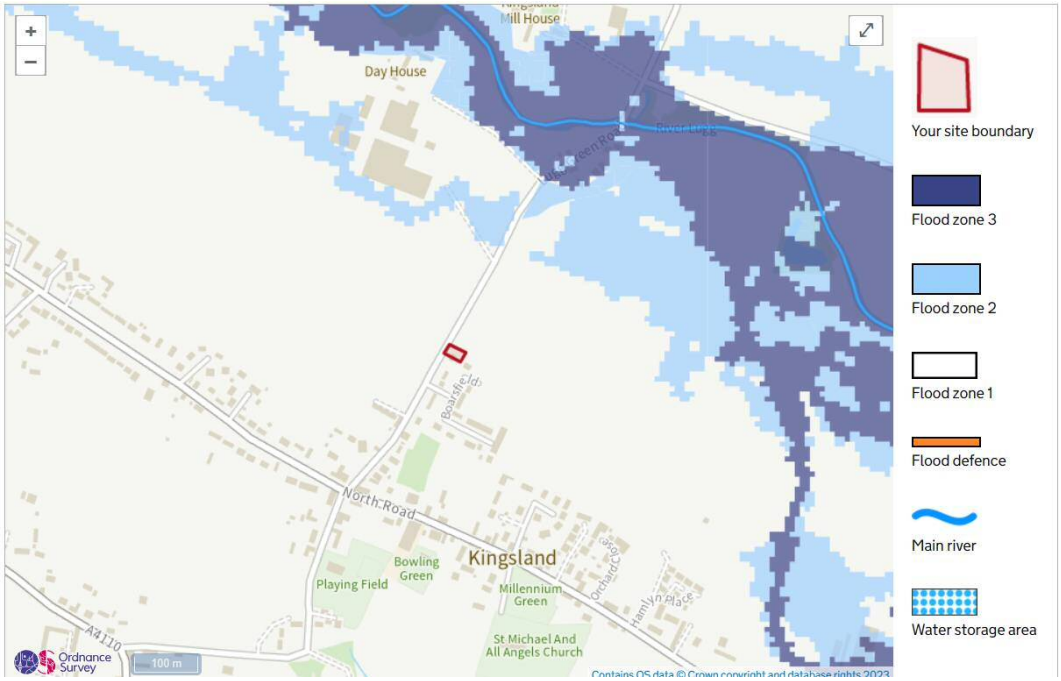
The soil characteristics were checked on Soilscapes. The area of the site is shown as "Freely draining slightly acid loamy soils".



A check of the "Flood maps for Planning" website shows the site is in Zone 1 and free of flood risk.

Flood map showing the flood zone your site is in

The map shows the flood risk to your site and the surrounding area.



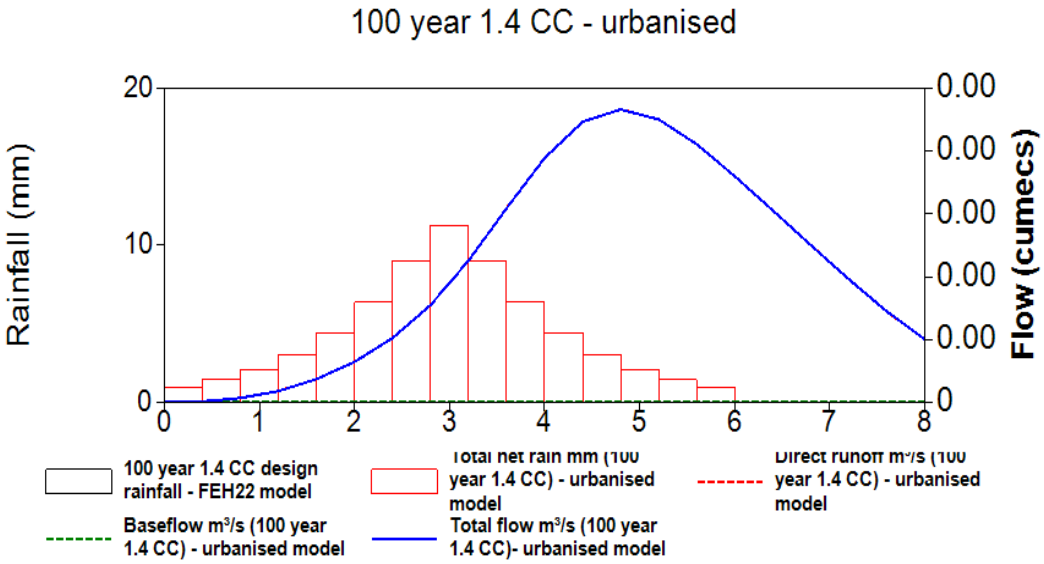
Onsite testing

Tests were planned on site, details of which are included in the Infiltration test report in Appendix A. Successful tests were undertaken and an acceptable infiltration result of **1.35 x 10^{-5} m/s** was obtained.

Rainfall Calculations

Rainfall Data

Using FEH 2022 rainfall data for the site (Obtained from the FEH Web Service – Appendix B) input into the REFH Revitalised Flood Hydrograph modelling software (produced by Wallingford Hydro Solutions) the storm levels for a 1 in 100 year + 40% Climate Change 6 hr storm flow for the existing site have been calculated (Appendix B). A 6-hr scenario has been chosen as this is recommended by the REFH2 software as follows "*run off volume for a development site is usually defined as the 1:100 year 6 hour duration design event based upon research by Kellagher (2002)*".



Drainage Areas

Assuming a total area of 100m2 (The actual impermeable area is 93m2, but this has been rounded up), the REFH software calculates that for a 1 in 100 year (+40% climate Change Uplift) 6-hour storm on the building will generate 6.62m^3 of rainwater.

Proposed Drainage Design

It is proposed to use two drainage crate soakaways (one to the front, and one to the rear of the property), in order to dispose of the surface water to ground. Calculations are attached in Appendix B which show 2nr soakaways with dimensions 2.0 m x 1.0 m x 1.2m (base of soakaway at 1.7m below finished ground level) would be required.

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Appendix A – Infiltration Test Results

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Infiltration Test Report

8a Boarsfield, Kingsland

Infiltration Test Report

8a Boarsfield, Kingsland

GENERAL NOTES

Report ref: GPT_001_ITR

Date: 26th January 2023

Version	Date	Issued to
Original	June 2023	George Thomas

Author: Bill Stokes

Introduction

A visit was made to the site on the 23rd June 2023 to undertake infiltration tests as requested by George Thomas, to assist with a planning application for a building on the site. The Infiltration Tests were to be undertaken in accordance with BRE 365.

The weather was warm and sunny.

Site Location

The site is located at the eastern edge of the Boarsfield housing estate, on the road between Kingsland and Yarpole. The Grid Reference for the site is: SO445617. The test location was a level site.

Test Locations

Specifically, the test locations agreed with the Client was to be the location of the proposed soak away at the front of the property. The actual locations of the GWLA and the Trial Hole are as per the Location Sheet in Appendix A.

Ground Water Level Assessment Trial Pit

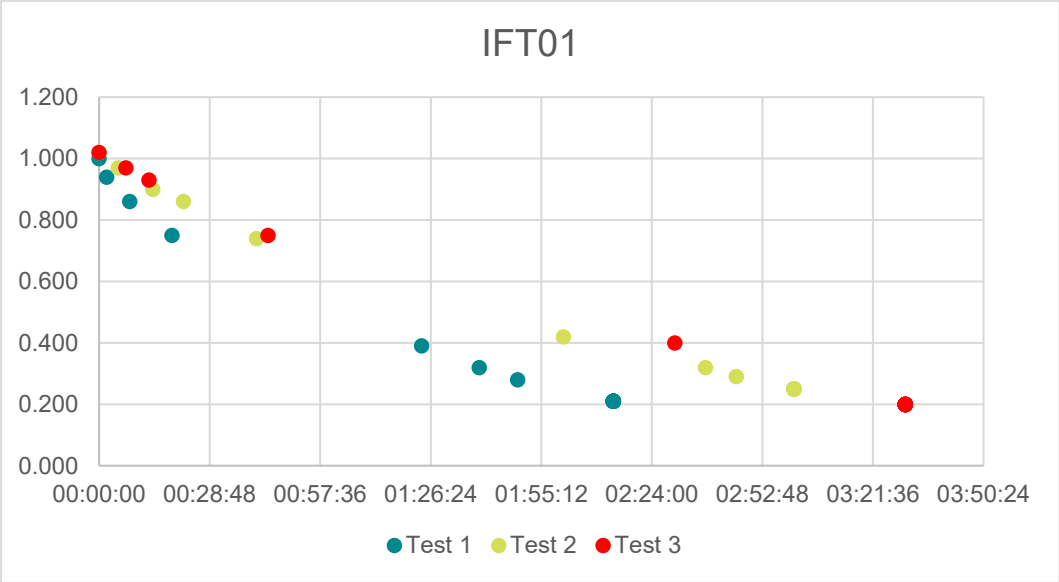
The trial pit was excavated to an overall dimension of 2.1m x 0.45m x 2.5m. Below a layer of topsoil was encountered a layer of brown loam subsoil which extended to 700mm below ground level. Beyond this depth a brown loam/gravel was found. This contained small to medium rounded stones and was increasingly damp at depth. The excavation ceased at 2.5m below ground level and was left open for the duration of the visit. At no time did any ground water enter the excavation. A record of the soil strata encountered is included in Appendix B.

Test Pits

The Infiltration test pit was excavated to a depth of 1.5m below ground level. The soil strata in the test pit was identical to the GWLA.

