STRUCTURAL CALCULATIONS

For

NEW DEVELOPMENT

DODDINGTON LANE

SNUBTON NG23

DRAINAGE STRATEGY

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PROJECT NO: 7954

DATE : 11-JUN-26

YORK SILLS CIVIL & STRUCTURAL CONSULTING ENGINEERS	Prepared : **ACT** Checked : Approved :	Job ref : **7954** Sheet : **1 – 20** Rev No: **A**
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1 INTRODUCTION

1.1 Site Location

The project involves the development of four or more sizeable residential properties on a Green field site just outside Snubton, Nottinghamshire.

Figure 1 - Site Location

The purpose of this document is to establish a Drainage Strategy for the development for both Foul Water (FW) and Storm Water (SW).

1.2 Site History & Geology

The existing site has been historically used as an agricultural for growing crops and to graze animals. From historic records it would appear that there have been no structures on the site.

As indicated from BGS records the site is underlined by a Stubton Limestones Bed Formation as bedrock with overlaying Head-clay, silt, sand and gravel as a superficial deposit. These superficial deposits are detrital, comprising coarse- to fine- grained materials, forming down-slope layers and fans of accumulated material: define in the GBS Lexicon of Named Rock Units as:

> *Head is poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes. Solifluction is the slow viscous downslope flow of waterlogged soil and other unsorted and unsaturated superficial deposits. The term gelifluction is restricted to the slow flow of fluidized superficial deposits during the thawing of seasonally frozen ground. The flow is initiated by meltwater from thawing ice lenses. Polymict deposit: comprises gravel, sand and clay depending on upslope source and distance from source. Locally with lenses of silt, clay or peat and organic material.*

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No relevant borehole logs could be found in the vicinity.

1.3 Proposed Development

The Proposed Development comprises a group of four single storey, 4-Bed Bungalows set around a Private Close as indicated in Figure 2, below.

Figure 2 - Proposed Development Plan

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2 OVERALL DRAINAGE STRATEGY

2.1 Ground Conditions

Both the Soakaway and the Attenuation Tank approaches rely upon the ability of the ground to allow the water to flow away through the upper strata. A recent Infiltration Test carried out on 30th April 2026 by Humberside Material Testing has established that the site is NOT suitable for soakawys as there was no infiltration recorded.

2.2 Potential Options for the Site

Considering the foul drainage, the nearest discharge point into a public sewerage is in the centre of the village of Snubton, approx. 225m due north of the site. According to the Anglian Water Asset Register, there is a potential receiving manhole (AWA Asset Ref 3804) which could receive this (subject to potential Capacity Checks) but it is shallow, with an invert level of 28.86m, and too high for straightforward gravity discharge from the site at the level of 29.25m. This means that we would have to pump the foul water from the site through a Rising Main to a new manhole within 5m of the the existing.

As an alternative, the treatment of the sewage may be carried out on site using a dedicated Septic Tank or Sewage Treatment Plant (STP) and the resulting treated effluent discharged to ground or to an existing seasonally wet water course. Unfortulately, the on-site Infiltration Test carried out by Humberside Materials Laboratory on 30-Apr-26 (See Appendix 2) concludes that the site is deemed not suitable to allow the treated effluent to be discharged to ground (using either a Drainage Field or Soakaway) to drain so the only viable option would be to pipe it to the stream at the bottom of Doddington Lane approx 500m away.

The lack of infiltration on the site also impacts the options for disposing of the surface water runoff. The simplest solution would be to attenuate the runoff from all impermable surfaces being introduced by the Development and let that be released into the existing seasonally dry ditch along Doddington Lane, which would end up at the water course at the bottom of Doddington Lane.

Considering the two systems together, the better option may be to lay a piped drain from the site to the water course, either within the edge of the fields to the south of the site, or within the edge of the road corridor, into which both the treated effluent and surface water runoff can be discharged. Permissions would need to be sought from either the owners of the field or the local Council.

In summary, the following scenarios have been considered:

Scenarios	Foul Water	Storm Water
Scenario 1 - On-Site STP and attenuated discharge to normally wet water course	Provide STP on site and pipe down parallel to Doddington Lane to existing flowing water couse 520m away.	Attenuate runoff on site and discharge in to same pipe as foul water system to existing flowing water couse 520m away.
Scenario 2 - Pumped Main and attenuated flow to ditch	Provide Pump Station on site, a Rising main up Doddington Lane to a new Manhole within 5m of existing maonhole and gravity drain from the new manhole to existing	Attenuate runoff on site and discharge in to existing ditch at an agreed rate
Scenario 3 - On-Site STP discharching to existing water course and attenuated discharge to ditch	Provide STP on site and pipe down parallel to Doddington Lane to existing flowing water couse 520m away.	Attenuate runoff on site and discharge into current not normally wet ditch along Doddington Road.

