

PRELIMINARY SURFACE WATER DRAINAGE STRATEGY

Erection of 20 Dwellings (Outline)
including Access

Land Adjacent to Chestnut Court,
Summerhill Road, Gwersyllt, LL11 4SW

Prepared for Castlemead Group Ltd by
Nigel Thorns BSc(Hons) DipTP MRTPI

NigelThornsPlanningConsultancy
Chartered Consultant • Town & Country Planning

Watton, 22 Kingsland Road,
Shrewsbury, Shropshire, SY3 7LD
Tel/Fax (01743) 343660
Mobile (07791) 316173
E.mail NigelThorns@aol.com

Contents

Section	Page
1. Introduction	1
2. The Site	2
3. Flood Risk	2
4. Technical Guidance Requirements	3
5. Percolation Tests	4
6. Conclusions	4

Document 1 Percolation Tests provided by Kane Design

1. Introduction

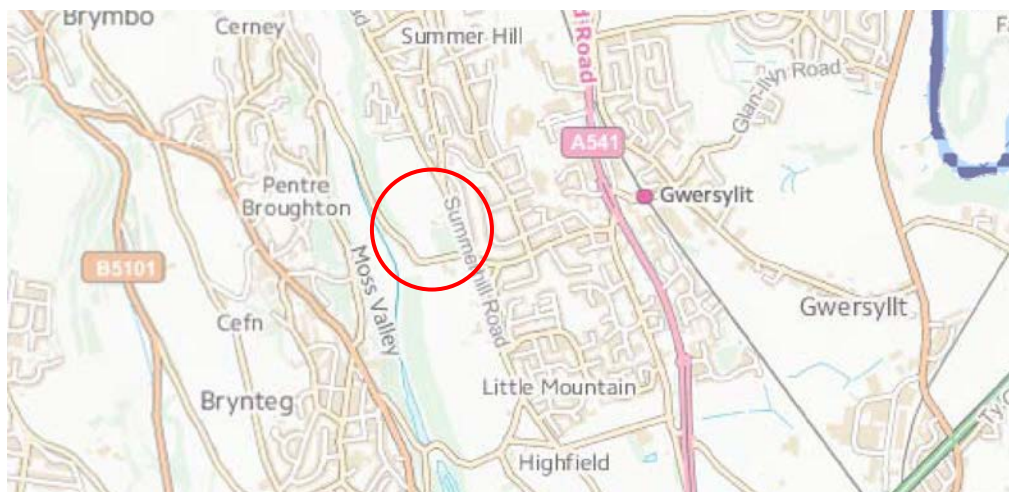
- 1.1 This report considers the surface water drainage issues associated with the planning application for 20 dwellings on Land Adjacent to Chestnut Court, Summerhill Road, Gwersyllt, LL11 4SW.
- 1.2 The preliminary surface water drainage strategy has been developed to assess the viability of effectively draining the proposed residential development.
- 1.3 The outline strategy is designed to inform a sustainable approach and will be supplemented with a detailed drainage strategy as part of any future Reserved Matters planning application.

2. The Site

- 2.1 The site is a roughly rectangular shaped field covering approximately 1.06 hectares
- 2.2 The site currently comprises a parcel of overgrown land on the urban fringe.
- 2.3 The land includes a number of trees covered by a Tree Preservation Order
- 2.3 The land is raised above Summerhill Road but is generally flat within the site.

3. Flood Risk

- 3.1 A floodplain is the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.
- 3.2 The site is shown to be outside the Environment Agency's Indicative Floodplain which shows the 0.1% annual probability flooding and an extract of the Environment Agency mapping is shown below.



- 3.3 There will be no detrimental impact upon any future occupiers of the development through flood risk and the development of the site will not result in the loss of flood storage capacity
- 3.4 The development fulfils the criteria within Technical Advice Note 15 Development and Flood Risk.

4. Technical Guidance Requirements

- 4.1 TAN 15 Development and Flood Risk states that the aim should be for new development not to create additional run-off when compared with the undeveloped situation, and for redevelopment to reduce run-off where possible.
- 4.2 In accordance with TAN15, Sustainable Drainage Systems (SuDS) should be specified wherever possible to manage surface water.
- 4.3 A hierarchical approach should be taken to the design of the surface water drainage system with priority given to:
- Prevention – the use of good site design to prevent run off (e.g. rainwater re-use or harvesting).
 - Source Control – control of run off at or near the source (e.g. soakaways, infiltration beds, green roofs, pervious paving, etc.).
 - Site Controls – management of water run off in a local area or the site (i.e. routing of surface water to large soakaways or attenuation basins/structures).
- 4.4 Approved Document H of the current Building Regulations sets out a hierarchy for disposal of surface water from new development, as listed below in order of preference:
- Infiltration via soakaway or other infiltration device;
 - Watercourse; and,
 - Sewer.