Infiltration Test

ITP01 was filled with 1.00m of water, and the subsequent drop in levels recorded. The initial test started at 09:26 and the level had reached 25% full after 1hr 59m. Two further tests were successfully conducted, and the hole was allowed to drain completely after the final test. A copy of these results is included in Appendix B, and is shown on the graph below:



A summary table from these results is shown below:

Test	Time at 75% Full	Time at 25% Full	Difference (Min)	Difference (Sec)
Test 1	00:19	01:59	101	6,043
Test 2	00:39	03:01	142	8,495
Test 3	00:44	03:15	151	9,060
Worst Result				9,060

Calculations are included in appendix C which show the infiltration rate for this test hole equates to **1.35 x 10^{-5} m/s.**

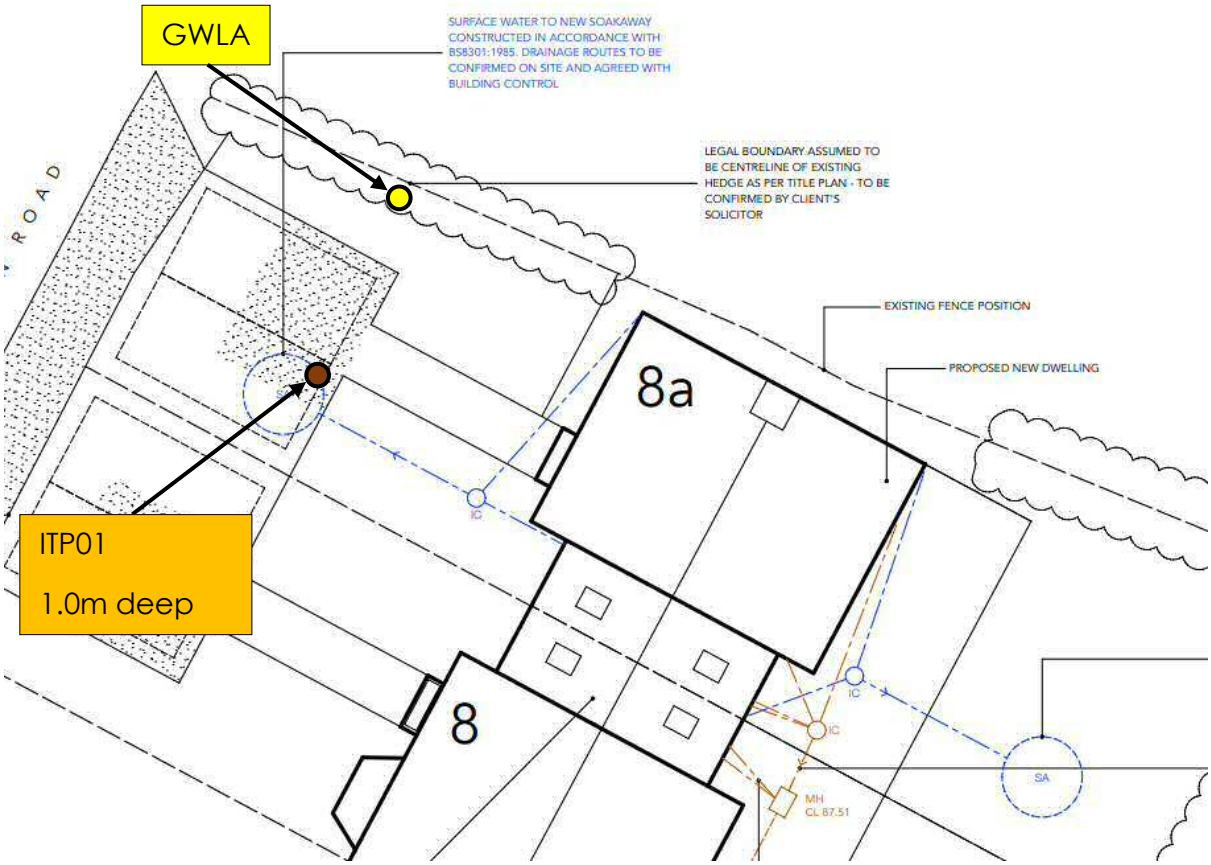
Summary

A successful infiltration test was undertaken on site, giving a reasonable result, which would be expected with the ground conditions encountered in the GWLA hole. The latter also showed no evidence of ground water at a depth of 2.5m for the duration of the site visit.

Appendix A

Test Locations

Drainage Test Locations



Trial Holes 1nr – 2.5m deep	Infiltration Test Pits 1 Nr – 1.0m deep	Percolation Tests n/a
Percolation Tests to Building Regs / Infiltration Testing to BRE 365		
Client: GP Thomas	Site: 8a Boarsfield, Kingsland	Date: 23rd June 2023

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Appendix B

Trial Hole / Test Logs

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TRIAL PIT LOG

Trial Hole No. 1

Project: 8a Boarsfield, Kingsland	Client: GP Thomas	Logged by: BS
Job No: GPT_001	Date: 23/06/2023	Ground Lvl (m): 86m AOD
		Checked By:

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
						(0.3) 0.30	TOPSOIL: Brown / red with Organic Matter
						(0.4) 0.70	Brown clay LOAM / occasional round stones
						(1.8) 2.50	Brown LOAM/Gravel with small / medium rounded stones
							End of hole at 2.5m bgl

Length: 2.1m

Width: = 0.45

TRIAL PIT DIMENSIONS

Ground Water	General Remarks	Final Depth
Strike Depth Rising To Remarks **No water found**		**2.5m bgl**
Contractor: William Stokes Consulting	Method / Plant Used: JCB 3CX	

William Stokes Consulting

SOAKAWAY TEST SHEET TO BRE365

RESULT SHEET

Site Location: 8a Boarsfield, Kingsland

Weather: Sunny

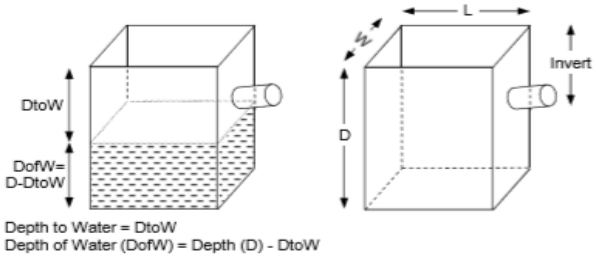
Position on Site: Near Entrance

Hole Number: IFT01

Hole Dimensions (m): Length 1.7 L

Width 0.4 W

Depth 1.44 D



Proposed Depth to pipe invert (m): 0.500 Invert

Was hole filled with Granular Material: No

Dates:

1st Test 23/06/2023 2nd Test 23/06/2023 3rd Test 23/06/2023

TEST 1			TEST 2			TEST 3		
Time (00:00Hrs)	Depth OF Water (DofW) (m)	Depth TO Water (DtoW) (m)	Time (00:00Hrs)	Depth OF Water (DofW) (m)	Depth TO Water (DtoW) (m)	Time (00:00Hrs)	Depth OF Water (DofW) (m)	Depth TO Water (DtoW) (m)
09:26:00	1.000	0.440	11:44:00	1.020	0.420	14:50:00	1.020	0.420
09:28:00	0.940	0.500	11:49:00	0.970	0.470	14:57:00	0.970	0.470
09:34:00	0.860	0.580	11:58:00	0.900	0.540	15:03:00	0.930	0.510
09:45:00	0.750	0.690	12:06:00	0.860	0.580	15:34:00	0.750	0.690
10:50:00	0.390	1.050	12:25:00	0.740	0.700	17:20:00	0.400	1.040
11:05:00	0.320	1.120	13:45:00	0.420	1.020	18:20:00	0.200	1.240
11:15:00	0.280	1.160	14:22:00	0.320	1.120			
11:40:00	0.210	1.230	14:30:00	0.290	1.150			
			14:45:00	0.250	1.190			

Appendix C

Infiltration Calculation

William Stokes Consulting	**Infiltration Calculation**	Test Hole No. ITP01
Project: 8a Boarsfield, Kingsland	Client: GP Thomas	Logged by: BS
Job No: GPT/01	Date: 23rd June 2023 Ground Lvl (m): 86 AOD	Checked By:

ITP02

Part A: Trial Pit Data

Length of Trial Pit	1.70	m
Width of Pit	0.40	m
Depth of trial pit (below invert)	1.00	m
Free Volume	100	%

75% depth of pit	0.75	m
50% depth of pit	0.5	m
25% depth of pit	0.25	m

Part B: Test Data

Test 1 from 75% to 25%	6043	Secs
Test 2 from 75% to 25%	8495	Secs
Test 3 from 75% to 25%	9060	Secs
Worst time from 75% to 25% (t_{p75-25})	9060	Sec

Part C: Calculation

Storage Volume from 75% to 25% (V_{P75-25})	0.34	m3
Internal Surf Area from 75% to 25% (a_{s50})	2.78	m2
Soil Infiltration Rate (f) $f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$	0.00001350	m/s

Appendix B – Rainfall Data / Calculations

VERSION "FEH Web Version 1.0.0 exported a 14:47:38 GMT Tue 27-Jun-23
Parameters
Rainfall mc FEH22
Calculatior Design rainfall
Calculatior For a point
Calculatior Point GB 344592 261752 SO 44592 61752
Duration= 6 Hours
Fixed dura no
Return per 100 Years
Annual ma yes
A design rainfall of 66.9 mm was calculated.
This design rainfall has been calculated for a return period on the annual maximum scale.
The data in the following table have been computed using sliding durations.