Of the three scanarios, Scenario 1 is the technically most preferred as does not require a disruptive pumped discharge into the village and allows the effluent discharge from an On-Site STP to be periodically flushed by the storm water discharge to avoid blockage and/or smells.

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3 SUMMARY OF COMPLIANCE AND APPROACH

3.1 British Standards And Other References

a) CIRIA Report C609 – Sustainable Drainage Systems
b) CIRIA Report C697 – The SuDS Manual
c) CIRIA Report CR156 - Report 156 - Infiltration drainage Manual of good practice
d) Sewerage Sector Guidance Version 2.1
e) Building Regulations 2010 - Approved Document H – Drainage and Waste Disposal
f) Proprietary manufacturer's technical literature
g) British Water - Code of Practice - Flows & Loads – 4
h) National Standards For Suds - updated 30-Jul-2025.

3.2 Requirements for Foul Water Systems

If not discharging directly into a public sewer, the sewage must be treated on site to such a standard such that it may be treated as storm water.

3.3 Requirements for Storm Water Systems

The storm water drainage is evaluated against the National standards for sustainable drainage systems (SuDS) - GOV.UK. This evauation is summarised as follows:

3.3.1 Designated Sensitive Areas:

The location has been checked on the Magic Map website with the following results:

- Source Protection Zone 1 – Not applicable to this site
- Special Areas of Conservation (SAC) – Not applicable to this site
- Special Protection Areas (SPA) – Not applicable to this site
- Ramsar Sites– Not applicable to this site
- Sites of Special Scientific Interest (SSSI) – Not applicable to this site.
- Designated Bathing Waters – Not applicable to this site
- Shellfish Protected Waters – Not applicable to this site
- Ancient Woodlands – Not applicable to this site
- Selected protected species and protected habitats - Not applicable to this site
- Local nature reserves and local wildlife sites (aquatic in nature) – Not applicable to this site

3.3.2 STANDARD 1: Runoff Destinations

➢ **Surface Water Drainage Hierarchy:**

The surface water disposal hierarchy is as follows:

- Collected for non-potable use
- Infiltration to ground
- Discharge to an above ground surface water body
- Discharge to a surface water sewer or other piped surface water drainage system
- Discharge to a combined sewer

➢ **Collected for non-portable use:**

The collection of surface water runoff & re-use of it for non-potable use is not a complete means of sustainable water disposal from a site of this size. It may be considered as an option within the Development as reuse option, but water from any greywater system will end up within the foul water drainage and in need of safe, sustainable disposal.

➢ **Infiltration:**

From infiltraction tests carried out by Humberside Materials Laboratory on 30-Apr-26 and summarised in their report of the 04-May-26, the ground was found to be unsuitable for infiltration via soakaways. This is therefore not considered to be a viable option.

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- **Watercourses:**

  The nearest documented water course to the site is approx 550m away down Doddington Lane, approx 4 - 5m below the level of the site. However, the surface water from the site is currently running from the site to a drainage ditch on the west side of Doddington Lane. This being the case, the peak runoff from the Development's impermeable areas must be collected, attenuated and released into the same water course resulting in the runoff condition being identical to the current use.

  There is no other viable runoff destination.

- **Surface water Sewer:**

  As per Anglian water asset plan map there are no surface water sewers.

- **Combined Sewer:**

  As per Anglian water asset plan map there is a foul water sewer located in the centre of Snubton. Any connection would require the drain to pass through property which are not in the ownership of the client.

3.3.3 STANDARD 2: Management Of Everyday Rainfall

The following have been used to intercept the first 5mm of rainfall for a majority rainfall event preventing this water from being discharched from site during that majority rainfall event (attentuated). This attenuated water is discharged into the nearby water course at a rate not exceeding that of a majority rainfall event.

3.3.4 STANDARD 3: Management Of Extreme Rainfall And Flooding

- **Flood Risk:**

  The Environment Agency Flood Map (Figure 2, below) indicates the following:

  - The site lies in Flood Zone 1 indicating low (<0.1% per annum) change of flooring from rivers or the sea.
  - The site includes area at low risk (<300mm depth) of surface water flooding. The building footprint does not lie within the area at risk of surface water flooding.
  - No increased risk of on- or off-site flooding will occur as a result of the proposed work.

Figure 3 - Flood Risk Map

- **Surface Water Drainage:**

  It is proposed that all rainwater is collected, attenuated and discharged into an existing watercourse. The approx impermeable area created by the development is estimated by including the following new elements, totalling 1,430m² (See Section 5.2 below):

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- Roofs
- Driveways
- Pavements
- Site Roads

The proposed runoff will need to be collected and attenuated to meet the following requirements:

Storm	Criteria for Compliance	Flow Rate for site	Flow rate for attenuated water
1 in 10 year	50% of attenuation tank half of which is drained in 24 hours	4.2 l/s	0.9 ltr/s
1 in 30 year	Together with % increace due to Climate Change + Urban Creep with 100% contained within the attenuation tank.	6.2 l/s	1.3 ltr/s
1 in 100 year	Together with % increace due to Climate Change + Urban Creep - results in no off-site flooding	9.0 l/s	1.9 ltr/s

The Flow Rate or the site has been determing using HR Wallingford's greenfield run off rate calculator and adopting the IH124 Method the Greenfield Runoff (see Appendix 2). The area of this site 6810m² and under the three Storm scenarios, the relevant runoff flow rate may be estimated.

