TECHNICAL NOTE 01

PROPOSED EXTENSION TO WAREHOUSE

1.0 INTRODUCTION

1.1 This Technical Note, (TN), has been produced on behalf of Produce Packaging to discharge planning condition number 3 of South Holland District Council planning permission H14-0365-21.

1.2 The site is located at grid reference TF2598625509 as shown on **Figure 1.1** below.

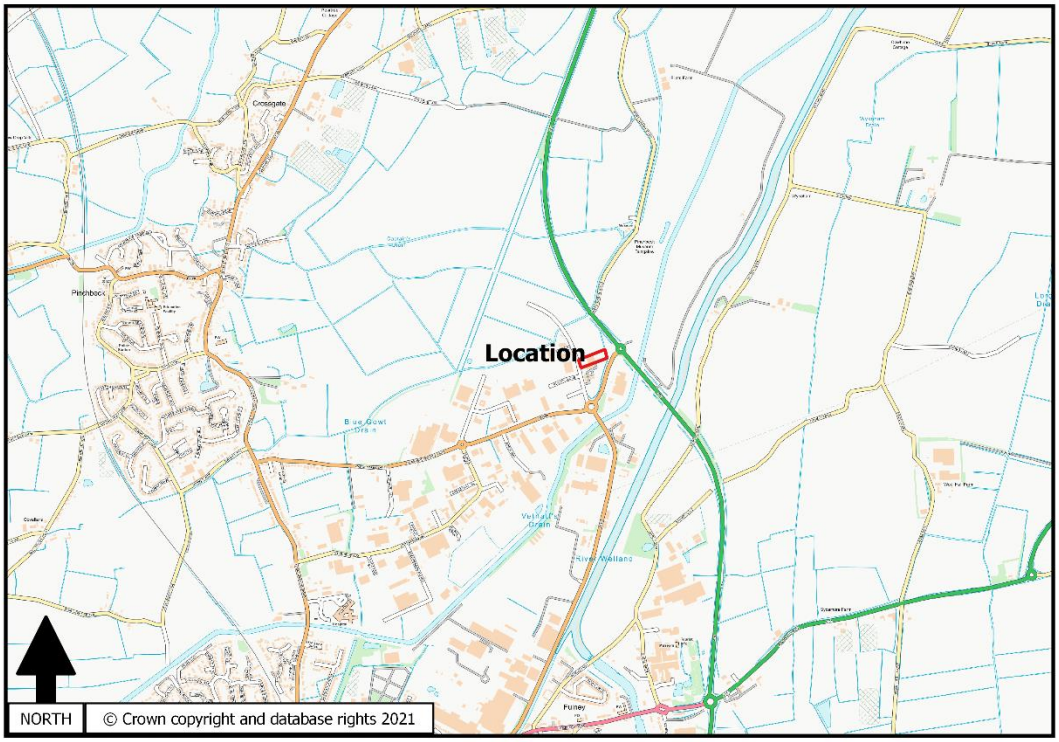


Figure 1.1 Location Plan

Proposed Development

1.3 The proposed development consists of an extension to an existing warehouse.

2.0 SURFACE WATER DRAINAGE

2.1 The recommended surface water drainage hierarchy is to utilise soakaway, or infiltration as the preferred option, followed by discharging to an appropriate watercourse or if this is not available the final option is to an existing public sewer.

Surface Water Discharge to Sewer

2.2 The online British Geological Survey maps indicates that the site is located on mudstone which will not support the use of infiltration.

2.3 Surface water runoff and storage calculations have been undertaken using a software tool developed by HR Wallingford and a summary is included below with the full results included in **Appendix 1.**

Existing Site Runoff

2.4 SOIL types (1 to 5) are defined in the Flood Studies Report and broadly describes the maximum runoff potential.

2.5 SOIL type 1 is sandy highly permeable material with permeability reducing as the SOIL value increases. SOIL type 4 is heavy clay and 5 (which is rarely applied) is exposed rock.

2.6 The software considers the site to be located on SOIL type 2 but this is not the case and therefore a SOIL type 4 has been used.

2.7 The total impermeable area is 0.1521ha, (1,521m^2).

Surface Water Storage

2.8 Two volume control approaches are available as follows;

- Flow control is limited to the greater rate of Qbar or 2 l/s/ha.
- Long Term Storage allows the site discharge rate to be based on the greenfield 100-year value. Runoff rates are higher as part of the runoff is retained for a significant period or infiltrated on the site.

2.9 For this Site the flow control has been limited to the minimum discharge of 5 l/sec.

2.10 The storage volume has been calculated for the 20% climate change allowances in peak rainfall intensity and is 52m^3.

On-Site Requirements

2.11 The storage will be provided in an underground system before being discharged at a rate of 5l/sec to the adjacent surface water sewer as shown below in **Figure 2.1**.