Duration h	Duration d	2 year rain	5 year rain	10 year rai	20 year rai	30 year rai	50 year rai	75 year rai	100 year ra	150 year ra	200 year ra	500 year ra	1000 year	10000 year rainfall (mm)
0.25	0.010417	6.84	10.68	13.34	16.1	17.71	19.76	21.47	22.73	24.52	25.82	30.1	33.44	44.85
0.5	0.020833	8.88	13.9	17.51	21.25	23.45	26.28	28.6	30.32	32.9	34.77	40.84	45.67	62.3
0.75	0.03125	10.22	15.92	20.11	24.49	27.06	30.43	33.22	35.27	38.22	40.39	47.69	53.42	73.5
1	0.041667	11.18	17.49	22.11	26.86	29.73	33.49	36.6	38.87	42.19	44.61	52.68	59.12	81.75
1.25	0.052083	12.34	19.05	23.95	28.96	32.05	36.07	39.4	41.85	45.41	48	56.63	63.49	87.28
1.5	0.0625	13.51	20.49	25.59	30.82	34.07	38.29	41.81	44.4	48.16	50.89	59.95	67.1	91.61
1.75	0.072917	14.63	21.8	27.07	32.49	35.86	40.26	43.94	46.65	50.56	53.41	62.82	70.2	95.2
2	0.083333	15.68	23	28.41	33.99	37.48	42.03	45.85	48.67	52.72	55.65	65.36	72.93	98.29
2.25	0.09375	16.53	24.05	29.59	35.36	38.97	43.68	47.64	50.56	54.74	57.78	67.76	75.49	101.25
2.5	0.104167	17.31	25	30.67	36.61	40.32	45.19	49.28	52.28	56.59	59.71	69.92	77.8	103.91
2.75	0.114583	18.03	25.88	31.66	37.77	41.57	46.59	50.78	53.86	58.28	61.48	71.9	79.9	106.31
3	0.125	18.7	26.69	32.58	38.84	42.73	47.88	52.18	55.32	59.85	63.11	73.71	81.82	108.49
3.25	0.135417	19.32	27.45	33.44	39.83	43.81	49.08	53.47	56.68	61.29	64.62	75.39	83.59	110.49
3.5	0.145833	19.91	28.16	34.24	40.77	44.82	50.2	54.67	57.94	62.64	66.02	76.93	85.22	112.34
3.75	0.15625	20.46	28.83	35	41.64	45.77	51.25	55.8	59.12	63.89	67.32	78.37	86.73	114.04
4	0.166667	20.98	29.46	35.71	42.47	46.66	52.23	56.86	60.23	65.06	68.54	79.7	88.14	115.62
4.25	0.177083	21.47	30.05	36.38	43.23	47.49	53.14	57.83	61.24	66.14	69.65	80.92	89.42	117.08
4.5	0.1875	21.93	30.61	37.01	43.95	48.28	54	58.74	62.2	67.15	70.69	82.05	90.62	118.44
4.75	0.197917	22.37	31.13	37.61	44.64	49.02	54.81	59.6	63.1	68.09	71.67	83.11	91.74	119.71
5	0.208333	22.78	31.64	38.18	45.28	49.72	55.57	60.42	63.94	68.98	72.59	84.11	92.78	120.89
5.25	0.21875	23.18	32.11	38.72	45.9	50.38	56.29	61.18	64.74	69.82	73.45	85.05	93.77	122.01
5.5	0.229167	23.56	32.57	39.24	46.48	51.01	56.97	61.91	65.5	70.61	74.27	85.93	94.7	123.06
5.75	0.239583	23.93	33.01	39.73	47.04	51.61	57.63	62.6	66.22	71.37	75.04	86.77	95.59	124.06
6	0.25	24.28	33.43	40.21	47.57	52.19	58.25	63.26	66.9	72.08	75.78	87.57	96.42	125
6.25	0.260417	24.62	33.82	40.65	48.07	52.72	58.83	63.88	67.54	72.75	76.47	88.32	97.21	125.88
6.5	0.270833	24.94	34.2	41.08	48.55	53.24	59.39	64.47	68.15	73.39	77.13	89.03	97.96	126.71
6.75	0.28125	25.26	34.57	41.49	49.01	53.73	59.92	65.03	68.74	74	77.76	89.71	98.68	127.5
7	0.291667	25.56	34.92	41.89	49.45	54.2	60.43	65.57	69.29	74.59	78.36	90.35	99.36	128.26
7.25	0.302083	25.85	35.26	42.27	49.88	54.65	60.91	66.08	69.83	75.14	78.93	90.97	100	128.98
7.5	0.3125	26.14	35.58	42.64	50.28	55.08	61.38	66.58	70.34	75.68	79.48	91.56	100.63	129.67
7.75	0.322917	26.41	35.9	42.99	50.68	55.5	61.83	67.05	70.83	76.19	80	92.13	101.22	130.32
8	0.333333	26.68	36.21	43.34	51.05	55.9	62.26	67.5	71.3	76.68	80.51	92.67	101.79	130.96
8.25	0.34375	26.93	36.5	43.67	51.42	56.29	62.68	67.94	71.75	77.15	80.99	93.19	102.33	131.56
8.5	0.354167	27.18	36.79	43.99	51.77	56.66	63.08	68.36	72.18	77.6	81.46	93.69	102.86	132.14
8.75	0.364583	27.42	37.07	44.3	52.12	57.02	63.47	68.77	72.6	78.04	81.91	94.17	103.36	132.7
9	0.375	27.66	37.34	44.6	52.45	57.37	63.84	69.16	73.01	78.46	82.34	94.63	103.85	133.24
9.25	0.385417	27.89	37.61	44.9	52.77	57.71	64.2	69.54	73.4	78.87	82.76	95.08	104.32	133.76
9.5	0.395833	28.11	37.86	45.18	53.08	58.03	64.55	69.91	73.78	79.26	83.16	95.51	104.77	134.26
9.75	0.40625	28.33	38.12	45.46	53.38	58.35	64.89	70.27	74.14	79.64	83.55	95.93	105.2	134.75
10	0.416667	28.54	38.36	45.73	53.68	58.66	65.22	70.61	74.5	80.01	83.93	96.33	105.62	135.21
10.25	0.427083	28.75	38.6	45.99	53.96	58.96	65.54	70.94	74.84	80.37	84.29	96.72	106.03	135.67
10.5	0.4375	28.95	38.83	46.25	54.24	59.25	65.85	71.27	75.17	80.72	84.65	97.1	106.42	136.11
10.75	0.447917	29.14	39.06	46.5	54.51	59.53	66.15	71.58	75.5	81.05	84.99	97.47	106.81	136.53
11	0.458333	29.34	39.28	46.74	54.77	59.81	66.44	71.89	75.81	81.38	85.33	97.82	107.17	136.94
11.25	0.46875	29.52	39.49	46.98	55.03	60.08	66.73	72.18	76.12	81.69	85.65	98.17	107.53	137.34
11.5	0.479167	29.71	39.71	47.21	55.28	60.34	67	72.47	76.41	82	85.96	98.5	107.88	137.73
11.75	0.489583	29.88	39.91	47.44	55.53	60.59	67.27	72.75	76.7	82.3	86.27	98.83	108.22	138.11
12	0.5	30.06	40.12	47.66	55.77	60.84	67.54	73.03	76.98	82.59	86.57	99.14	108.55	138.48
12.25	0.510417	30.23	40.31	47.88	56	61.08	67.79	73.29	77.25	82.87	86.86	99.45	108.86	138.83
12.5	0.520833	30.39	40.51	48.09	56.22	61.31	68.04	73.54	77.51	83.15	87.14	99.74	109.16	139.18
12.75	0.53125	30.55	40.7	48.29	56.45	61.54	68.28	73.79	77.77	83.41	87.41	100.03	109.45	139.51
13	0.541667	30.71	40.89	48.5	56.66	61.76	68.51	74.04	78.02	83.67	87.68	100.31	109.74	139.84
13.25	0.552083	30.87	41.07	48.7	56.88	61.98	68.74	74.28	78.26	83.93	87.94	100.58	110.02	140.16
13.5	0.5625	31.02	41.25	48.89	57.08	62.2	68.97	74.51	78.5	84.17	88.19	100.85	110.29	140.47
13.75	0.572917	31.17	41.43	49.08	57.29	62.41	69.19	74.74	78.73	84.42	88.44	101.11	110.56	140.77
14	0.583333	31.31	41.6	49.27	57.49	62.61	69.4	74.96	78.96	84.65	88.68	101.37	110.82	141.07
14.25	0.59375	31.46	41.77	49.45	57.68	62.81	69.61	75.18	79.18	84.89	88.92	101.61	111.07	141.36
14.5	0.604167	31.6	41.94	49.63	57.88	63.01	69.82	75.39	79.4	85.11	89.15	101.86	111.32	141.65
14.75	0.614583	31.74	42.11	49.81	58.06	63.2	70.02	75.6	79.61	85.33	89.38	102.1	111.57	141.92
15	0.625	31.88	42.27	49.99	58.25	63.39	70.22	75.8	79.82	85.55	89.6	102.33	111.81	142.2
15.25	0.635417	32.01	42.43	50.16	58.43	63.58	70.41	76.01	80.03	85.76	89.82	102.56	112.04	142.46
15.5	0.645833	32.14	42.59	50.33	58.61	63.77	70.61	76.2	80.23	85.97	90.03	102.78	112.27	142.73
15.75	0.65625	32.28	42.74	50.49	58.79	63.95	70.79	76.4	80.43	86.17	90.24	103	112.49	142.98
16	0.666667	32.41	42.9	50.66	58.96	64.12	70.98	76.59	80.62	86.37	90.44	103.21	112.71	143.23
16.25	0.677083	32.53	43.05	50.82	59.13	64.3	71.16	76.77	80.81	86.57	90.64	103.42	112.93	143.48
16.5	0.6875	32.66	43.2	50.98	59.3	64.47	71.34	76.95	81	86.76	90.84	103.63	113.14	143.72
16.75	0.697917	32.78	43.34	51.13	59.46	64.64	71.51	77.13	81.18	86.95	91.03	103.83	113.35	143.96
17	0.708333	32.9	43.49	51.29	59.63	64.81	71.68	77.31	81.36	87.14	91.22	104.03	113.55	144.19
17.25	0.71875	33.03	43.63	51.44	59.79	64.97	71.85	77.48	81.54	87.32	91.41	104.23	113.76	144.42
17.5	0.729167	33.14	43.77	51.59	59.94	65.13	72.02	77.66	81.71	87.5	91.59	104.42	113.95	144.65
17.75	0.739583	33.26	43.9	51.73	60.1	65.29	72.18	77.82	81.88	87.67	91.77	104.61	114.15	144.87
18	0.75	33.38	44.04	51.88	60.25	65.45	72.35	77.99	82.05	87.85	91.94	104.79	114.34	145.09
18.25	0.760417	33.49	44.17	52.02	60.4	65.6	72.5	78.15	82.22	88.01	92.11	104.97	114.53	145.3
18.5	0.770833	33.61	44.3	52.16	60.55	65.75	72.66	78.31	82.38	88.17	92.28	105.15	114.71	145.51