5. Percolation Tests

- 5.1 Percolation Tests in accordance with BRE 365 guidelines have been provided by Kane Design of 15 Winchester Way, Gresford, Wrexham, LL12 8HH and these are attached as Document 1.
- 5.2 The two trial pits tested passed all soakaway design criteria

6. Conclusions

- 6.1 It is recommended that surface water is discharged via infiltration techniques.
- 6.2 A detailed drainage design strategy to include SuDs measures will be prepared at the Reserved Matters application stage in consultation with the sewerage undertaker and the Environment Agency.
- 6.3 The detailed drainage design strategy will need to consider the tree constraints plan prepared by Tree Solutions (Arboricultural Consultants) of 5 Orchard Close, Chester, Cheshire, CH2 2JD.
- 6.4 On the basis of the Preliminary Surface Water Drainage Strategy, and the Percolation Tests undertaken it is clear that the site is suitable for development.

**SOAKAWAY RESULTS AND CALCULATIONS
for
CHESNUT COURT
SUMMERHILL, WREXHAM, LL11 4SP**

11 July 2014

Client:

**SOAKAWAY RESULTS AND CALCULATIONS FOR
CHESNUT COURT, SUMMERHILL, WREXHAM, LL11 4SP**

1.0 Introduction

- 1.1 Soakaway tests were requested by Castlemead Homes at the location of a proposed residential development and undertaken by Kane Design / Alan Kane on 10 June 2014.
This site is Greenfield, very heavily overgrown and wooded, and site levels range from 51-58m.
- 1.2 Weather on the test day was hot, with intermittent short heavy showers.
- 1.3 Trial pits were partially filled with water and the time taken to empty recorded. In accordance with B.S. 365, the time to empty from 75% to 25% was computed, and from this a soil infiltration rate was calculated.
- 1.4 This was compared with the B.S. 363 criteria for the acceptance of soakaways, namely:
- The effective pit depth (depth beneath incoming pipework) must be able to contain a worst-in-30 year storm, all storm durations up to 6 hours.
 - The pit must half-empty within 24 hours.

Typical soakaway designs are included using the obtained infiltration rates

2.0 Results.

- 2.1 Two trial pits were excavated

Test 1: 2.0 x 1.0m 1.83m average depth.

Approximate log: 0-400 mm topsoil
600- gravelly

Infiltration rate: 1.22 X 10⁻⁴m³/s

Test 2: 1.5 x 1.0m x 1.85m average depth.

Approximate log: 0-400 mm topsoil
600- gravelly

Infiltration rate: 4.58 X 10⁻⁶m³/s

**SOAKAWAY RESULTS AND CALCULATIONS FOR
CHESNUT COURT, SUMMERHILL, WREXHAM, LL11 4SP**

Based on an infiltration rate of $1.22 \times 10^{-4} \text{ m}^3/\text{s}$, and draining an area of 200 m^2 :

A soakaway size of 1200mm diameter rings, with an effective depth of 2.0m (beneath incoming pipe) would empty in 1.14 hours.

Required storm storage is 2.59 m^3 , and 2.51 m^3 is available.

2.0 Summary

The two trial pits tested passed all soakaway design criteria

Trial pit 1 infiltration rate is “good”. The pit was emptying as quick as it was being filled. Trial pit 2, about 23m further into the site, had a low (not very good) but workable infiltration rate. Trial pit 2 may eventually need re-visited, as filling was by a tap rather than an instant fill, which can distort readings.

However, the good fast emptying of trial pit 1 is proof that areas of the site soak well.

3.0 Limitation and comment

The above tests were limited by time constraints, but do give an overview of the ability of the site to soak. All measurements are approximate.

These test results do not remove the need for a site investigation. Comments on the trial pit composition are visual from site, and there is no detailed analysis.

For detailed design, the Highway Authority may request a further test in the proposed road. They may want to be present for this. The full B.S. 363 testing criteria is for each test to be repeated three times.