The Site Flow Rates have been modified to reflect the attenuated runoff from the impermeable area of 1430m²: Flow for Attenuated Water = Site Runoff x 1430 / 6810.

SeeSection 5.3 below for detailed calculations.

3.3.5 STANDARD 4: Water Quality

As this is a solely domestic development, no explicit treatment is necessary.

3.3.6 STANDARD 5: Amenity

Due to the size of the site, there is insufficient undeveloped area to consider additional amenity through the use of raingardens, storage ponds, etc. The site is very rural so there would be very limited requirement for such amenities.

3.3.7 STANDARD 6: Biodiversity

Due to the surface water strategy causing the water to discharge directly to an existing watercourse there is no opportunity to increase biodiversity.

3.3.8 STANDARD 7: Design of Drainage for Construction, Operation, Maintenance, Decommissioning and Structural Integrity

Maintenance of the system by the homeowner will comprise an inspection of the system every 6 months. If required then the following should take place removing sediment, decanting of oils & hydrocarbons, channel jetting. Any sediment build-up will require suction removal.

3.3.9 General Binding Rules Checklist

A treatment plant will discharge treated effluent from the site through a buried pipe into the watercourse at OS Grid Ref SK8731248146 and therefore the site would have to comply with the *General Binding Rules* in order to avoid a specific Permit from the Environment Agency.

The following checklist summarises the compliance.

An 'X' indicates that the General Binding Rule is to be applied, a 'YES' indicates compliance, a 'NO' would mean that we would need apply for an authority approval:

No.	Discharges to Surface Water	Discharges to Ground	General Binding Rule	Compliant?
1		X	The discharge must be 2 cubic metres or less per day in volume.	N/A

No.	Discharges to Surface Water	Discharges to Ground	General Binding Rule	Compliant?
2	X		The discharge must be 5 cubic metres or less per day in volume.	Yes
3	X	X	The sewage must only be domestic.	YES
4	X	X	The discharge must not cause pollution of surface water or groundwater.	YES
5		X	The sewage must receive treatment from a septic tank and infiltration system (drainage field) or a sewage treatment plant and infiltration system.	N/A
6	X		The sewage must receive treatment from a sewage treatment plant.	YES
7		X	The discharge must not be within a groundwater Source Protection Zone 1 or within 50 metres from any well, spring or borehole that is used to supply water for domestic or food production purposes.	N/A
8	X		For discharges in tidal waters, the discharge outlet must be below the mean spring low water mark.	N/A
9	X	X	All works and equipment used for the treatment of sewage effluent and its discharge must comply with the relevant design and manufacturing standards ie the British Standard that was in force at the time of the installation, and guidance issued by the appropriate authority on the capacity and installation of the equipment.	YES
10	X	X	The system must be installed and operated in accordance with the manufacturer's specification.	CLIENT TO NOTE
11	X	X	Maintenance must be undertaken by someone who is competent.	CLIENT TO NOTE
12	X	X	Waste sludge from the system must be safely disposed of by an authorised person.	CLIENT TO NOTE
13	X	X	If a property is sold, the operator must give the new operator a written notice stating that a small sewage discharge is being carried out, and giving a description of the waste water system and its maintenance requirements.	CLIENT TO NOTE
14	X	X	The operator must ensure the system is appropriately decommissioned where it ceases to be in operation so that there is no risk of pollutants or polluting matter entering groundwater, inland fresh waters or coastal waters.	CLIENT TO NOTE

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No.	Discharges to Surface Water	Discharges to Ground	General Binding Rule	Compliant?
15	X	X	New discharges must not be within 30 metres of a public foul sewer.	YES
16	X	X	For new discharges, the operator must ensure that the necessary planning and building control approvals for the treatment system are in place.	CLIENT TO NOTE
17	X		New discharges must not in or within: 500 metres of a Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site, biological Site of Special Scientific Interest (SSSI), freshwater pearl mussel population, designated bathing water, or protected shellfish water, 200 metres of an aquatic local nature reserve, 50 metres of a chalk river or aquatic local wildlife site.	YES
18		X	New discharges must not be in, or within 50 metres of, a Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site, or biological Site of Special Scientific Interest (SSSI), and must not be in an Ancient Woodland.	N/A
19	X		New discharges must be made to a watercourse that normally has flow throughout the year.	YES
20	X		For new discharges, any partial drainage field must be installed within 10 metres of the bank side of the watercourse.	N/A
21	X		New discharges must not be made to an enclosed lake or pond.	YES
22	X	X	A new discharge shall not use the same outlet as any other discharge if the combined volume of those discharges would exceed the volumetric general binding rules thresholds for groundwater or surface water.	YES
23	X	X	A new discharge shall not be made to a discharge point within 50 metres of any other exempt groundwater activity or water discharge activity.	YES