18.75	0.78125	33.72	44.43	52.3	60.7	65.91	72.81	78.47	82.54	88.34	92.44	105.32	114.89	145.71
19	0.791667	33.83	44.56	52.43	60.84	66.05	72.96	78.62	82.69	88.49	92.6	105.49	115.07	145.92
19.25	0.802083	33.94	44.69	52.57	60.98	66.2	73.11	78.77	82.85	88.65	92.76	105.66	115.25	146.12
19.5	0.8125	34.05	44.81	52.7	61.12	66.35	73.26	78.92	83	88.8	92.92	105.82	115.43	146.31
19.75	0.822917	34.16	44.94	52.83	61.26	66.49	73.41	79.07	83.15	88.96	93.07	105.99	115.6	146.51
20	0.833333	34.27	45.06	52.96	61.4	66.63	73.55	79.22	83.3	89.11	93.22	106.15	115.77	146.7
20.25	0.84375	34.38	45.18	53.09	61.53	66.77	73.69	79.36	83.45	89.26	93.37	106.31	115.94	146.89
20.5	0.854167	34.48	45.3	53.22	61.67	66.91	73.83	79.51	83.59	89.4	93.52	106.47	116.1	147.08
20.75	0.864583	34.59	45.42	53.34	61.8	67.05	73.97	79.65	83.74	89.55	93.67	106.62	116.27	147.26
21	0.875	34.69	45.54	53.47	61.93	67.19	74.11	79.79	83.88	89.69	93.81	106.78	116.43	147.44
21.25	0.885417	34.79	45.65	53.59	62.06	67.32	74.25	79.93	84.02	89.83	93.96	106.93	116.59	147.63
21.5	0.895833	34.89	45.77	53.71	62.19	67.45	74.38	80.06	84.16	89.97	94.1	107.08	116.75	147.8
21.75	0.90625	34.99	45.88	53.83	62.32	67.59	74.51	80.2	84.3	90.11	94.24	107.22	116.9	147.98
22	0.916667	35.09	46	53.95	62.45	67.72	74.65	80.33	84.43	90.24	94.37	107.37	117.06	148.15
22.25	0.927083	35.19	46.11	54.07	62.57	67.85	74.78	80.46	84.57	90.38	94.51	107.52	117.21	148.33
22.5	0.9375	35.29	46.22	54.19	62.7	67.97	74.91	80.6	84.7	90.51	94.64	107.66	117.36	148.5
22.75	0.947917	35.39	46.33	54.31	62.82	68.1	75.03	80.73	84.83	90.64	94.78	107.8	117.51	148.67
23	0.958333	35.48	46.44	54.42	62.94	68.23	75.16	80.85	84.96	90.77	94.91	107.94	117.66	148.83
23.25	0.96875	35.58	46.55	54.54	63.06	68.35	75.29	80.98	85.09	90.9	95.04	108.08	117.81	149
23.5	0.979167	35.67	46.65	54.65	63.18	68.48	75.41	81.11	85.22	91.03	95.17	108.22	117.95	149.16
23.75	0.989583	35.77	46.76	54.76	63.3	68.6	75.53	81.23	85.34	91.16	95.3	108.35	118.09	149.32
24	1	35.86	46.87	54.88	63.42	68.72	75.66	81.36	85.47	91.28	95.42	108.49	118.24	149.48
24.25	1.010417	35.95	46.97	54.99	63.53	68.84	75.77	81.48	85.59	91.4	95.55	108.62	118.37	149.64
24.5	1.020833	36.04	47.07	55.1	63.65	68.95	75.89	81.59	85.71	91.52	95.67	108.74	118.51	149.79
24.75	1.03125	36.13	47.17	55.2	63.76	69.07	76.01	81.71	85.83	91.64	95.79	108.87	118.64	149.95
25	1.041667	36.21	47.28	55.31	63.87	69.18	76.12	81.83	85.94	91.76	95.91	109	118.77	150.1
25.25	1.052083	36.3	47.38	55.42	63.99	69.3	76.24	81.94	86.06	91.88	96.03	109.12	118.9	150.25
25.5	1.0625	36.39	47.48	55.53	64.1	69.41	76.35	82.06	86.17	91.99	96.14	109.25	119.03	150.39
25.75	1.072917	36.47	47.58	55.63	64.21	69.52	76.46	82.17	86.29	92.11	96.26	109.37	119.16	150.54
26	1.083333	36.56	47.67	55.74	64.32	69.64	76.58	82.28	86.4	92.22	96.38	109.49	119.29	150.69
26.25	1.09375	36.64	47.77	55.84	64.43	69.75	76.69	82.39	86.51	92.34	96.49	109.61	119.41	150.83
26.5	1.104167	36.73	47.87	55.95	64.54	69.86	76.8	82.51	86.63	92.45	96.6	109.73	119.54	150.98
26.75	1.114583	36.81	47.97	56.05	64.64	69.97	76.91	82.62	86.74	92.56	96.72	109.85	119.66	151.12
27	1.125	36.89	48.06	56.15	64.75	70.07	77.02	82.73	86.85	92.67	96.83	109.97	119.79	151.26
27.25	1.135417	36.98	48.16	56.26	64.86	70.18	77.13	82.84	86.96	92.78	96.94	110.09	119.91	151.4
27.5	1.145833	37.06	48.26	56.36	64.96	70.29	77.23	82.94	87.07	92.89	97.05	110.2	120.03	151.54
27.75	1.15625	37.14	48.35	56.46	65.07	70.4	77.34	83.05	87.17	93	97.16	110.32	120.15	151.68
28	1.166667	37.22	48.44	56.56	65.17	70.5	77.45	83.16	87.28	93.11	97.27	110.43	120.27	151.82
28.25	1.177083	37.3	48.54	56.66	65.28	70.61	77.55	83.26	87.39	93.22	97.38	110.55	120.39	151.95
28.5	1.1875	37.38	48.63	56.76	65.38	70.71	77.66	83.37	87.49	93.32	97.49	110.66	120.51	152.09
28.75	1.197917	37.46	48.72	56.86	65.48	70.82	77.76	83.48	87.6	93.43	97.6	110.78	120.63	152.23
29	1.208333	37.54	48.82	56.96	65.58	70.92	77.87	83.58	87.7	93.54	97.7	110.89	120.74	152.36
29.25	1.21875	37.62	48.91	57.06	65.69	71.02	77.97	83.68	87.81	93.64	97.81	111	120.86	152.49
29.5	1.229167	37.7	49	57.15	65.79	71.13	78.08	83.79	87.91	93.75	97.91	111.11	120.97	152.63
29.75	1.239583	37.78	49.09	57.25	65.89	71.23	78.18	83.89	88.02	93.85	98.02	111.22	121.09	152.76
30	1.25	37.85	49.18	57.35	65.99	71.33	78.28	83.99	88.12	93.95	98.12	111.33	121.2	152.89
30.25	1.260417	37.93	49.27	57.44	66.09	71.43	78.38	84.09	88.22	94.06	98.23	111.44	121.32	153.02
30.5	1.270833	38.01	49.36	57.54	66.19	71.53	78.48	84.19	88.32	94.16	98.33	111.55	121.43	153.15
30.75	1.28125	38.08	49.45	57.64	66.29	71.63	78.58	84.3	88.42	94.26	98.43	111.66	121.54	153.28
31	1.291667	38.16	49.54	57.73	66.39	71.73	78.68	84.4	88.52	94.36	98.53	111.76	121.65	153.41
31.25	1.302083	38.24	49.63	57.83	66.48	71.83	78.78	84.49	88.62	94.46	98.64	111.87	121.76	153.53
31.5	1.3125	38.31	49.71	57.92	66.58	71.93	78.88	84.59	88.72	94.56	98.74	111.98	121.87	153.66
31.75	1.322917	38.39	49.8	58.01	66.68	72.03	78.98	84.69	88.82	94.66	98.84	112.08	121.98	153.79
32	1.333333	38.46	49.89	58.11	66.77	72.12	79.08	84.79	88.92	94.76	98.94	112.19	122.09	153.91
32.25	1.34375	38.53	49.98	58.2	66.87	72.22	79.17	84.89	89.02	94.86	99.04	112.29	122.2	154.04
32.5	1.354167	38.61	50.06	58.29	66.97	72.32	79.27	84.99	89.11	94.96	99.14	112.39	122.31	154.16
32.75	1.364583	38.68	50.15	58.38	67.06	72.41	79.37	85.08	89.21	95.06	99.24	112.5	122.41	154.29
33	1.375	38.76	50.23	58.48	67.16	72.51	79.47	85.18	89.31	95.15	99.33	112.6	122.52	154.41
33.25	1.385417	38.83	50.32	58.57	67.25	72.6	79.56	85.28	89.4	95.25	99.43	112.7	122.63	154.53
33.5	1.395833	38.9	50.4	58.66	67.35	72.7	79.66	85.37	89.5	95.35	99.53	112.81	122.73	154.65
33.75	1.40625	38.97	50.49	58.75	67.44	72.79	79.75	85.47	89.6	95.44	99.63	112.91	122.84	154.77
34	1.416667	39.04	50.57	58.84	67.53	72.89	79.85	85.56	89.69	95.54	99.72	113.01	122.94	154.89
34.25	1.427083	39.12	50.66	58.93	67.63	72.98	79.94	85.66	89.78	95.63	99.82	113.11	123.05	155.01
34.5	1.4375	39.19	50.74	59.02	67.72	73.08	80.03	85.75	89.88	95.73	99.91	113.21	123.15	155.13
34.75	1.447917	39.26	50.82	59.11	67.81	73.17	80.13	85.84	89.97	95.82	100.01	113.31	123.25	155.25
35	1.458333	39.33	50.91	59.2	67.9	73.26	80.22	85.94	90.07	95.92	100.1	113.41	123.36	155.37
35.25	1.46875	39.4	50.99	59.29	68	73.35	80.31	86.03	90.16	96.01	100.2	113.51	123.46	155.49
35.5	1.479167	39.47	51.07	59.38	68.09	73.45	80.41	86.12	90.25	96.1	100.29	113.6	123.56	155.61
35.75	1.489583	39.54	51.15	59.46	68.18	73.54	80.5	86.21	90.34	96.2	100.39	113.7	123.66	155.72
36	1.5	39.61	51.24	59.55	68.27	73.63	80.59	86.31	90.44	96.29	100.48	113.8	123.76	155.84
36.25	1.510417	39.68	51.32	59.64	68.36	73.72	80.68	86.4	90.53	96.38	100.57	113.9	123.86	155.96
36.5	1.520833	39.75	51.4	59.73	68.45	73.81	80.77	86.49	90.62	96.47	100.67	113.99	123.96	156.07
36.75	1.53125	39.82	51.48	59.81	68.54	73.9	80.86	86.58	90.71	96.57	100.76	114.09	124.06	156.19
37	1.541667	39.89	51.56	59.9	68.63	73.99	80.96	86.67	90.8	96.66	100.85	114.19	124.16	156.3
37.25	1.552083	39.95	51.64	59.99	68.72	74.08	81.05	86.76	90.89	96.75	100.94	114.28	124.26	156.42
37.5	1.5625	40.02	51.72	60.07	68.81	74.17	81.14	86.85	90.98	96.84	101.03	114.38	124.36	156.53
37.75	1.572917	40.09	51.8	60.16	68.9	74.26	81.23	86.94	91.07	96.93	101.12	114.47	124.46	156.64
38	1.583333	40.16	51.88	60.24	68.98	74.35	81.31	87.03	91.16	97.02	101.21	114.57	124.56	156.76
38.25	1.59375	40.23	51.96	60.33	69.07	74.44	81.4	87.12	91.25	97.11	101.3	114.66	124.65	156.87
38.5	1.604167	40.29	52.04	60.41	69.16	74.53	81.49	87.21	91.34	97.2	101.39	114.76	124.75	156.98
38.75	1.614583	40.36	52.12	60.5	69.25	74.62	81.58	87.29	91.42	97.29	101.48	114.85	124.85	157.09
39	1.625	40.43	52.2	60.58	69.33	74.7	81.67	87.38	91.51	97.38	101.57	114.94	124.94	157.2
39.25	1.635417	40.49	52.27	60.67	69.42	74.79	81.76	87.47	91.6	97.46	101.66	115.03	125.04	157.31
39.5	1.645833	40.56	52.35	60.75	69.51	74.88	81.84	87.56	91.69	97.55	101.75	115.13	125.14	157.42
39.75	1.65625	40.62	52.43	60.84	69.6	74.96	81.93	87.65	91.78	97.64	101.84	115.22	125.23	157.53
40	1.666667	40.69	52.51	60.92	69.68	75.05	82.02	87.73	91.86	97.73	101.93	115.31	125.33	157.64
40.25	1.677083	40.76	52.58	61	69.77	75.14	82.11	87.82	91.95	97.82	102.02	115.4	125.42	157.75
40.5	1.6875	40.82	52.66	61.09	69.85	75.22	82.19	87.91	92.04	97.9	102.1	115.49	125.51	157.86