Detailed design would require about 6 tests, to give a good mapping of the entire site

The purpose of this document is to prove that there are areas where soakaways do work, therefore removed the major issues connected with draining surface water to public sewers (assuming they will accept it), and the cost of over-size storage pipes and large diameter manholes.

The “worst-storm-in 100 years, plus 30% climate change” must also be considered. At design stage this can be accommodated in several ways, such as:

- Deeper soakaways.
- Designated emergency flood zones such as public open spaces, car parks.

PROPOSED DEVELOPMENT at CHESNUT COURT, SUMMERHILL, WREXHAM, LL11 4SP

KANE DESIGN

JOB NUMBER:

1243

SOAKAWAY RESULTS

CLIENT

Castlemead Homes

11 June 2014 AK

PAGE

1/2

SOAKAWAY REFERENCE : TRIAL PIT 1**Test details**

Date Tue 10 June 2014

Weather: Hot sunny, some heavy showers

DEPTH OF WATER IN PIT(mm)TIME (MINS)

TIME

START	15.30pm	0	300
	15.35pm	5	110
END	15.40pm	10	25

PIT SIZE (m)

Length 2.0

Width 1.0

Average Depth 1.83

TOTAL TIME 10.00 minutes

PIT AREA (m2 2.00

CALCULATED:

V25 25%

V75 75%

TIME TO FALL FROM 75% to 25% (mins)

	ACTUAL	INTERPLOATED
TIME (mins)	TIME	DEPTH (mm)
2.5		205.00
7.5		67.50
5		137.50

CALCULATION:INFILTRATION RATE = $f =$ $V = \text{Effective Storage Volume between 75\% and 25\% full}$ $T = \text{Time taken to drain above } X \text{ AP}$

where AP = 50% internal surface area, including base:

 $= 7.49 \text{ m}^2$

CALCULATED

 $V (V75-V25)$

CALCULATED

SOAKAWAY**PIT AREA**

FROM ABOVE

Depth 25%**Depth 75%****x PIT AREA****T****AP****f (Infiltration rate)**

1

m2

mm

mm

m3

minutes

m2

2.00

205.00

67.50

0.275

5.00

7.49

1.22E-04

m3/second

PROPOSED DEVELOPMENT at CHESNUT COURT, SUMMERHILL, WREXHAM, LL11 4SP

KANE DESIGN

JOB NUMBER:

1243

SOAKAWAY RESULTS

CLIENT

Castlemead Homes

11 June 2014 AK

PAGE

2/2

SOAKAWAY REFERENCE : TRIAL PIT 2**Test details**

Date Tue 10 June 2014

Weather: Hot sunny, some heavy showers

DEPTH OF WATER IN PIT(mm)TIME (MINS)

TIME

START	15.54pm	0	350
	16.12pm	18	330
END	16.20pm	26	303

PIT SIZE (m)

Length 1.5

Width 1.0

Average Depth 1.85

TOTAL TIME 26.00 minutes

PIT AREA (m2 1.50)

CALCULATED:

V25 25%

V75 75%

TIME TO FALL FROM 75% to 25% (mins)

	ACTUAL	INTERPLOATED
TIME (mins)	TIME	DEPTH (mm)
6.5		344.15
19.5		329.56
13		14.59

CALCULATION:

INFILTRATION RATE = f =

V = Effective Storage Volume between 75% and 25% full

T= Time taken to drain above X AP

where AP = 50% internal surface area, including base:

= 6.13 m2

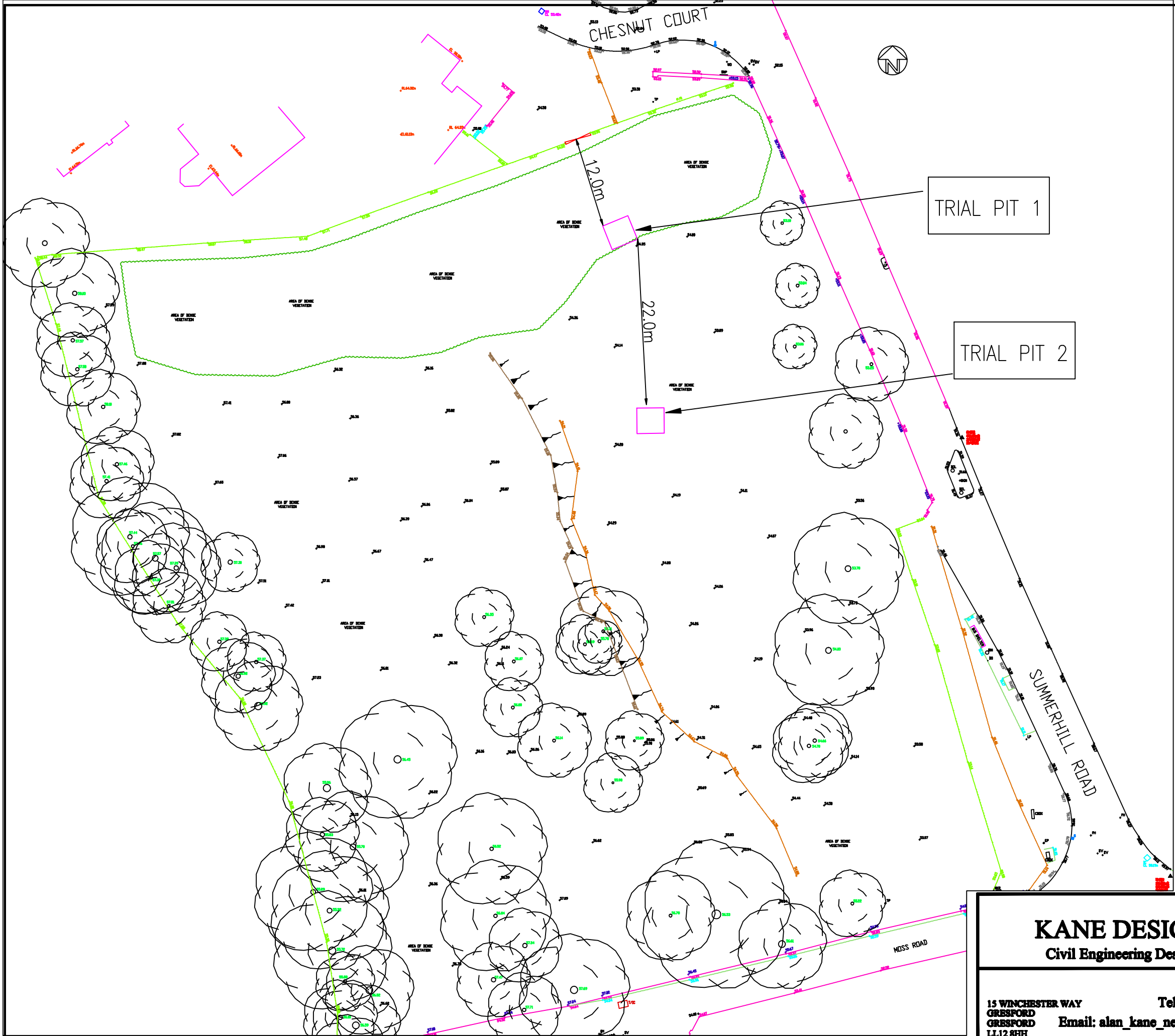
CALCULATED

V (V75-V25)

CALCULATED

SOAKAWAY	PIT AREA	FROM ABOVE Depth 25%	Depth 75%	x PIT AREA	T	AP	f (Infiltration rate)
----------	----------	-------------------------	-----------	------------	---	----	-----------------------

	m2	mm	mm	m3	minutes	m2	
1	1.50	344.15	329.56	0.022	13.00	6.13	4.58E-06 m3/second



- NOTES
1. SURVEY TAKEN FROM
 2. TRIAL PITTS DIMENSIONS ARE APPROXIMATE

Rev.		Description	Date	Dwn.	Chd.
Project		PROPOSED DEVELOPMENT at CHESNUT COURT, SUMMERHILL WREXHAM LL11 4SP			
Title		SOAKAWAY TEST LOCATIONS			
Dwg. No.	1242-100	Dwn.	AK	Date	11.06.14
Scale	1:1000	Rev.			

KANE DESIGN
Civil Engineering Design

15 WINCHESTER WAY
GRESFORD
GRESFORD
LL12 8HH

Tel: 01 978 855888
Email: alan_kane_net@btinternet.com



PIT 1



PIT 2

NigelThornsPlanningConsultancy
CharteredConsultant•Town&CountryPlanning
Watton, 22 Kingsland Road,
Shrewsbury, Shropshire, SY3 7LD
Tel/Fax (01743) 343660
Mobile (07791) 316173
e.mail NigelThorns@aol.com