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4 POTENTIAL OPTIONS

4.1 Foul Option 1: Pumping to Existing Foul Water Drain on Brandon Road

The existing main drain on Brandon Road is unreachable from the site by gravity alone other than by installing a new rising main or pumped main from from the site along Doddington Lane and Brandon Road. This approach will require either a Pump Station on the site or a Lift Station in the centre of the Village . This approach would need to be agreed with the Local Authority to understand their acceptability and their technical conditions. To be commerically viable, this option is considered too small unless the site is expanded and/or the properties on Doddington Lane can be added to the scheme.

An area of 4m x 4m would be required within the Development for an underground Pump Station.

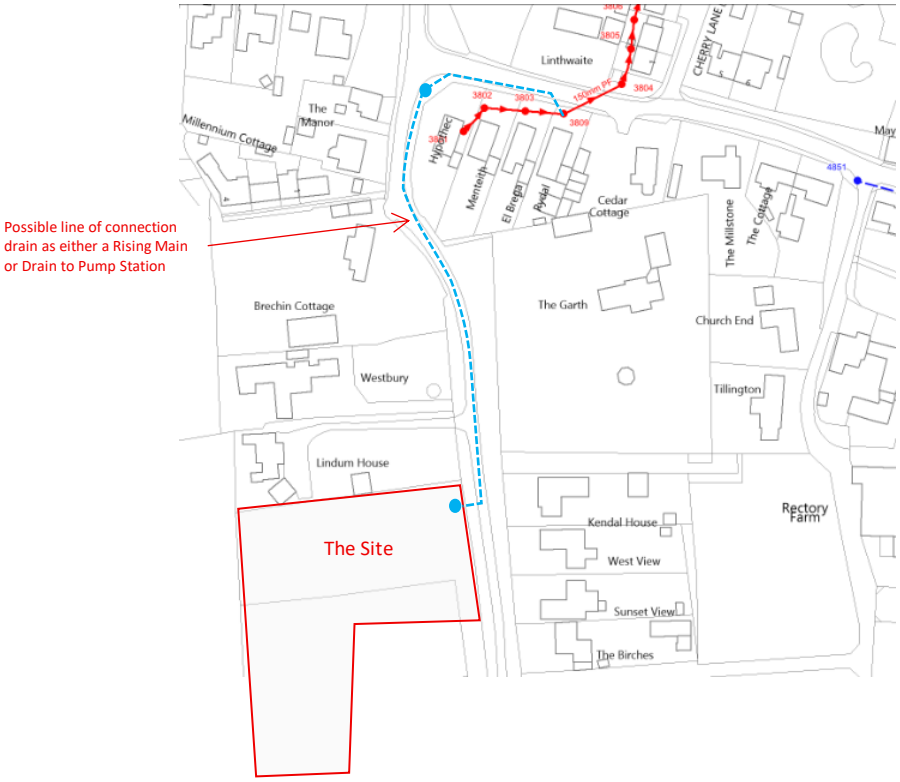

Figure 4 - Existing FW Services (from AWA) and Line of Connecting Drain

4.1.1 Foul Option 2: On-site Sewage Treatment Plant (STP)

A common approach would be to install an STP on the site to serve all of the dwellings, and the STP would discharge to an existing natural watercourse.

An area of 4m x 4m would be required within the Development for an underground STP.

An STP will serve these 4 dwellings only as the limit to discharge to surface water is 5m³/day without an additional Environmental Permit.

The STP would be a package unit and may be bought from a range of suppliers in the UK, either 'to-order' or off-the-shelf.

4.1.2 Storm Option 1: Soakaway or Drainage Field

As previously discussed the ground has been found not to support either a soakawy or a drainage field, so this is not a technically viable option.

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4.1.3 Storm Option 2: Discharge into existing Water Course

- **Discharge to Watercourse**

  This would be a gravity pipe from the STP into a normally flowing water course. The ditch running alongside Doddington Lane is not a substantiable 'normally wet' water course, so we would propose to discharge into the nearest normally wet watercourse, being the stream at the bottom of Doddington Lane.

  The discharge pipe would run along the side of the adjacent fields subject to the approval of the owners of the land, which has been agreed in principle.

  The pipe would be approx 520m long and would run under gravity down an approx. 4m change in elevation. The discharge point in the stream would require a headwall at the lower end.

  The concern that we would ordinarily have would be the low level of flow from the STP, only 4.5m^3/day as a maximum.