40.75	1.697917	40.89	52.74	61.17	69.94	75.31	82.28	87.99	92.12	97.99	102.19	115.59	125.61	157.97
41	1.708333	40.95	52.82	61.25	70.02	75.4	82.37	88.08	92.21	98.08	102.28	115.68	125.7	158.08
41.25	1.71875	41.02	52.89	61.33	70.11	75.48	82.45	88.16	92.29	98.16	102.37	115.77	125.8	158.19
41.5	1.729167	41.08	52.97	61.42	70.19	75.57	82.54	88.25	92.38	98.25	102.45	115.86	125.89	158.29
41.75	1.739583	41.15	53.04	61.5	70.28	75.65	82.62	88.34	92.46	98.34	102.54	115.95	125.98	158.4
42	1.75	41.21	53.12	61.58	70.36	75.74	82.71	88.42	92.55	98.42	102.63	116.04	126.07	158.51
42.25	1.760417	41.27	53.2	61.66	70.45	75.82	82.79	88.51	92.63	98.51	102.71	116.13	126.17	158.62
42.5	1.770833	41.34	53.27	61.74	70.53	75.91	82.88	88.59	92.72	98.59	102.8	116.22	126.26	158.72
42.75	1.78125	41.4	53.35	61.82	70.62	75.99	82.96	88.67	92.8	98.68	102.88	116.3	126.35	158.83
43	1.791667	41.47	53.42	61.9	70.7	76.07	83.05	88.76	92.89	98.76	102.97	116.39	126.44	158.93
43.25	1.802083	41.53	53.5	61.98	70.78	76.16	83.13	88.84	92.97	98.85	103.05	116.48	126.53	159.04
43.5	1.8125	41.59	53.57	62.06	70.87	76.24	83.22	88.93	93.06	98.93	103.14	116.57	126.62	159.14
43.75	1.822917	41.66	53.65	62.15	70.95	76.33	83.3	89.01	93.14	99.01	103.22	116.66	126.71	159.25
44	1.833333	41.72	53.72	62.23	71.03	76.41	83.38	89.09	93.22	99.1	103.31	116.74	126.8	159.35
44.25	1.84375	41.78	53.79	62.31	71.11	76.49	83.47	89.18	93.31	99.18	103.39	116.83	126.89	159.46
44.5	1.854167	41.84	53.87	62.38	71.2	76.57	83.55	89.26	93.39	99.27	103.48	116.92	126.98	159.56
44.75	1.864583	41.91	53.94	62.46	71.28	76.66	83.63	89.34	93.47	99.35	103.56	117.01	127.07	159.66
45	1.875	41.97	54.02	62.54	71.36	76.74	83.71	89.43	93.55	99.43	103.64	117.09	127.16	159.77
45.25	1.885417	42.03	54.09	62.62	71.44	76.82	83.8	89.51	93.64	99.52	103.73	117.18	127.25	159.87
45.5	1.895833	42.09	54.16	62.7	71.52	76.9	83.88	89.59	93.72	99.6	103.81	117.27	127.34	159.97
45.75	1.90625	42.15	54.24	62.78	71.6	76.99	83.96	89.67	93.8	99.68	103.89	117.35	127.43	160.07
46	1.916667	42.22	54.31	62.86	71.69	77.07	84.04	89.75	93.88	99.76	103.98	117.44	127.52	160.18
46.25	1.927083	42.28	54.38	62.94	71.77	77.15	84.13	89.84	93.96	99.85	104.06	117.52	127.61	160.28
46.5	1.9375	42.34	54.45	63.02	71.85	77.23	84.21	89.92	94.04	99.93	104.14	117.61	127.69	160.38
46.75	1.947917	42.4	54.53	63.09	71.93	77.31	84.29	90	94.13	100.01	104.22	117.69	127.78	160.48
47	1.958333	42.46	54.6	63.17	72.01	77.39	84.37	90.08	94.21	100.09	104.31	117.78	127.87	160.58
47.25	1.96875	42.52	54.67	63.25	72.09	77.47	84.45	90.16	94.29	100.17	104.39	117.86	127.96	160.68
47.5	1.979167	42.58	54.74	63.33	72.17	77.55	84.53	90.24	94.37	100.25	104.47	117.95	128.04	160.78
47.75	1.989583	42.64	54.81	63.41	72.25	77.63	84.61	90.32	94.45	100.33	104.55	118.03	128.13	160.88
48	2	42.7	54.89	63.48	72.33	77.71	84.69	90.4	94.53	100.42	104.63	118.12	128.22	160.98
48.25	2.010417	42.76	54.96	63.56	72.41	77.8	84.78	90.49	94.61	100.5	104.72	118.2	128.3	161.09
48.5	2.020833	42.83	55.03	63.64	72.49	77.88	84.86	90.57	94.7	100.58	104.8	118.29	128.39	161.19
48.75	2.03125	42.89	55.11	63.72	72.58	77.96	84.95	90.65	94.78	100.67	104.88	118.37	128.48	161.29
49	2.041667	42.95	55.18	63.8	72.66	78.05	85.03	90.74	94.86	100.75	104.97	118.46	128.57	161.39
49.25	2.052083	43.01	55.25	63.88	72.74	78.13	85.11	90.82	94.95	100.84	105.05	118.55	128.66	161.49
49.5	2.0625	43.07	55.32	63.96	72.82	78.21	85.2	90.9	95.03	100.92	105.14	118.63	128.75	161.59
49.75	2.072917	43.13	55.4	64.03	72.9	78.29	85.28	90.99	95.11	101	105.22	118.72	128.83	161.69
50	2.083333	43.2	55.47	64.11	72.99	78.38	85.36	91.07	95.2	101.09	105.3	118.8	128.92	161.8
50.25	2.09375	43.26	55.54	64.19	73.07	78.46	85.44	91.15	95.28	101.17	105.39	118.89	129.01	161.9
50.5	2.104167	43.32	55.61	64.27	73.15	78.54	85.53	91.24	95.36	101.25	105.47	118.97	129.1	162
50.75	2.114583	43.38	55.69	64.35	73.23	78.62	85.61	91.32	95.45	101.33	105.55	119.06	129.18	162.1
51	2.125	43.44	55.76	64.42	73.31	78.7	85.69	91.4	95.53	101.42	105.64	119.14	129.27	162.2
51.25	2.135417	43.5	55.83	64.5	73.39	78.79	85.77	91.48	95.61	101.5	105.72	119.23	129.36	162.3
51.5	2.145833	43.56	55.9	64.58	73.47	78.87	85.86	91.57	95.69	101.58	105.8	119.31	129.45	162.4
51.75	2.15625	43.62	55.97	64.66	73.55	78.95	85.94	91.65	95.78	101.67	105.88	119.4	129.53	162.5
52	2.166667	43.68	56.04	64.73	73.63	79.03	86.02	91.73	95.86	101.75	105.97	119.48	129.62	162.6
52.25	2.177083	43.74	56.12	64.81	73.71	79.11	86.1	91.81	95.94	101.83	106.05	119.56	129.71	162.7
52.5	2.1875	43.8	56.19	64.89	73.79	79.19	86.18	91.9	96.02	101.91	106.13	119.65	129.79	162.79
52.75	2.197917	43.86	56.26	64.96	73.87	79.27	86.27	91.98	96.1	101.99	106.21	119.73	129.88	162.89
53	2.208333	43.92	56.33	65.04	73.95	79.36	86.35	92.06	96.19	102.08	106.29	119.82	129.96	162.99
53.25	2.21875	43.98	56.4	65.12	74.03	79.44	86.43	92.14	96.27	102.16	106.38	119.9	130.05	163.09
53.5	2.229167	44.04	56.47	65.19	74.11	79.52	86.51	92.22	96.35	102.24	106.46	119.98	130.14	163.19
53.75	2.239583	44.1	56.54	65.27	74.19	79.6	86.59	92.3	96.43	102.32	106.54	120.07	130.22	163.29
54	2.25	44.16	56.61	65.35	74.27	79.68	86.67	92.39	96.51	102.4	106.62	120.15	130.31	163.39
54.25	2.260417	44.22	56.68	65.42	74.35	79.76	86.75	92.47	96.59	102.48	106.7	120.23	130.39	163.49
54.5	2.270833	44.28	56.75	65.5	74.43	79.84	86.83	92.55	96.68	102.57	106.79	120.31	130.48	163.58
54.75	2.28125	44.34	56.82	65.57	74.51	79.92	86.92	92.63	96.76	102.65	106.87	120.4	130.56	163.68
55	2.291667	44.4	56.89	65.65	74.59	80	87	92.71	96.84	102.73	106.95	120.48	130.65	163.78
55.25	2.302083	44.46	56.96	65.73	74.67	80.08	87.08	92.79	96.92	102.81	107.03	120.56	130.73	163.88
55.5	2.3125	44.52	57.03	65.8	74.75	80.16	87.16	92.87	97	102.89	107.11	120.65	130.82	163.97
55.75	2.322917	44.57	57.1	65.88	74.83	80.24	87.24	92.95	97.08	102.97	107.19	120.73	130.9	164.07
56	2.333333	44.63	57.17	65.95	74.9	80.32	87.32	93.03	97.16	103.05	107.27	120.81	130.99	164.17
56.25	2.34375	44.69	57.24	66.03	74.98	80.4	87.4	93.11	97.24	103.13	107.35	120.89	131.07	164.26
56.5	2.354167	44.75	57.31	66.1	75.06	80.48	87.48	93.19	97.32	103.21	107.43	120.98	131.16	164.36
56.75	2.364583	44.81	57.38	66.18	75.14	80.56	87.56	93.27	97.4	103.29	107.51	121.06	131.24	164.46
57	2.375	44.87	57.45	66.25	75.22	80.64	87.64	93.35	97.48	103.37	107.6	121.14	131.33	164.56
57.25	2.385417	44.93	57.52	66.33	75.3	80.72	87.72	93.43	97.56	103.46	107.68	121.22	131.41	164.65
57.5	2.395833	44.98	57.59	66.4	75.37	80.8	87.8	93.51	97.64	103.54	107.76	121.3	131.49	164.75
57.75	2.40625	45.04	57.66	66.48	75.45	80.87	87.88	93.59	97.72	103.62	107.84	121.38	131.58	164.84
58	2.416667	45.1	57.73	66.55	75.53	80.95	87.96	93.67	97.8	103.7	107.92	121.47	131.66	164.94
58.25	2.427083	45.16	57.8	66.63	75.61	81.03	88.04	93.75	97.88	103.78	108	121.55	131.75	165.04
58.5	2.4375	45.22	57.87	66.7	75.69	81.11	88.12	93.83	97.96	103.86	108.08	121.63	131.83	165.13
58.75	2.447917	45.27	57.93	66.77	75.76	81.19	88.2	93.91	98.04	103.94	108.16	121.71	131.91	165.23
59	2.458333	45.33	58	66.85	75.84	81.27	88.28	93.99	98.12	104.02	108.24	121.79	132	165.32
59.25	2.46875	45.39	58.07	66.92	75.92	81.35	88.36	94.07	98.2	104.1	108.32	121.87	132.08	165.42
59.5	2.479167	45.45	58.14	67	76	81.43	88.44	94.15	98.28	104.18	108.4	121.95	132.16	165.51
59.75	2.489583	45.51	58.21	67.07	76.07	81.5	88.51	94.23	98.36	104.26	108.48	122.04	132.25	165.61
60	2.5	45.56	58.28	67.14	76.15	81.58	88.59	94.31	98.44	104.33	108.56	122.12	132.33	165.7
60.25	2.510417	45.62	58.35	67.22	76.23	81.66	88.67	94.39	98.52	104.41	108.64	122.2	132.41	165.8
60.5	2.520833	45.68	58.41	67.29	76.31	81.74	88.75	94.47	98.6	104.49	108.71	122.28	132.5	165.89
60.75	2.53125	45.73	58.48	67.37	76.38	81.82	88.83	94.55	98.68	104.57	108.79	122.36	132.58	165.99
61	2.541667	45.79	58.55	67.44	76.46	81.9	88.91	94.63	98.76	104.65	108.87	122.44	132.66	166.08
61.25	2.552083	45.85	58.62	67.51	76.54	81.97	88.99	94.71	98.84	104.73	108.95	122.52	132.74	166.18
61.5	2.5625	45.91	58.68	67.59	76.61	82.05	89.07	94.79	98.92	104.81	109.03	122.6	132.83	166.27
61.75	2.572917	45.96	58.75	67.66	76.69	82.13	89.15	94.87	99	104.89	109.11	122.68	132.91	166.37
62	2.583333	46.02	58.82	67.73	76.77	82.21	89.22	94.94	99.07	104.97	109.19	122.76	132.99	166.46
62.25	2.59375	46.08	58.89	67.81	76.84	82.28	89.3	95.02	99.15	105.05	109.27	122.84	133.07	166.56
62.5	2.604167	46.13	58.96	67.88	76.92	82.36	89.38	95.1	99.23	105.13	109.35	122.92	133.16	166.65