Alternative

2.12 An alternative arrangement is that the Internal Drainage Board may accept and unattenuated discharge into their system including a contribution for the future maintenance required.

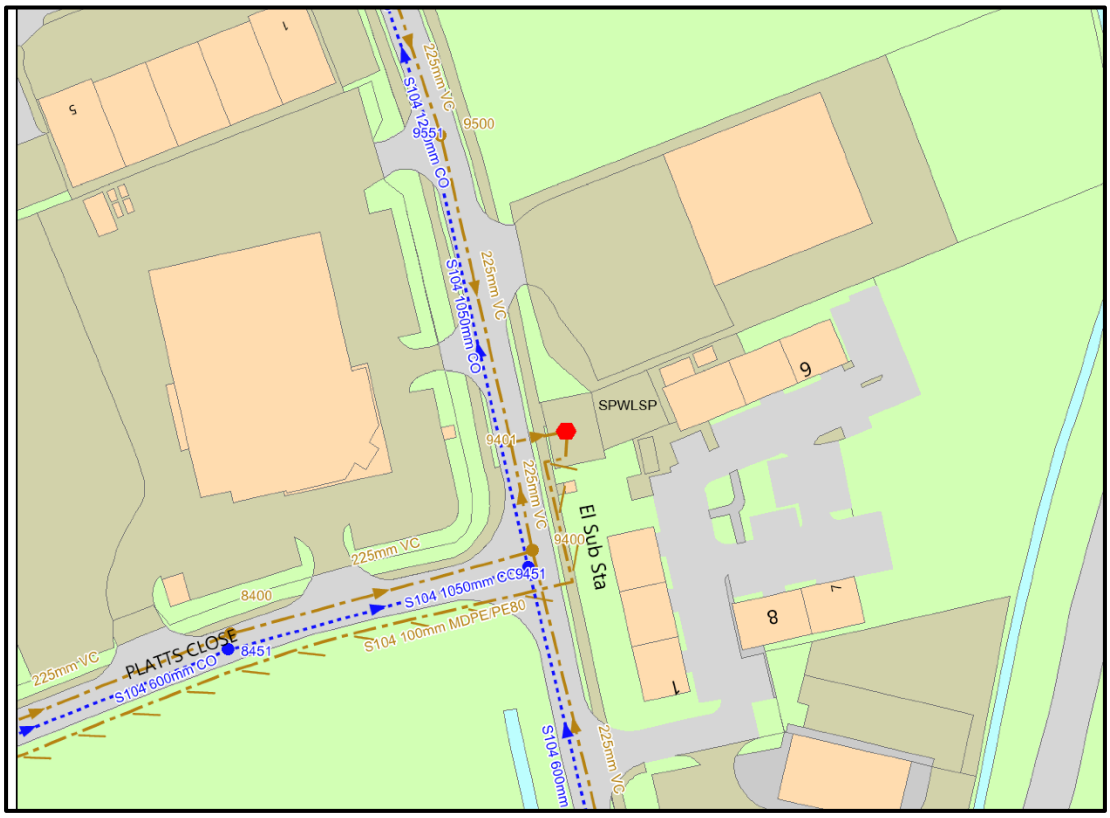


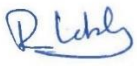
Figure 2.1 Sewers

3.0 DOCUMENT ISSUE RECORD

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Revision		Date of Issue
1	Issued	19/08/2021

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Limitations

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The information in this report is based on statistical data and qualitative analysis which are for guidance purposes only. This study provides no guarantee against flooding or of the absolute accuracy of water levels, flows and associated probabilities.

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Appendix 1
Surface Water Calculations

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Roy Lobley
Site name:	RLC-0851
Site location:	Pinchbeck

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	52.81262° N
Longitude:	0.13242° W
Reference:	3520067930
Date:	Aug 18 2021 07:07

Site characteristics

Total site area (ha):	0.1521
Significant public open space (ha):	0
Area positively drained (ha):	0.1521
Impermeable area (ha):	0.1521
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.15
Net impermable area for storage volume design (ha):	0.15
Pervious area contribution to runoff (%):	0

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	2	4
SPR:	0.3	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	63
Rainfall 100 yrs 12 hrs:	--	97.79
FEH / FSR conversion factor:	1.27	1.27
SAAR (mm):	560	560
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydological region:	5	5
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.65	1.65
Growth curve factor 30 year:	2.45	2.45
Growth curve factor 100 years:	3.56	3.56
Q_{BAR} for total site area (l/s):	0.21	0.57
Q_{BAR} for net site area (l/s):	0.21	0.57

Design criteria

Climate change allowance factor:	1.2
Urban creep allowance factor:	1
Volume control approach	Flow control to max of 2 l/s/ha or Qbar
Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	5

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	5	5
1 in 30 years (l/s):	5	5
1 in 100 year (l/s):	5	5

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m³):	52	52
Long term storage 1/100 years (m³):	0	0
Total storage 1/100 years (m³):	52	52

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

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