  The discharge of runoff water may be run directly into a not normally wet water course: ie the ditch adjacent to Doddington Lane as this is currently draining the site. However, the effluent from an STP cannot flow into this so we are proposing to discharge the runoff water into this into a pipe so that it is shared with the effluent discharge.

- **Attenuation Tank(s)**

  Using a combination of an Attenuation Tank under the road and available freeboard to a pond on the site, we are proposing a design that holds back the immediate runoff from impermeable surfaces such that the outflow from the site for this water.

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5 CALCULATIONS

5.1 Determination of Water Volumes from Foul Water

A single dwelling with more than three bedrooms, an additional one person is added per bedroom above the minimum single house value of 5P.

Design inflows will therefore be as follows:

Four bedroom house Nr Occupants, P = 5 + 1 =	6 People
The flow for a standard residential domestic dwelling, V_p =	150 litres / person / day
Maximum volume of effluent to be discharged per day, $V_1 = P \times V_p = 6 \times 150$ =	0.9m³ /day / House
Maximum Nr Houses, H =	5 Houses
Maximum volume of effluent to be discharged per day, $V_{max} = 0.9 \times 5$ =	**4.5m³/day**

PROVIDE PROPRIETRY STP DRAINING INTO NEW DISCHARGE PIPE TO WATER COURSE.

5.2 Determination of Water Volumes from Surface Water

5.2.1 Determination of Greenfield Runoff

Using the HR Wallingord Greenfield runo rate estimation tool results in the following:

Results

Method	IH124	
Flow rate 1 year (l/s)	2.2	l/s
Flow rate 2 year (l/s)	2.3	l/s
Flow rate 10 years (l/s)	4.2	l/s
Flow rate 30 years (l/s)	6.2	l/s
Flow rate 100 years (l/s)	9.0	l/s
Flow rate 200 years (l/s)	10.7	l/s

5.3 Preliminary Stormwater Attenuation Tank Sizing

Site Specific Properties:

Impermeable Area =	4 x 210 + 2 x 71 x 2 59 x 330 =	1430 m³
Additional in-line Storage available = ignored =		0 m³
Country =	England or Scotland	

Design Parameters:

Inflow Routing Coefficient =	1
Run-off Coefficient =	0.83
Constant Outflow Rate, QBAR =	2.5 l/s
Exceedance Level – CL of Hydro brake Chamber/Access Road LVL =	29.37 m
Max Outlet Invert – Outlet into Water Course =	22.90 m
Distance from Hydro brake Chamber to Outlet to Water Course =	520 m

5.3.1 Case 1 : Design Storm Properties: 10yr

Specified Return Period =	10 years
Specified Duration =	ALL mins
M5-60 Rainfall =	20 mm
Rainfall Ratio =	0.42
Total M10-60 Rainfall =	19.9 mm
Greenfield runoff flow rate = 4.2 / 6810 x 1430 =	0.9 ltr/s

Stormwater Storage Design:

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Critical Storm Duration =	120 mins	
Total Inflow =	34.2 m^3	
Total Outflow =	6.6 m^3	
Volume of Storage Required =	**27.7 m^3**	

Size of Attentuation Tank using Clean Hardcore Subbase below On-Site Road

Area of subbase under road not more than 0.90 x 330 = 297 m^2, ≈	300 m^2	
Depth of harcore below lowest point =	0.35 m	
Void Ratio of Subbase =	30%	
Volume of Attenuation Tank Provided = 300 x 0.35 x 30% =	**31.5 m^3**	-- OK
Time taken to half empty =	4 hrs and 16 mins	-- OK

5.3.2 Case 2: Design Storm Properties: 30yr

Specified Return Period =	30 years	
Specified Duration =	ALL mins	
M5-60 Rainfall =	20 mm	
Rainfall Ratio =	0.42	
Total M30-120 Rainfall =	30.6 mm	
Greenfield runoff flow rate = 4.2 / 6810 x 1430 =	0.9 ltr/s	

Stormwater Storage Design:

Critical Storm Duration =	120 mins	
Total Inflow =	43.8 m^3	
Total Inflow due to Climate Change + Urban Creep = 40% x 43.8 =	17.5m^3	
Total Inflow =	61.3 m^3	
Total Outflow =	9.4 m^3	
Volume of Storage Required =	**51.9 m^3**	

Size of Attentuation Tank

Area of subbase under road not more than 0.90 x 330 = 297 m^2, ≈	300 m^2	
Depth of harcore below lowest point =	0.35 m	
Void Ratio of Subbase =	30%	
Volume of Attenuation Tank Provided = 300 x 0.35 x 30% =	**31.5 m^3**	-- Considered OK
Additional Volume required = 51.9 - 31.5 =	20.4 m^3	
Provide Catchment Pond of Min Area 25 x 3.5 =	87.5 m^2	
Required Freeboard = 43.7 / 87.5 =	0.23 m	
Freeboard provided =	0.5 m	-- OK