62.75	2.614583	46.19	59.02	67.95	77	82.44	89.46	95.18	99.31	105.21	109.43	123	133.24	166.74
63	2.625	46.25	59.09	68.03	77.07	82.52	89.54	95.26	99.39	105.28	109.51	123.08	133.32	166.84
63.25	2.635417	46.3	59.16	68.1	77.15	82.59	89.62	95.34	99.47	105.36	109.59	123.16	133.4	166.93
63.5	2.645833	46.36	59.22	68.17	77.22	82.67	89.69	95.42	99.55	105.44	109.66	123.24	133.49	167.03
63.75	2.65625	46.42	59.29	68.24	77.3	82.75	89.77	95.49	99.63	105.52	109.74	123.32	133.57	167.12
64	2.666667	46.47	59.36	68.32	77.38	82.83	89.85	95.57	99.7	105.6	109.82	123.4	133.65	167.21
64.25	2.677083	46.53	59.43	68.39	77.45	82.9	89.93	95.65	99.78	105.68	109.9	123.48	133.73	167.31
64.5	2.6875	46.58	59.49	68.46	77.53	82.98	90.01	95.73	99.86	105.76	109.98	123.56	133.81	167.4
64.75	2.697917	46.64	59.56	68.53	77.6	83.06	90.08	95.81	99.94	105.83	110.06	123.64	133.89	167.49
65	2.708333	46.7	59.63	68.61	77.68	83.13	90.16	95.89	100.02	105.91	110.13	123.72	133.98	167.59
65.25	2.71875	46.75	59.69	68.68	77.76	83.21	90.24	95.96	100.1	105.99	110.21	123.8	134.06	167.68
65.5	2.729167	46.81	59.76	68.75	77.83	83.29	90.32	96.04	100.17	106.07	110.29	123.88	134.14	167.77
65.75	2.739583	46.86	59.83	68.82	77.91	83.36	90.39	96.12	100.25	106.15	110.37	123.96	134.22	167.87
66	2.75	46.92	59.89	68.89	77.98	83.44	90.47	96.2	100.33	106.23	110.45	124.04	134.3	167.96
66.25	2.760417	46.98	59.96	68.97	78.06	83.52	90.55	96.27	100.41	106.3	110.53	124.12	134.38	168.05
66.5	2.770833	47.03	60.02	69.04	78.13	83.59	90.63	96.35	100.49	106.38	110.6	124.19	134.46	168.14
66.75	2.78125	47.09	60.09	69.11	78.21	83.67	90.7	96.43	100.56	106.46	110.68	124.27	134.55	168.24
67	2.791667	47.14	60.16	69.18	78.28	83.75	90.78	96.51	100.64	106.54	110.76	124.35	134.63	168.33
67.25	2.802083	47.2	60.22	69.25	78.36	83.82	90.86	96.59	100.72	106.62	110.84	124.43	134.71	168.42
67.5	2.8125	47.25	60.29	69.33	78.43	83.9	90.94	96.66	100.8	106.69	110.92	124.51	134.79	168.51
67.75	2.822917	47.31	60.36	69.4	78.51	83.98	91.01	96.74	100.87	106.77	110.99	124.59	134.87	168.61
68	2.833333	47.36	60.42	69.47	78.58	84.05	91.09	96.82	100.95	106.85	111.07	124.67	134.95	168.7
68.25	2.84375	47.42	60.49	69.54	78.66	84.13	91.17	96.9	101.03	106.93	111.15	124.75	135.03	168.79
68.5	2.854167	47.47	60.55	69.61	78.73	84.2	91.24	96.97	101.11	107	111.23	124.83	135.11	168.88
68.75	2.864583	47.53	60.62	69.68	78.81	84.28	91.32	97.05	101.18	107.08	111.3	124.9	135.19	168.97
69	2.875	47.58	60.68	69.75	78.88	84.36	91.4	97.13	101.26	107.16	111.38	124.98	135.27	169.07
69.25	2.885417	47.64	60.75	69.82	78.96	84.43	91.47	97.2	101.34	107.24	111.46	125.06	135.35	169.16
69.5	2.895833	47.69	60.82	69.9	79.03	84.51	91.55	97.28	101.42	107.31	111.54	125.14	135.43	169.25
69.75	2.90625	47.75	60.88	69.97	79.11	84.58	91.63	97.36	101.49	107.39	111.61	125.22	135.51	169.34
70	2.916667	47.8	60.95	70.04	79.18	84.66	91.7	97.44	101.57	107.47	111.69	125.3	135.59	169.43
70.25	2.927083	47.86	61.01	70.11	79.26	84.74	91.78	97.51	101.65	107.55	111.77	125.38	135.68	169.52
70.5	2.9375	47.91	61.08	70.18	79.33	84.81	91.86	97.59	101.73	107.62	111.85	125.45	135.76	169.61
70.75	2.947917	47.97	61.14	70.25	79.4	84.89	91.93	97.67	101.8	107.7	111.92	125.53	135.84	169.71
71	2.958333	48.02	61.21	70.32	79.48	84.96	92.01	97.74	101.88	107.78	112	125.61	135.92	169.8
71.25	2.96875	48.08	61.27	70.39	79.55	85.04	92.09	97.82	101.96	107.86	112.08	125.69	136	169.89
71.5	2.979167	48.13	61.34	70.46	79.63	85.11	92.16	97.9	102.03	107.93	112.16	125.77	136.08	169.98
71.75	2.989583	48.19	61.4	70.53	79.7	85.19	92.24	97.97	102.11	108.01	112.23	125.84	136.16	170.07
72	3	48.24	61.47	70.6	79.78	85.26	92.32	98.05	102.19	108.09	112.31	125.92	136.24	170.16
72.25	3.010417	48.3	61.53	70.67	79.85	85.34	92.39	98.13	102.26	108.16	112.39	126	136.32	170.25
72.5	3.020833	48.35	61.6	70.74	79.92	85.41	92.47	98.2	102.34	108.24	112.46	126.08	136.4	170.34
72.75	3.03125	48.4	61.66	70.81	80	85.49	92.54	98.28	102.42	108.32	112.54	126.16	136.48	170.43
73	3.041667	48.46	61.73	70.89	80.07	85.56	92.62	98.36	102.49	108.39	112.62	126.23	136.56	170.53
73.25	3.052083	48.51	61.79	70.96	80.15	85.64	92.7	98.43	102.57	108.47	112.69	126.31	136.64	170.62
73.5	3.0625	48.57	61.86	71.03	80.22	85.71	92.77	98.51	102.65	108.55	112.77	126.39	136.72	170.71
73.75	3.072917	48.62	61.92	71.1	80.29	85.79	92.85	98.59	102.72	108.63	112.85	126.47	136.8	170.8
74	3.083333	48.67	61.99	71.17	80.37	85.86	92.92	98.66	102.8	108.7	112.93	126.55	136.88	170.89
74.25	3.09375	48.73	62.05	71.24	80.44	85.94	93	98.74	102.88	108.78	113	126.62	136.95	170.98
74.5	3.104167	48.78	62.11	71.31	80.51	86.01	93.08	98.82	102.95	108.86	113.08	126.7	137.03	171.07
74.75	3.114583	48.84	62.18	71.38	80.59	86.09	93.15	98.89	103.03	108.93	113.16	126.78	137.11	171.16
75	3.125	48.89	62.24	71.45	80.66	86.16	93.23	98.97	103.11	109.01	113.23	126.86	137.19	171.25
75.25	3.135417	48.94	62.31	71.52	80.73	86.24	93.3	99.05	103.18	109.09	113.31	126.93	137.27	171.34
75.5	3.145833	49	62.37	71.59	80.81	86.31	93.38	99.12	103.26	109.16	113.39	127.01	137.35	171.43
75.75	3.15625	49.05	62.44	71.66	80.88	86.39	93.46	99.2	103.34	109.24	113.46	127.09	137.43	171.52
76	3.166667	49.11	62.5	71.72	80.95	86.46	93.53	99.27	103.41	109.32	113.54	127.17	137.51	171.61
76.25	3.177083	49.16	62.56	71.79	81.03	86.54	93.61	99.35	103.49	109.39	113.62	127.24	137.59	171.7
76.5	3.1875	49.21	62.63	71.86	81.1	86.61	93.68	99.43	103.57	109.47	113.69	127.32	137.67	171.79
76.75	3.197917	49.27	62.69	71.93	81.17	86.69	93.76	99.5	103.64	109.54	113.77	127.4	137.75	171.88
77	3.208333	49.32	62.76	72	81.25	86.76	93.83	99.58	103.72	109.62	113.84	127.48	137.83	171.97
77.25	3.21875	49.37	62.82	72.07	81.32	86.83	93.91	99.65	103.8	109.7	113.92	127.55	137.91	172.06
77.5	3.229167	49.43	62.88	72.14	81.39	86.91	93.98	99.73	103.87	109.77	114	127.63	137.99	172.15
77.75	3.239583	49.48	62.95	72.21	81.47	86.98	94.06	99.81	103.95	109.85	114.07	127.71	138.07	172.24
78	3.25	49.53	63.01	72.28	81.54	87.06	94.14	99.88	104.02	109.93	114.15	127.78	138.15	172.33
78.25	3.260417	49.59	63.07	72.35	81.61	87.13	94.21	99.96	104.1	110	114.23	127.86	138.22	172.42
78.5	3.270833	49.64	63.14	72.42	81.69	87.21	94.29	100.03	104.18	110.08	114.3	127.94	138.3	172.51
78.75	3.28125	49.69	63.2	72.49	81.76	87.28	94.36	100.11	104.25	110.16	114.38	128.02	138.38	172.6
79	3.291667	49.75	63.27	72.56	81.83	87.35	94.44	100.19	104.33	110.23	114.46	128.09	138.46	172.69
79.25	3.302083	49.8	63.33	72.63	81.9	87.43	94.51	100.26	104.4	110.31	114.53	128.17	138.54	172.78
79.5	3.3125	49.85	63.39	72.7	81.98	87.5	94.59	100.34	104.48	110.38	114.61	128.25	138.62	172.87
79.75	3.322917	49.9	63.46	72.76	82.05	87.58	94.66	100.41	104.56	110.46	114.68	128.32	138.7	172.95
80	3.333333	49.96	63.52	72.83	82.12	87.65	94.74	100.49	104.63	110.54	114.76	128.4	138.78	173.04
80.25	3.34375	50.01	63.58	72.9	82.19	87.73	94.81	100.56	104.71	110.61	114.84	128.48	138.86	173.13
80.5	3.354167	50.06	63.65	72.97	82.27	87.8	94.89	100.64	104.78	110.69	114.91	128.56	138.93	173.22
80.75	3.364583	50.12	63.71	73.04	82.34	87.87	94.96	100.72	104.86	110.77	114.99	128.63	139.01	173.31
81	3.375	50.17	63.77	73.11	82.41	87.95	95.04	100.79	104.94	110.84	115.07	128.71	139.09	173.4
81.25	3.385417	50.22	63.84	73.18	82.48	88.02	95.11	100.87	105.01	110.92	115.14	128.79	139.17	173.49
81.5	3.395833	50.27	63.9	73.25	82.56	88.09	95.19	100.94	105.09	110.99	115.22	128.86	139.25	173.58
81.75	3.40625	50.33	63.96	73.32	82.63	88.17	95.26	101.02	105.16	111.07	115.29	128.94	139.33	173.67
82	3.416667	50.38	64.03	73.38	82.7	88.24	95.34	101.09	105.24	111.15	115.37	129.02	139.41	173.76
82.25	3.427083	50.43	64.09	73.45	82.77	88.32	95.41	101.17	105.32	111.22	115.45	129.09	139.49	173.85
82.5	3.4375	50.49	64.15	73.52	82.85	88.39	95.49	101.24	105.39	111.3	115.52	129.17	139.56	173.94
82.75	3.447917	50.54	64.21	73.59	82.92	88.46	95.56	101.32	105.47	111.37	115.6	129.25	139.64	174.02
83	3.458333	50.59	64.28	73.66	82.99	88.54	95.64	101.4	105.54	111.45	115.67	129.32	139.72	174.11
83.25	3.46875	50.64	64.34	73.73	83.06	88.61	95.71	101.47	105.62	111.53	115.75	129.4	139.8	174.2
83.5	3.479167	50.7	64.4	73.8	83.14	88.68	95.79	101.55	105.69	111.6	115.83	129.48	139.88	174.29
83.75	3.489583	50.75	64.47	73.86	83.21	88.76	95.86	101.62	105.77	111.68	115.9	129.55	139.96	174.38
84	3.5	50.8	64.53	73.93	83.28	88.83	95.94	101.7	105.85	111.75	115.98	129.63	140.04	174.47
84.25	3.510417	50.85	64.59	74	83.35	88.91	96.01	101.77	105.92	111.83	116.05	129.71	140.12	174.56
84.5	3.520833	50.9	64.65	74.07	83.42	88.98	96.09	101.85	106	111.9	116.13	129.78	140.19	174.65

84.75	3.53125	50.96	64.72	74.14	83.5	89.05	96.16	101.92	106.07	111.98	116.21	129.86	140.27	174.73
85	3.541667	51.01	64.78	74.21	83.57	89.13	96.24	102	106.15	112.06	116.28	129.94	140.35	174.82
85.25	3.552083	51.06	64.84	74.27	83.64	89.2	96.31	102.07	106.22	112.13	116.36	130.02	140.43	174.91
85.5	3.5625	51.11	64.9	74.34	83.71	89.27	96.38	102.15	106.3	112.21	116.43	130.09	140.51	175
85.75	3.572917	51.17	64.97	74.41	83.78	89.35	96.46	102.22	106.38	112.28	116.51	130.17	140.59	175.09
86	3.583333	51.22	65.03	74.48	83.86	89.42	96.53	102.3	106.45	112.36	116.59	130.25	140.66	175.18
86.25	3.59375	51.27	65.09	74.55	83.93	89.49	96.61	102.38	106.53	112.44	116.66	130.32	140.74	175.27
86.5	3.604167	51.32	65.15	74.61	84	89.57	96.68	102.45	106.6	112.51	116.74	130.4	140.82	175.35
86.75	3.614583	51.37	65.22	74.68	84.07	89.64	96.76	102.53	106.68	112.59	116.81	130.47	140.9	175.44
87	3.625	51.43	65.28	74.75	84.14	89.71	96.83	102.6	106.75	112.66	116.89	130.55	140.98	175.53
87.25	3.635417	51.48	65.34	74.82	84.22	89.79	96.91	102.68	106.83	112.74	116.96	130.63	141.06	175.62
87.5	3.645833	51.53	65.4	74.89	84.29	89.86	96.98	102.75	106.9	112.81	117.04	130.7	141.14	175.71
87.75	3.65625	51.58	65.47	74.95	84.36	89.93	97.06	102.83	106.98	112.89	117.12	130.78	141.21	175.8
88	3.666667	51.63	65.53	75.02	84.43	90.01	97.13	102.9	107.05	112.97	117.19	130.86	141.29	175.88
88.25	3.677083	51.69	65.59	75.09	84.5	90.08	97.2	102.98	107.13	113.04	117.27	130.93	141.37	175.97
88.5	3.6875	51.74	65.65	75.16	84.57	90.15	97.28	103.05	107.21	113.12	117.34	131.01	141.45	176.06
88.75	3.697917	51.79	65.71	75.23	84.65	90.22	97.35	103.13	107.28	113.19	117.42	131.09	141.53	176.15
89	3.708333	51.84	65.78	75.29	84.72	90.3	97.43	103.2	107.36	113.27	117.5	131.16	141.61	176.24
89.25	3.71875	51.89	65.84	75.36	84.79	90.37	97.5	103.28	107.43	113.34	117.57	131.24	141.68	176.33
89.5	3.729167	51.94	65.9	75.43	84.86	90.44	97.58	103.35	107.51	113.42	117.65	131.32	141.76	176.41
89.75	3.739583	52	65.96	75.5	84.93	90.52	97.65	103.43	107.58	113.5	117.72	131.39	141.84	176.5
90	3.75	52.05	66.02	75.56	85	90.59	97.73	103.5	107.66	113.57	117.8	131.47	141.92	176.59
90.25	3.760417	52.1	66.09	75.63	85.07	90.66	97.8	103.58	107.73	113.65	117.87	131.55	142	176.68
90.5	3.770833	52.15	66.15	75.7	85.15	90.74	97.87	103.65	107.81	113.72	117.95	131.62	142.07	176.77
90.75	3.78125	52.2	66.21	75.77	85.22	90.81	97.95	103.73	107.88	113.8	118.03	131.7	142.15	176.85
91	3.791667	52.25	66.27	75.83	85.29	90.88	98.02	103.8	107.96	113.87	118.1	131.78	142.23	176.94
91.25	3.802083	52.31	66.33	75.9	85.36	90.95	98.1	103.88	108.04	113.95	118.18	131.85	142.31	177.03
91.5	3.8125	52.36	66.4	75.97	85.43	91.03	98.17	103.95	108.11	114.03	118.25	131.93	142.39	177.12
91.75	3.822917	52.41	66.46	76.04	85.5	91.1	98.25	104.03	108.19	114.1	118.33	132.01	142.47	177.21
92	3.833333	52.46	66.52	76.1	85.57	91.17	98.32	104.1	108.26	114.18	118.4	132.08	142.54	177.29
92.25	3.84375	52.51	66.58	76.17	85.65	91.25	98.39	104.18	108.34	114.25	118.48	132.16	142.62	177.38
92.5	3.854167	52.56	66.64	76.24	85.72	91.32	98.47	104.25	108.41	114.33	118.56	132.24	142.7	177.47
92.75	3.864583	52.61	66.7	76.31	85.79	91.39	98.54	104.33	108.49	114.4	118.63	132.31	142.78	177.56
93	3.875	52.66	66.77	76.37	85.86	91.46	98.62	104.4	108.56	114.48	118.71	132.39	142.86	177.65
93.25	3.885417	52.72	66.83	76.44	85.93	91.54	98.69	104.48	108.64	114.56	118.78	132.46	142.94	177.73
93.5	3.895833	52.77	66.89	76.51	86	91.61	98.76	104.55	108.71	114.63	118.86	132.54	143.01	177.82
93.75	3.90625	52.82	66.95	76.57	86.07	91.68	98.84	104.63	108.79	114.71	118.93	132.62	143.09	177.91
94	3.916667	52.87	67.01	76.64	86.14	91.76	98.91	104.7	108.86	114.78	119.01	132.69	143.17	178
94.25	3.927083	52.92	67.07	76.71	86.21	91.83	98.99	104.78	108.94	114.86	119.09	132.77	143.25	178.08
94.5	3.9375	52.97	67.14	76.78	86.29	91.9	99.06	104.85	109.02	114.93	119.16	132.85	143.33	178.17
94.75	3.947917	53.02	67.2	76.84	86.36	91.97	99.14	104.93	109.09	115.01	119.24	132.92	143.41	178.26
95	3.958333	53.07	67.26	76.91	86.43	92.05	99.21	105	109.17	115.09	119.31	133	143.48	178.35
95.25	3.96875	53.13	67.32	76.98	86.5	92.12	99.28	105.08	109.24	115.16	119.39	133.08	143.56	178.44
95.5	3.979167	53.18	67.38	77.04	86.57	92.19	99.36	105.15	109.32	115.24	119.47	133.15	143.64	178.52
95.75	3.989583	53.23	67.44	77.11	86.64	92.26	99.43	105.23	109.39	115.31	119.54	133.23	143.72	178.61
96	4	53.28	67.5	77.18	86.71	92.34	99.51	105.3	109.47	115.39	119.62	133.31	143.8	178.7