5.3.3 Case 3: Design Storm Properties: 100yr + Climate Change & Urban Creep

Specified Return Period =	100 years	
Specified Duration =	ALL mins	
M5-60 Rainfall =	20 mm	
Rainfall Ratio =	0.42	
Total M100-120 Rainfall =	40.3 mm	
Greenfield runoff flow rate = Same as Case 2 =	1.3ltr/s	

Stormwater Storage Design:

Critical Storm Duration =	120 mins	
Total Inflow due to 100yr Storm =	67.1 m^3	
Total Inflow due to Climate Change + Urban Creep = 40% x 67.1 =	26.8 m^3	
Total Inflow =	93.9 m^3	
Total Outflow =	18.7 m^3	
Volume of Storage Required =	**75.2 m^3**	
Capacity of Attentuation Tank =	31.5 m^3	
Additional Volume required = 75.2 - 31.5 =	43.7 m^3	
Provide Catchment Pond of Min Area 25 x 3.5 =	87.5 m^2	

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Required Freeboard =	43.7 / 87.5 =	0.5 m < 0.5 m	-- OK

PROPOSE MIN OF 350mm HARDCORE WITH MIN VOID RATIO OF 30% DETAILED AS AN ATTENUATION TANK OF 300m^2, DRAINING INTO TWO DISCHARGE PIPES:

PIPE 1: @ LEVEL +28.50m WITH MAX FLOW OF 1.0 l/s DRAINING INTO NEW DRAIN TO WATER COURSE.

PIPE 2: @ LEVEL 29.05m DRAINING INTO POND MIN 87.5m^2 POND WITH FREEBOARD OF 500mm, DRAINING AT LEVEL OF 28.60m WITH MAX FLOW OF 0.3l/s DRAINING INTO NEW DRAIN TO WATER COURSE.

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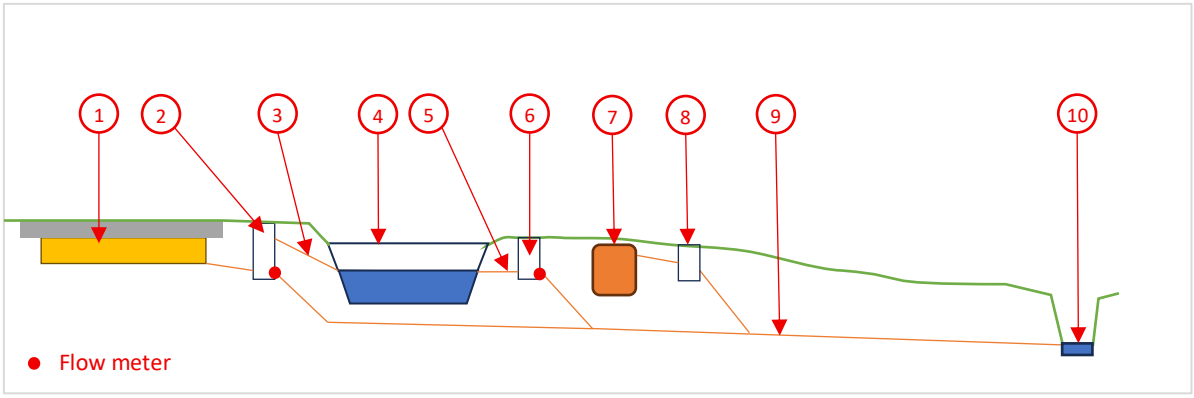
6 RECOMMENDED STRATEGY

The strategy that we are therefore proposing is Scenario 1 as defined below:

Surface Water	Foul Water
Attenuate Immedaite runoff on site using both an Attenuation Tank and freeboard in an Attenuation Pond / Basin and discharge into shared pipe running parallel to Doddington Lane down to an existing normally wet water course 520m away.	Provide STP on site and discharge effluent into discharge into pipe running parallel to Doddington Lane down to an existing normally wet water course 520m away.



Key

Item	Description
1	300m² x 3m x 0.3m deep permeable granular Attentuation Tank with bottom level at +28.50m under road with top level above +29.20m
2	Chamber with outflow into Discharge Pipe limited to 1.0 l/s at +28.30m and, outflow into Pond at +28.85m
3	Outflow into Pond between +28.85m and +28.50m
4	Pond / Basin with highest natural water level at +28.40m and minimum freeboard of 0.50m
5	Outflow at +28.40m
6	Chamber with outflow into Discharge Pipe limited to +0.3 l/s at +28.30m
7	On-Site STP discharging Effluent into Discharge Pipe
8	Effluent Sampling Chamber
9	Discharge Pipe (Approx. 520m long) in fields parallel to Doddington Lane
10	Outfall into current normally wet Water Course at Approx. +21.00m

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	Reference: **DS**	Date : **04-Aug-26**