Project: 8a Boarsfield, Kingsland
Client: David Thomas

Site Area	100	m^2
Impervious %	100	%
Impervious Area	100	m^2

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Data from REFH2 Software Model - URBAN

Time	100 year 1.4 CC design rainfall - FEH 2013 model	Urban net rain mm (100 year 1.4 CC) - urbanised model	Rural net rain mm (100 year 1.4 CC) - urbanised model	Sewer loss m3/s (100 year 1.4 CC) - urbanised model	Total net rain mm (100 year 1.4 CC) - urbanised model	Direct runoff m3/s (100 year 1.4 CC) - urbanised model	Baseflow m3/s (100 year 1.4 CC) - urbanised model	Total flow m3/s (100 year 1.4 CC)- urbanised model	Total flow l/s (100 year 1.4 CC)- urbanised model	Total flow m3 (100 year 1.4 CC)- urbanised model	
										Period	Cumulative
00:00:00	0.989874416	0.989874416	0	0	0.989874416	0.000000000	0	0.000000000	0.000000000	0.000000000	0.00000
00:24:00	1.446525839	1.446525839	0	0	1.446525839	0.000001565	0	0.000001565	0.001565122	0.002253776	0.00225
00:48:00	2.108724873	2.108724873	0	0	2.108724873	0.000006983	0	0.000006983	0.006982516	0.010054823	0.01231
01:12:00	3.064560918	3.064560918	0	0	3.064560918	0.000018021	0	0.000018021	0.018021232	0.025950574	0.03826
01:36:00	4.434759524	4.434759524	0	0	4.434759524	0.000037117	0	0.000037117	0.037117461	0.053449143	0.09171
02:00:00	6.375277705	6.375277705	0	0	6.375277705	0.000064555	0	0.000064555	0.064554943	0.092959118	0.18467
02:24:00	9.039562141	9.039562141	0	0	9.039562141	0.000102445	0	0.000102445	0.102444708	0.147520379	0.33219
02:48:00	11.29782209	11.29782209	0	0	11.29782209	0.000155024	0	0.000155024	0.155023804	0.223234277	0.55542
03:12:00	9.039562141	9.039562141	0	0	9.039562141	0.000225779	0	0.000225779	0.225778776	0.325121438	0.88054
03:36:00	6.375277705	6.375277705	0	0	6.375277705	0.000309206	0	0.000309206	0.309206313	0.445257091	1.32580
04:00:00	4.434759524	4.434759524	0	0	4.434759524	0.000389147	0	0.000389147	0.389147463	0.560372346	1.88617
04:24:00	3.064560918	3.064560918	0	0	3.064560918	0.000446793	0	0.000446793	0.446792648	0.643381413	2.52955
04:48:00	2.108724873	2.108724873	0	0	2.108724873	0.000466507	0	0.000466507	0.466506638	0.671769558	3.20132
05:12:00	1.446525839	1.446525839	0	0	1.446525839	0.000450529	0	0.000450529	0.450529130	0.648761947	3.85009
05:36:00	0.989874416	0.989874416	0	0	0.989874416	0.000411000	0	0.000411000	0.410999988	0.591839983	4.44193
06:00:00	0	0	0	0	0	0.000360126	0	0.000360126	0.360126005	0.518581447	4.96051
06:24:00	0	0	0	0	0	0.000305698	0	0.000305698	0.305698258	0.440205492	5.40071
06:48:00	0	0	0	0	0	0.000250426	0	0.000250426	0.250425966	0.360613391	5.76133
07:12:00	0	0	0	0	0	0.000196219	0	0.000196219	0.196219109	0.282555517	6.04388
07:36:00	0	0	0	0	0	0.000144798	0	0.000144798	0.144798368	0.208509650	6.25239
08:00:00	0	0	0	0	0	0.000100301	0	0.000100301	0.100301004	0.144433446	6.39682
08:24:00	0	0	0	0	0	0.000065268	0	0.000065268	0.065268447	0.093986564	6.49081
08:48:00	0	0	0	0	0	0.000040590	0	0.000040590	0.040589919	0.058449484	6.54926
09:12:00	0	0	0	0	0	0.000024463	0	0.000024463	0.024463437	0.035227349	6.58449
09:36:00	0	0	0	0	0	0.000013975	0	0.000013975	0.013974504	0.020123286	6.60461
10:00:00	0	0	0	0	0	0.000007308	0	0.000007308	0.007308477	0.010524207	6.61514
10:24:00	0	0	0	0	0	0.000003288	0	0.000003288	0.003287706	0.004734296	6.61987
10:48:00	0	0	0	0	0	0.000001089	0	0.000001089	0.001088660	0.001567670	6.62144
11:12:00	0	0	0	0	0	0.000000140	0	0.000000140	0.000140019	0.000201628	6.62164

Total Rainfall (mm/m2)	66.216	
Total Run Off (m3)		6.622
Max Flow (l/s)		0.467

Project: 8a Boarsfield, Kingsland
Client: David Thomas

Site Area 100 m^2
Impervious % 100 %
Impervious Area 100 m^2

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Whole Site Area

Time	Total flow m3/s (100 year 1.4 CC)-urbanised model	Total flow l/s (100 year 1.4 CC)-urbanised model	Total flow m3 (100 year 1.4 CC)-urbanised model Period	Total flow m3 (100 year 1.4 CC)-urbanised model Cumulative
00:00:00	0.000000000	0.000000000	0.000000000	0.00000
00:24:00	0.000001565	0.001565122	0.002253776	0.00225
00:48:00	0.000006983	0.006982516	0.010054823	0.01231
01:12:00	0.000018021	0.018021232	0.025950574	0.03826
01:36:00	0.000037117	0.037117461	0.053449143	0.09171
02:00:00	0.000064555	0.064554943	0.092959118	0.18467
02:24:00	0.000102445	0.102444708	0.147520379	0.33219
02:48:00	0.000155024	0.155023804	0.223234277	0.55542
03:12:00	0.000225779	0.225778776	0.325121438	0.88054
03:36:00	0.000309206	0.309206313	0.445257091	1.32580
04:00:00	0.000389147	0.389147463	0.560372346	1.88617
04:24:00	0.000446793	0.446792648	0.643381413	2.52955
04:48:00	0.000466507	0.466506638	0.671769558	3.20132
05:12:00	0.000450529	0.450529130	0.648761947	3.85009
05:36:00	0.000411000	0.410999988	0.591839983	4.44193
06:00:00	0.000360126	0.360126005	0.518581447	4.96051
06:24:00	0.000305698	0.305698258	0.440205492	5.40071
06:48:00	0.000250426	0.250425966	0.360613391	5.76133
07:12:00	0.000196219	0.196219109	0.282555517	6.04388
07:36:00	0.000144798	0.144798368	0.208509650	6.25239
08:00:00	0.000100301	0.100301004	0.144433446	6.39682
08:24:00	0.000065268	0.065268447	0.093986564	6.49081
08:48:00	0.000040590	0.040589919	0.058449484	6.54926
09:12:00	0.000024463	0.024463437	0.035227349	6.58449
09:36:00	0.000013975	0.013974504	0.020123286	6.60461
10:00:00	0.000007308	0.007308477	0.010524207	6.61514
10:24:00	0.000003288	0.003287706	0.004734296	6.61987
10:48:00	0.000001089	0.001088660	0.001567670	6.62144
11:48:00	0.000000140	0.000140019	0.000201628	6.62164
12:48:00	0.000000000	0.000000000	0.000000000	6.62164
13:48:00	0.000000000	0.000000000	0.000000000	6.62164
14:48:00	0.000000000	0.000000000	0.000000000	6.62164
15:48:00	0.000000000	0.000000000	0.000000000	6.62164
16:48:00	0.000000000	0.000000000	0.000000000	6.62164

Attenuated Discharge

(l/s)	Period (m3)	Cumulative (m3)	Storage Requirement m3
	0.0000000	0.0000	0.00000
0.0015651	0.0000016	0.0023	0.00000
0.0069825	0.0000070	0.0123	0.00000
0.0180212	0.0000180	0.0383	0.00000
0.0371175	0.0000371	0.0917	0.00000
0.0645549	0.0000646	0.1847	0.00000
0.0971938	0.0000972	0.3246	0.00756
0.0971938	0.0000972	0.4646	0.09084
0.0971938	0.0000972	0.6045	0.27600
0.0971938	0.0000972	0.7445	0.58130
0.0971938	0.0000972	0.8845	1.00171
0.0971938	0.0000972	1.0244	1.50513
0.0971938	0.0000972	1.1644	2.03694
0.0971938	0.0000972	1.3043	2.54575
0.0971938	0.0000972	1.4443	2.99763
0.0971938	0.0000972	1.5843	3.37625
0.0971938	0.0000972	1.7242	3.67650
0.0971938	0.0000972	1.8642	3.89715
0.0971938	0.0000972	2.0041	4.03975
0.0971938	0.0000972	2.1441	4.10830
0.0971938	0.0000972	2.2841	4.11277
0.0971938	0.0000972	2.4240	4.06680
0.0971938	0.0000972	2.5640	3.98529
0.0971938	0.0000972	2.7039	3.88056
0.0971938	0.0000972	2.8439	3.76072
0.0971938	0.0000972	2.9838	3.63129
0.0971938	0.0000972	3.1238	3.49606
0.0971938	0.0000972	3.2638	3.35767
0.0971938	0.0000972	3.4037	3.21791
0.0971938	0.0000972	3.5437	3.07796
0.0971938	0.0000972	3.6836	2.93800
0.0971938	0.0000972	3.8236	2.79804
0.0971938	0.0000972	3.9636	2.65808
0.0971938	0.0000972	4.1035	2.51812

Max Flow (l/s) 0.467

Total Run Off (m3) 6.622

Max Storage Requirement (m3) 4.113

Appendix C – Soakaway Calculations

Proposed Drainage Design - Soakaway Calculation

Client: 8a Boarsfield, Kingsland
Site: David Thomas
Area: Soakaway

Proposed Storage

	Length	Width	Depth (below Invert)	Surface Area of Storage to 50% Depth	Fill	Volume of Storage*	Voids	Storage Volume
	m	m	m	m^2		m^3		m^3
Soakaway 1	2	1.00	1.20	3.6	Drainage Crate	2.4	95%	2.28
Soakaway 1	2	1.00	1.20	3.6	Drainage Crate	2.4	95%	2.28
				0				
				7.20		4.8		4.56

Attenuation Pond

	Area	Depth				
Centre				None	0	100%	0
Sides				None	0	100%	0
			0		0		0
TOTAL			7.20		4.8		4.56

Infiltration Rate (from infiltration test)	0.0000135 m/s		
Attenuated Outflow Factor	0.00010 m3/s		
Max Storage Required	4.11 m3	Proposed Storage Volume	4.56 m3
Time for storage to discharge from full to half	6.5 hrs	Sufficient Storage Volume	OK