7 APPENDIX 1 - INFILTRATION TEST REPORT

Our Ref: 0088/G
Your Ref: Doddington Lane, Stubton
Date: 4th May 2026

Humberside Materials Laboratory LTD
Atherton Way, Brigg
North Lincs DN20 8AR
Tel & fax 01652 652753
Email: info@humbersidematerialslab.co.uk

York Sills Ltd
5 Checkpoint Court
Lincoln
LN6 3PW

Dear Andrew Turner
Doddington Lane, Stubton

Further to your instruction a site investigation has been commissioned at a proposed residential development off Doddington Lane, Stubton. The site investigation on 30th April 2026 included two trial pits utilised for BRE365 digest soakaway testing. Test locations were selected by you and positioned on site by Humberside Materials Laboratory (HML) technician. Test locations are indicated on the plan within figure 1 below.

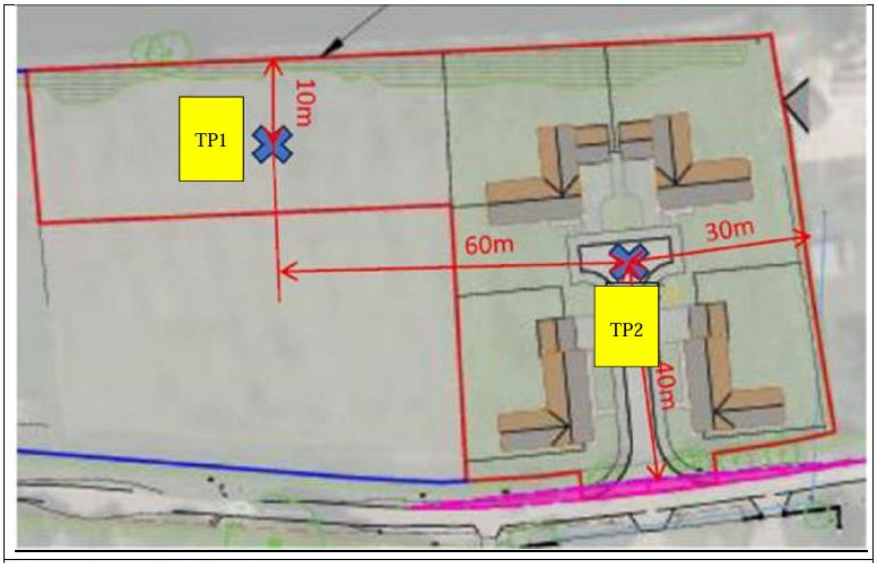

Figure 1: Trial pit locations

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	Reference: **DS**	Date : **04-Aug-26**

Trial pits

Trial pits were excavated utilising a wheeled excavator. Encountered strata was logged on site as the trial pit advanced. Encountered strata is summarised below within table 1. Photographs are enclosed.

Table 1: Summary of revealed ground conditions

Strata descriptions	*Exploratory hole*	
	TP1	**TP2**
	Depth to base of stratum (m bgl)	
Brown sandy, clayey TOPSOIL with occasional rootlets	0.32	0.26
Firm brown sandy CLAY with very occasional fine to medium gravels of limestone	0.90	1.05
Firm to stiff brown, grey brown and light grey mottled silty CLAY	1.80	1.85
Firm grey brown and brown slightly sandy silty CLAY with occasional fine to course laminated mudstone		2.00
Grey brown and brown slightly sandy, clayey medium to course laminated gravels of mudstone	1.85	2.05
Notes: TP1 – dry on completion, base of pit appeared very moist TP2 – dry on completion, base of pit appeared very moist		

Soakaway testing

Soakaway testing was completed as per guidance within BRE Digest 365.

Trial pit 1 (TP1) was excavated to 1.85m below ground level (bgl) with a width of 0.45m and a length of 1.30m. Water was added to the pit and monitored against time elapsed. An initial water level after filling was recorded at 1.45m bgl, the water level was monitored for 120 minutes with an end water level recorded at 1.41m bgl. With a slight rise in water levels recorded and no noted infiltration during the pits monitored period, testing was ceased and this location deemed unsuitable for soakaways.

Trial pit 2 (TP2) was excavated to 2.05m below ground level (bgl) with a width of 0.45m and a length of 1.20m. Water was added to the pit and monitored against time elapsed. An initial water level after filling was recorded at 1.40m bgl, the water level was monitored for 120 minutes with an end water level recorded at 1.38m bgl. With a slight rise in water levels recorded and no noted infiltration during the pits monitored period, testing was ceased and this location deemed unsuitable for soakaways.

YORKSHIRE CIVIL & STRUCTURAL CONSULTING ENGINEERS	Prepared : **ACT** Checked : Approved :	Job ref : **7954** Sheet : **18 – 20** Rev No: **A**
	Reference: **DS**	Date : **04-Aug-26**

Summary

Encountered strata appears typical for the local area with available geology mapping showing no superficial deposits at the site, nearby superficial deposits of Head (clay, silt, sand and gravel). Shallow bedrock deposits for the site could be changeable with Beckingham Member (mudstone and interbedded limestone) and Stubton limestone beds shown. Logged soils onsite could be typical to a weathered Beckingham Member bedrock stratum. Both trial pits remained stable during excavations and during test periods.

No infiltration was witness in both soakaway test pits (TP1 and TP2). No infiltration was witness over there monitored periods with a slight rise in water level noted, this may have been due to the noted very moist soil at the base of each pit. This site could be deemed as unsuitable for the inclusion of soakaways.

If you require any further information, please contact the laboratory.

Yours Sincerely

Daniel Driver

D. Driver *Director*

YORK SILLS CIVIL & STRUCTURAL CONSULTING ENGINEERS	Prepared : **ACT** Checked : Approved :	Job ref : **7954** Sheet : **19 – 20** Rev No: **A**
	Reference: **DS**	Date : **04-Aug-26**

8 APPENDIX 2 - GREENFIELD RUNOFF ESTIMATION

Greenfield runoff rate estimation tool

hrwallingford www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

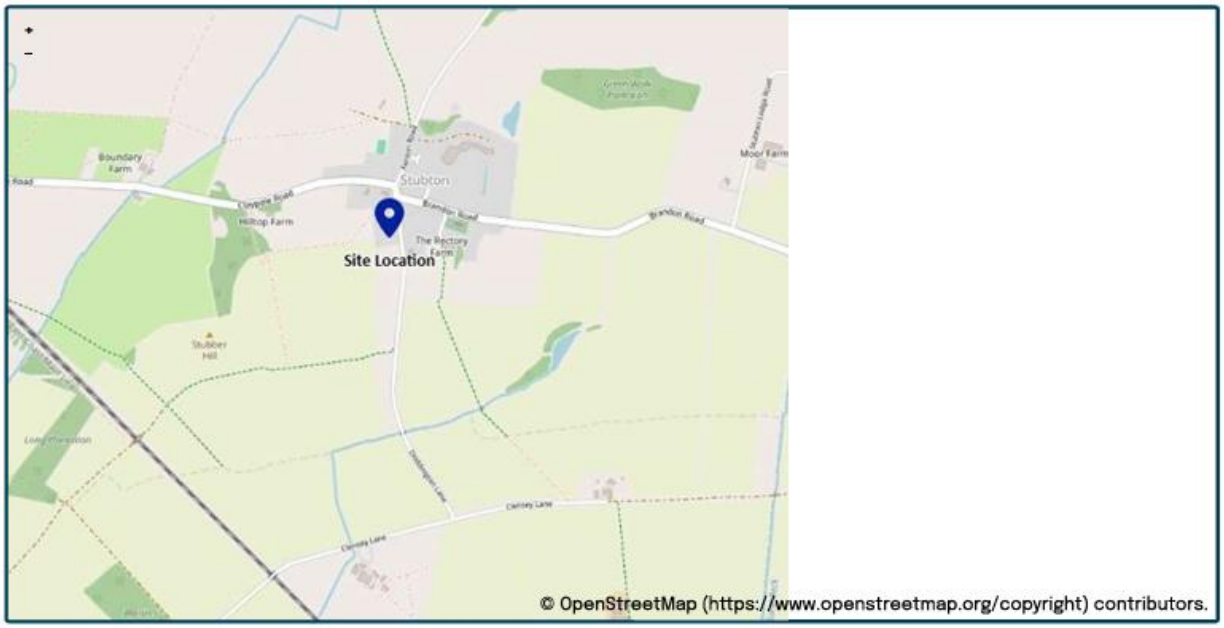
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	22/05/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	
Site location	



Site easting (British National Grid)	487269
Site northing (British National Grid)	348683

YORK SILLS CIVIL & STRUCTURAL CONSULTING ENGINEERS	Prepared : **ACT** Checked : Approved :	Job ref : **7954** Sheet : **20 – 20** Rev No: **A**
	Reference: **DS**	Date : **04-Aug-26**

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	561 mm	⬭	561
How should SPR be derived?	WRAP soil type		
WRAP soil type	4	⬭	4
SPR	0.47		
QBar (IH124) (l/s)	2.5 l/s		

Growth curve factors

	My value		Map value
Hydrological region	5	⬭	5
1 year growth factor	0.87		
2 year growth factor	0.89		
10 year growth factor	1.65		
30 year growth factor	2.45		
100 year growth factor	3.56		
200 year growth factor	4.21		

Results

Method	IH124
Flow rate 1 year (l/s)	2.2 l/s
Flow rate 2 year (l/s)	2.3 l/s
Flow rate 10 years (l/s)	4.2 l/s
Flow rate 30 years (l/s)	6.2 l/s
Flow rate 100 years (l/s)	9.0 l/s
Flow rate 200 years (l/s)	10.7 l/s